

ROMANIA

Reimbursable Advisory Services Agreement on the Bucharest Urban Development Program (P169577)

COMPONENT 1. ELABORATION OF BUCHAREST'S IUDS, CAPITAL INVESTMENT PLANNING AND MANAGEMENT

Output 3. Urban context and identification of key local issues and needs, and visions and objectives of IUDS and Identification of a long list of projects.

A. Rapid assessment of the current situation

Section 10. Territorial diagnosis

March 2021



DISCLAIMER

This report is a product of the International Bank for Reconstruction and Development/the World Bank. The findings, interpretations and conclusions expressed in this paper do not necessarily reflect the views of the Executive Directors of the World Bank or the governments they represent. The World Bank does not guarantee the accuracy of the data included in this work.

This report does not necessarily represent the position of the European Union or the Romanian Government.

COPYRIGHT STATEMENT

The material in this publication is copyrighted. Copying and/or transmitting portions of this work without permission may be a violation of applicable laws.

For permission to photocopy or reprint any part of this work, please send a request with the complete information to either: (i) the Municipality of Bucharest (Bd. Regina Elisabeta 47, Bucharest, Romania); or (ii) the World Bank Group Romania (Str. Vasile Lascăr 31, et. 6, Sector 2, Bucharest, Romania).

This report was delivered in March 2021 under the Reimbursable Advisory Services Agreement on the Bucharest Urban Development Program, concluded between the Municipality of Bucharest and the International Bank for Reconstruction and Development on March 4, 2019. It is part of Output 3 under the above-mentioned agreement – Urban context and identification of key local issues and needs, and visions and objectives of IUDS and Identification of a long list of projects – under Component 1, which refers to the elaboration of Bucharest's Integrated Urban Development Strategy, Capital Investment Planning and Management.

ACKNOWLEDGEMENTS

This report has been delivered under the provisions of the Reimbursable Advisory Services Agreement on the Bucharest Urban Development Program and has been prepared under the guidance and supervision of Christoph Pusch (Practice Manager, Social, Urban, Rural and Resilience for Europe and Central Asia) and Tatiana Proskuryakova (Country Manager, Romania and Hungary). The report has been prepared by a team under the coordination of Dean Cira (Lead Urban Specialist) and composed of Sorina Racoviceanu (Lead Urban Development Specialist), Andreea China (Senior Urban Development Specialist), Marius Cristea (Senior Urban Development Specialist), Marcel Ionescu-Heroiu (Senior Urban Development Specialist), Carli Venter (Senior Urban Development Specialist), Oana Franț (Operations Specialist), Bianca Butacu (Analyst), Adina Vințan (Operations Specialist), Ioana Irimia (Communications Specialist) and George Moldoveanu (Information Assistant).

The team would like to express its gratitude for the excellent cooperation, guidance, and timely feedback provided by the representatives of the Municipality of Bucharest, especially Mr. Nicușor Dan, Mr. Sorin Chiriță, Mr. Cătălin Zoican, Ms. Adriana Duțu, Ms. Luminița Glodea, and by the many other local and regional partners that have contributed to the elaboration of this report.

ABBREVIATIONS AND ACRONYMS

ALU	Active Local Units
AROPE	A composite indicator adopted at European Union level
BPO	Business Processes Outsourcing
CBD	Central Business District
CEE	Central and Eastern Europe
CFR	Romanian Railways
CLLD	Community-led local development
COR	Romanian Classification of Occupations
DGASMB	Bucharest General Directorate for Social Assistance
DGASPC	and the Bucharest General Directorate for Social Assistance
DGASPC	General Directorates for Social Assistance and Child Protection
EEC	European Economic Community
EU	European Union
EUROSTAT	Statistical office of the European Union.
FDI	Foreign Direct Investment
FUA	Functional Urban Area
GDP	Gross Domestic product
GTMP	General Transport Master Plan
GVA	gross value added
HORECA	Hotel/Restaurant/Catering
ICT	Information Communication and Technology
IT	Information Technology
IT&C	Information Technology and Communication
IUDS	Integrated Sustainable Urban Development Strategy
LAG	Local Action Group
MRDPA	Ministry of Regional Development and Public Administration
NACE	Nomenclature Statistique des Activités Économiques dans la Communauté Européenne
NBR	National Bank of Romania
NGO	Non-Governmental Organization
NIS	National Institute of Statistics
NTRO	National Trade Register Office
NUTS	The common classification of territorial units for statistics
PHC	Primary Health Care
RDI	Research, Development, Innovation
ROP	Regional Operational Programme
SME	small medium enterprises
TEN-T	Trans-European Transport Network
UMA	Urban Marginalized Areas
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNICEF	United Nations Children's Fund

TABLE OF CONTENTS

1.	TERRITORIAL CONTEXT	1
2.	DEVELOPMENT PROBLEMS/NEEDS AND TRENDS	7
2.1.	SOCIO-DEMOGRAPHIC PROFILE	8
2.1.1.	DEMOGRAPHIC STRUCTURE AND EVOLUTION	8
2.1.2.	LOCAL DEVELOPMENT AND COMMUNITIES	11
2.2.	ECONOMY	15
2.2.1.	ECONOMIC PROFILE	15
2.2.2.	WORKFORCE	19
2.2.3.	FOREIGN DIRECT INVESTMENTS AND FOREIGN TRADE	22
2.2.4.	RESEARCH, DEVELOPMENT AND INNOVATION	25
2.3.	SPATIAL AND FUNCTIONAL PROFILE	28
2.3.1.	HOUSING	28
2.3.2.	REAL ESTATE MARKET	32
2.3.3.	PUBLIC SPACES	37
2.3.4.	BUILT HERITAGE	41
2.4.	MOBILITY	45
2.4.1.	ACCESSIBILITY BY ROAD	45
2.4.2.	RAIL AND AIR ACCESSIBILITY	49
2.4.3.	PUBLIC TRANSPORT	52
2.4.4.	ENVIRONMENTALLY-FRIENDLY TRANSPORT	56
2.4.5.	TRAFFIC MANAGEMENT	59
2.5.	PUBLIC UTILITIES	62
2.5.1.	DRINKING WATER SUPPLY INFRASTRUCTURE AND SERVICES	62
2.5.2.	SEWERAGE AND WASTEWATER TREATMENT INFRASTRUCTURE AND SYSTEMS	65
2.5.3.	ELECTRICITY	69
2.5.4.	THERMAL ENERGY	72
2.5.5.	PUBLIC LIGHTING AND TELECOMMUNICATIONS	75
2.5.6.	WASTE MANAGEMENT	78
2.6.	PUBLIC SERVICES	82
2.6.1.	EDUCATION INFRASTRUCTURE AND SERVICES	82
2.6.2.	HEALTHCARE INFRASTRUCTURE AND SERVICES	87
2.6.3.	INFRASTRUCTURE AND SOCIAL SERVICES	91
2.6.4.	CULTURAL INFRASTRUCTURE, ACTIVITIES, EVENTS AND SERVICES	94
2.6.5.	SPORTS AND LEISURE INFRASTRUCTURE, ACTIVITIES, EVENTS AND SERVICES	98
2.6.6.	EMERGENCY RESPONSE AND PUBLIC SAFETY SERVICES	101
2.7.	ENVIRONMENT, CLIMATE CHANGE AND RISKS	104
2.7.1.	NATURAL CAPITAL AND GREEN/BLUE INFRASTRUCTURE	104

2.7.2.	ENVIRONMENTAL QUALITY FACTORS AND (WATER, AIR, SOIL, NOISE) POLLUTION	108
2.7.3.	HYDROLOGICAL HAZARDS AND RISKS. FLOODING.....	113
2.7.4.	CLIMATIC HAZARDS AND RISKS.....	116
2.7.5.	SEISMIC RISK	121
2.8.	ADMINISTRATIVE CAPACITY	125
2.8.1.	LOCAL PUBLIC ADMINISTRATION, ASSOCIATIVE STRUCTURES AND COOPERATION	125
2.8.2.	LOCAL BUDGET AND HUMAN RESOURCES, COMPUTERIZATION AND LOGISTICS.....	130
3.	DESCRIPTION OF THE ADVISORY PROCESS	135
4.	INTEGRATED SWOT ANALYSIS	137

LIST OF FIGURES

Figure 1.	Bucharest City functional urban area	1
Figure 2.	Main TEN-T network corridors	2
Figure 3.	GTMP implementing stage, 2020	3
Figure 4.	The number of available seats in 2018 (by destination) for direct flights from “Henri Coandă” International Airport.....	4
Figure 5.	Net yields for prime assets in European cities, 2018.....	5
Figure 6.	Office space market for Bucharest, Warsaw, Prague, Sofia and Budapest	6
Figure 7.	Evolution of the number of domiciled inhabitants, by sectors, between 2000 and 2018	8
Figure 8.	Age pyramid of the resident population in the Bucharest-Ilfov region in 2019	9
Figure 9.	Marginalized urban areas	11
Figure 10.	People at risk of poverty or social exclusion (%) at national and regional level, between 2007 and 2018	13
Figure 11.	Distribution of the turnover, employees at sector level; direct foreign investments at Bucharest level, 2018.....	15
Figure 12.	Evolution of the main economic indicators (absolute values).....	16
Figure 13.	Distribution by territory and by main economic activities for Bucharest City employees, 2018	19
Figure 14.	Bucharest City active population, by gender, between 2007-2018, thousand people	20
Figure 15.	Top 10 companies in terms of foreign equity ownership and top 10 foreign investors.....	22
Figure 16.	Dynamics of exports and imports for Bucharest City between 2011-2019, thousand EUR	23
Figure 17.	Bucharest RDI infrastructures.....	25
Figure 18.	City development evolution	28
Figure 19.	Privately funded dwellings completed at the end of the year	30
Figure 20.	Distribution of dwellings built after 2000 and of those with units available for sale; distribution of land buildings; land reserves	32
Figure 21.	Distribution of local and representative public spaces.....	37
Figure 22.	Spatial distribution of monuments in LHM 2015 and protected plots	41
Figure 23.	State of the architectural monuments in Bucharest City, in absolute numbers	42
Figure 24.	Bucharest major road traffic infrastructure	45
Figure 25.	Bucharest railway network	49
Figure 26.	Total number of passengers (mill.) who transited through the airports in South-East Europe between 2010 and 2019	50
Figure 27.	Public transport infrastructure - public urban transport stops	52
Figure 28.	Infrastructure for pedestrians, bicycles and non-polluting motorized transport.....	56
Figure 29.	Traffic and parking system congestion	59
Figure 30.	Localization of complaints regarding the drinking water and of the areas not served by the water supply network	62
Figure 31.	Areas not served by the sewerage network	65
Figure 32.	Power transmission and distribution networks.....	69
Figure 33.	Dynamics of the electricity consumption in Bucharest City, between 2010 and 2018	70
Figure 34.	Heating network	72

Figure 35. Telecommunication network.....	75
Figure 36. Waste management system	78
Figure 37. The composition of domestic (and similar) waste – 2017	79
Figure 38. School and university network coverage.....	82
Figure 39. Evolution of student numbers in Bucharest City in 2014-2018	83
Figure 40. Specialized medical services (hospitals and clinics)	87
Figure 41. Distribution of bed numbers in Bucharest City hospitals, according to ownership and affiliation, 31 December 2018	88
Figure 42. Social services for the elderly and home healthcare services, as well as cultural centers with senior clubs, in Bucharest, in 2019	91
Figure 43. Spatial distribution of cultural infrastructure	94
Figure 44. Evolution of cultural consumption in Bucharest	95
Figure 45. Territorial distribution of main sports facilities	98
Figure 46. Territorial distribution of the structures of the ISU, Police and Police Riot in Bucharest	101
Figure 47. Main indicators of the ISU “Dealul Spirii” activity 2015-2018	102
Figure 48. Areas served by natural and green areas in Bucharest	104
Figure 49. Sources of degradation of the quality of environmental factors and the quality of life in Bucharest	108
Figure 50. Flood areas in case of failure of Morii Lake (located on Dâmbovița River) and Buftea (located on Colentina River) storages.....	113
Figure 51. Residential areas most exposed to temperature risk depending on various vulnerabilities.....	116
Figure 52. Buildings examined and classified for seismic risk I and collective residential units older than 50 years	121
Figure 53. Organizational chart of the Municipality of Bucharest.....	125
Figure 54. - Own revenues and public investments	130
Figure 55. Evolution of revenue to Bucharest local budgets 2012-2018.....	131
Figure 56. Strengths and weaknesses resulting from the questionnaire addressed to the population.....	138
Figure 57. SWOT Analysis	139

1. TERRITORIAL CONTEXT

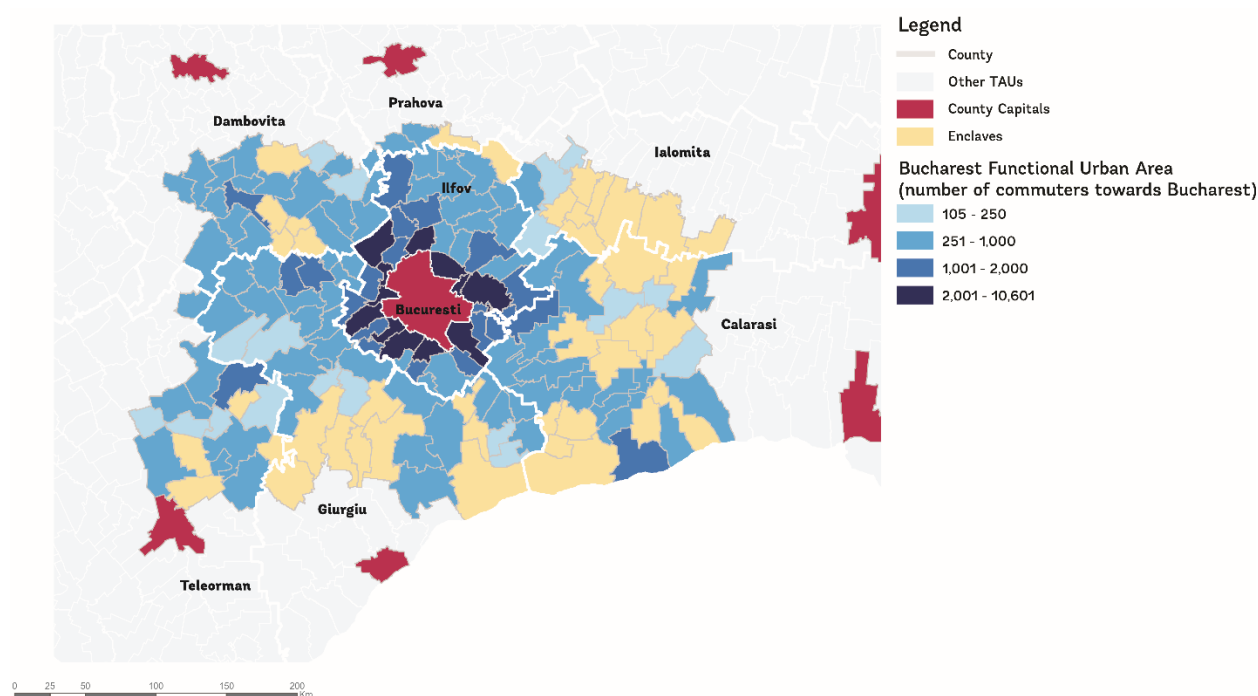
Together with Ilfov County, Bucharest City forms the Bucharest-Ilfov Development Region, one of the most developed regions (NUTS2) at European Union level in terms of the GDP/capita ratio. Even though they are distinct territorial-administrative units, the interdependence relations between Bucharest and Ilfov County are very strong, it is becoming the main area of residential development, logistics, storage and production through the peri-urban communes of the Capital.

Thus, given the lack of land stock in the Capital, most urban space consuming functions which depend on large infrastructure, such as industrial, storage, logistics activities, and the large commercial centers or residential neighborhoods turned to the peri-urban settlements in Ilfov County. Conversely, most jobs and some of the facilities of daily interest are still provided by the Capital.

The problem arising from the territorial relation with Ilfov County is complex, including challenges related to commuting, but also to ensuring environmental spatial continuity, equipping with public utilities and services, mobility, trade and other peri-urban area specific issues. There is also the problem of a metropolitan approach that needs to be addressed, as it is a triggering factor for cooperation initiatives and prospective investments.

However, the relation between Bucharest and its territory of influence goes beyond the limits of the Bucharest-Ilfov Development Region, with its functional urban area (area that comprises localities where at least 15% of the workforce commutes to Bucharest) spreading across the territory of other counties up to the southern border of the country.

Figure 1. Bucharest City functional urban area



Source: World Bank, 2017, Magnet cities

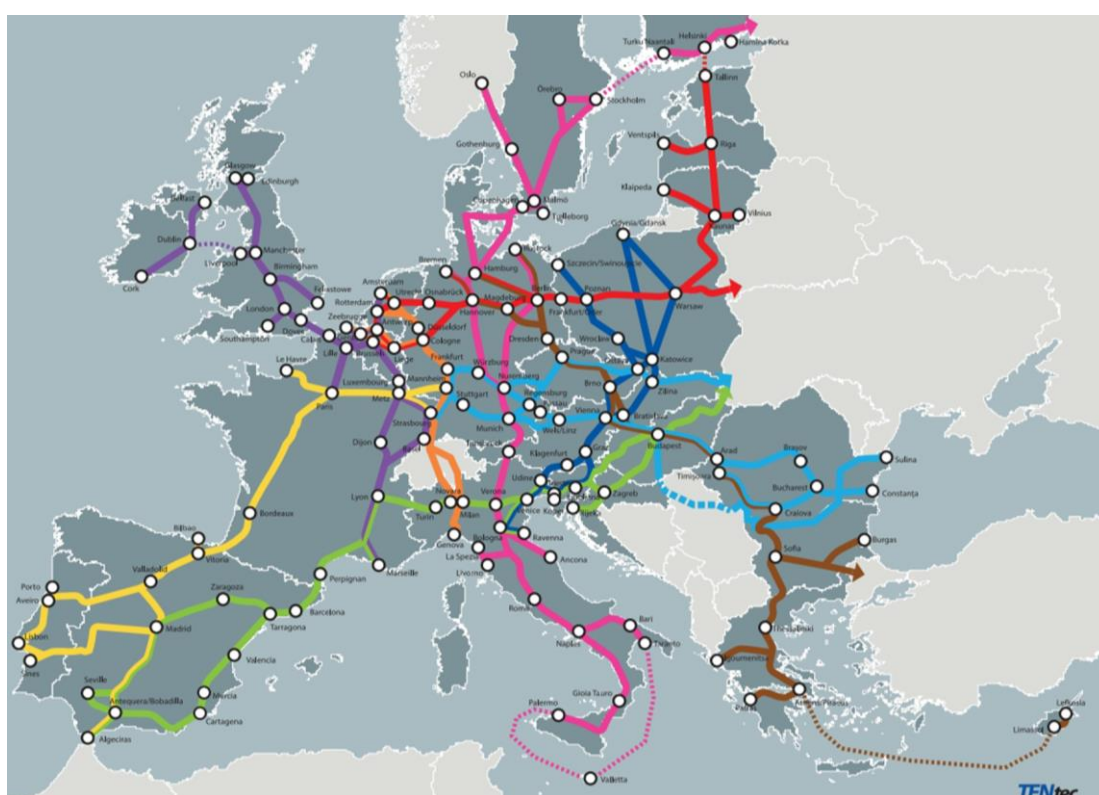
Bucharest-Ilfov Development Region is connected to the other EU Member States through Central and Global TEN-T networks.¹ The main corridor that serves it is Rhine-Danube TEN-T corridor. It provides access to the central-southern area of the Germany (Frankfurt, Nuremberg and Stuttgart) and to the

¹ Central TEN-T network (TEN-T Core) is made up of the main EU transport corridors which should be completed by 2030. Global TEN-T network (TEN-T Comprehensive) is made up of the secondary EU transport corridors and its completion is foreseen in 2050.

Strasbourg city in France. The infrastructure elements part of the Rhine-Danube TEN-T corridor are as it follows.

1. A1 Motorway that connects Bucharest City to Pitești City;
2. A2 Motorway that connects Bucharest City to Constanța City;
3. DN6 that connects Bucharest City to Alexandria City;
4. Bucharest ring road (DNCB);
5. 500/300 railway line that connects the Capital to Ploiești City, and then continuing to Brașov, Cluj-Napoca, Oradea (300) cities or Buzău, Bacău, Suceava (500) cities;
6. 300 railway line that connects the Capital to Craiova and Timișoara cities;
7. 800 railway line that connects the Capital to Constanța city;
8. Danube-Bucharest Canal (project phase);
9. "Henri Coandă" International Airport.

Figure 2. Main TEN-T network corridors



Source: ec.europa.eu, (2019). The Core Network Corridors
https://ec.europa.eu/transport/themes/infrastructure_en

Most of the infrastructure elements that form the Rhine-Danube TEN-T corridors are completed. 900 railway line is still at the feasibility study level and Danube-Bucharest Canal is still a project idea. Only the southern part of the ring road (DNCB) and the southern segments of the A0 were tendered and awarded in early 2019. The road and rail connections to Giurgiu, Ploiești (via A3) and Buzău, Bacău up to Suceava (part of the former TEN-T IX corridor) are also part of the TEN-T Core network (Central or core). Out of these, only the road connection to Ploiești and the rail connection to Brașov were completed. The connections to Giurgiu are poor and half of the 902 rail line is not even functional.

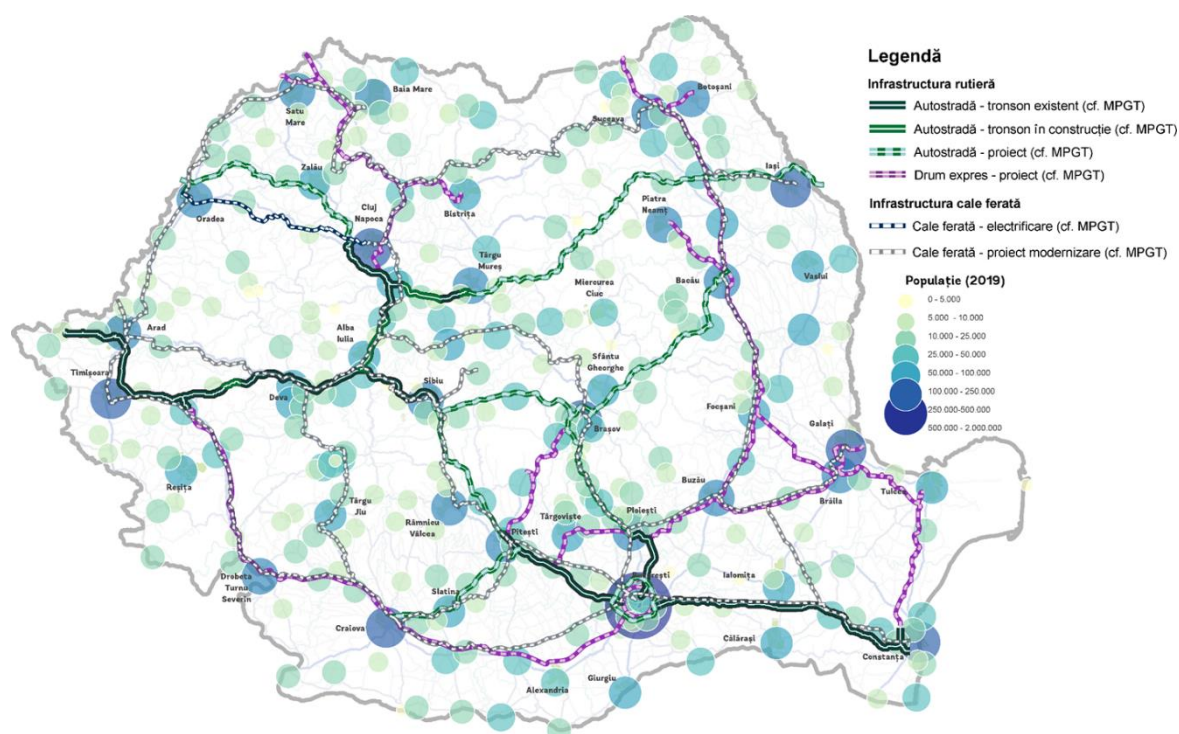
Infrastructure investments in recent years provide a good connectivity at regional level with Ploiești, Pitești and Constanța. However, at national level, the rest of the road and rail infrastructure segments of the Central TEN-T network (including the thematic Rhine-Danube corridor) are still work in progress or a project idea. Therefore, Romania is ranks among the last countries in EU in terms of completing the works related to TEN-T Core rail and road networks. The works on the railway lines and road

infrastructure along the former IV corridor have not been completed and those along IX corridor have not been launched yet. Consequently, even though they benefit from efficient connections at regional level, Ilfov County and Bucharest City are disconnected from the big European metropolises. In this context, Otopeni Airport remains the only easy connection to the rest of Europe.

Through 300 / 500 / 700 / 800 and 900 railway lines Ilfov County and Bucharest City benefit from easy access to urban centers of national interest, such as Constanța, Craiova, Brăila-Galați, Ploiești, Buzău or Brașov. 300 and 800 railway lines are the most important connections for Ilfov County and Bucharest City, as they provide access to 3 growth poles (Brașov, Ploiești, Constanța) in less than 150 minutes, making them one of the most powerful development axes at national level.

901/904, 801 and 902 secondary lines provide access to cities of regional interest, such as Târgoviște, Oltenița or Giurgiu. Due to the railway bridge from Grădiște, which is broken and scrapped, 901 line connection (not electrified) to Giurgiu is interrupted. The connection to Târgoviște and Oltenița is made in less than 90 minutes, which make 901 and 801 lines important routes for commuting.

Figure 3. GTMP implementing stage, 2020



Source: World Bank, 2020

In terms of road infrastructure, Bucharest-Ilfov Development Region is crossed by highways on east-west and center-north directions, providing access to Ploiești, Constanța and Pitești growth poles in 60-200 minutes. However, the poor condition of the Bucharest ring road (especially in the southern part) makes it very difficult to connect the three highways. The connection to the cities located in the south area of the county is made in 60-90 minutes via DN6 to Alexandria, DN5 to Giurgiu or DN4 to Oltenița. The connection to the cities located in the north, north-east and north-west area of the county is made in 60-90 minutes via DN7 to Târgoviște, DN2 to Buzău or DN1 and DN1A to Ploiești. The General Transport Masterplan implementation stage is presented in Figure 3.

As for the air transport infrastructure, “Henri Coandă” International Airport, located in Otopeni and part of the Rhine-Danube TEN-T corridor, represents the main gateway from the West. With 14.7 million passengers in 2019, “Henri Coandă” International Airport only ranks 43rd at European level in terms of the number of passengers (1st position – Heathrow International Airport in London, with 80 million passengers). As compared to 2018, the number of passengers who used “Henri Coandă”

International Airport increased by 6.4% (42 position among the European airports in 2018). With regard to the freight transport, the airport recorded a decrease of 2.3% in 2018-2019.

In the recent years, with the introduction of low-cost flights to the main urban centers in Romania, “Henri Coandă” International Airport has become an important gateway for passengers who come from the main urban centers of the country. There are more than 5 flights daily to Iași, Cluj or Timișoara, in the morning from 06.00 am to 09.00 am, at noon and in the evening, from 17.00. Thus, the low cost of the flight often makes it more favorable to travel by plane than by train, coach or own vehicle.

Figure 4. The number of available seats in 2018 (by destination) for direct flights from “Henri Coandă” International Airport



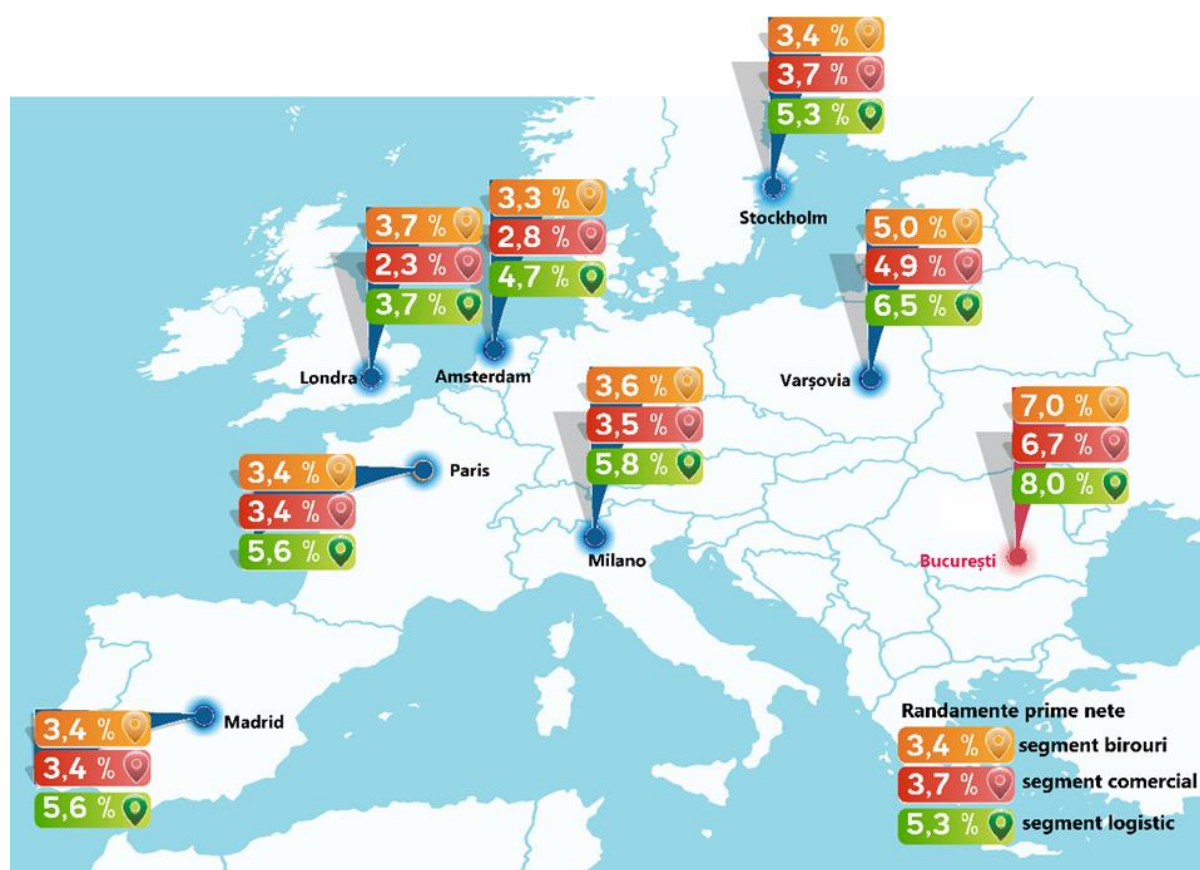
Source: ec.europa.eu, (2016). Yearly seats available (between cities).
http://ec.europa.eu/transport/modes/air/aos/aos_public.html

Băneasa - Aurel Vlaicu Bucharest International Airport is currently closed for commercial passenger flights. In order to re-open for passenger flights, capacity expansion is needed first. In this context, “Henri Coandă” International Airport remains an important gateway for East Europe (Romania, Bulgaria, Ukraine or Republic of Moldova). The Government intends to build an airport in the southern part of the Capital, as a public-private partnership. The airport should be designed with a capacity of 30 million passengers on an area of 600 ha.

The increase of territorial connectivity proves to be interesting in light of the strong economic performance of the entire EEC region - 5 (Romania, Hungary, Czech Republic, Poland, Bulgaria) which gained investors' attention, trading in the area more than EUR 13.1 billion in 2018. Investments increased compared to 2017 and set a new record for another consecutive year; the same trend was manifest in the second half of 2019, exceeding the investment transaction volumes reported for the same period of 2018.

Warsaw, Prague, Budapest and to a lesser extent Bucharest and Sofia show up on the investment radar insofar as investor are looking for bigger yields than those they can obtain in the more mature European markets. Consequently, the steep competition for investment products in the CEE region should still target yields for prime and secondary assets, especially in the office, industrial and logistics sectors.

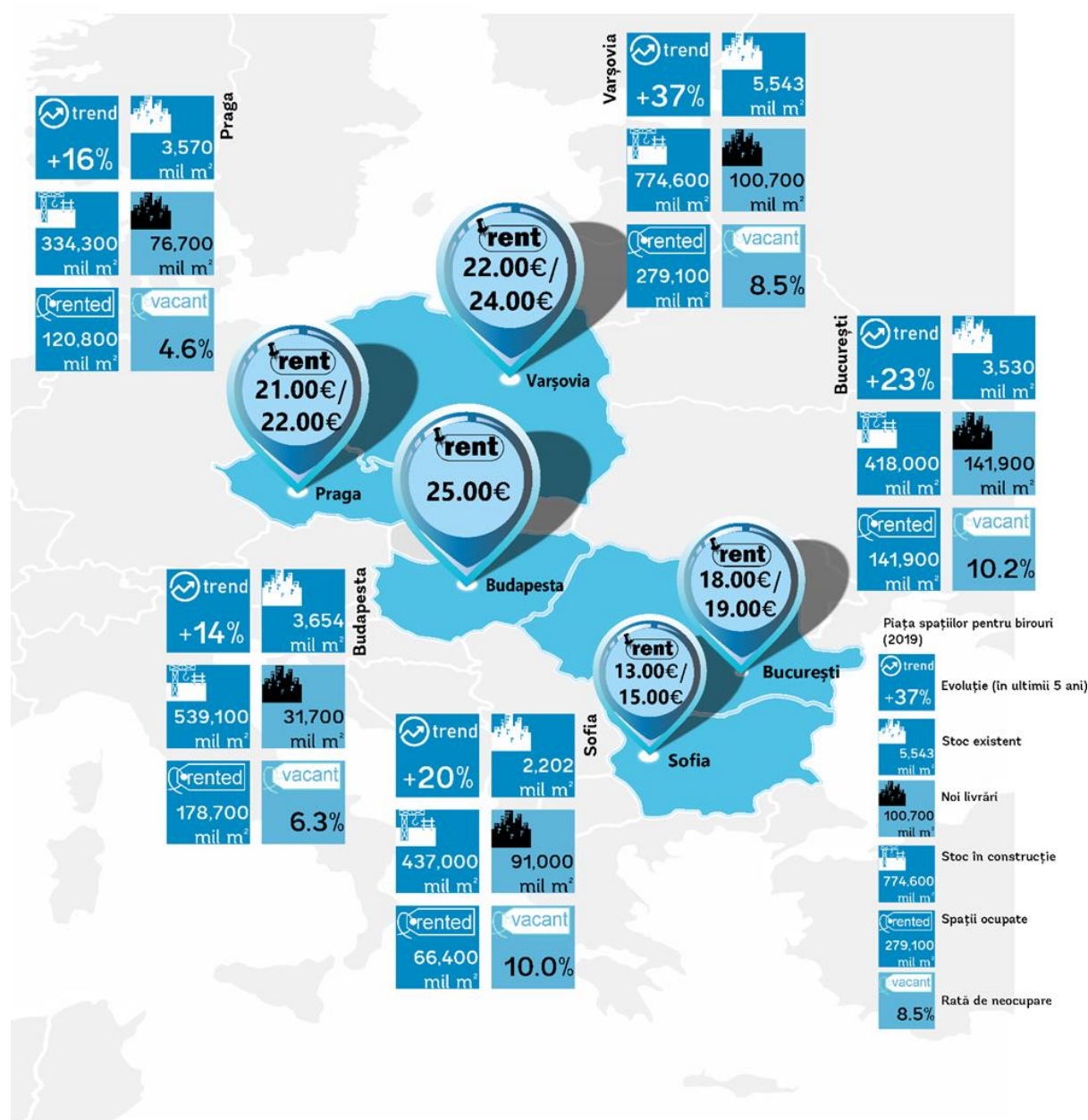
Figure 5. Net yields for prime assets in European cities, 2018



Source: data processed from The Polish Real Estate Guide 2019 edition Poland, The real state of the real estate Report and supplemented with data about Bucharest

In terms of zonal competitiveness, the office space market (as an indicator of investment attractiveness) is still dominated by the three large competitors in the Central and Eastern Europe: Prague, Warsaw and Budapest, which also register a vacancy rate below 8.5%. The highest values for stocks under construction are registered in Warsaw, but Bucharest dominates the new delivery market - exceeding Warsaw by more than 50%, due to the high demand for class A offices from the tertiary sector (especially IT, financial and banking or business services). The same is true for commercial and industrial space market which registers the highest prime yields due to the relocation of manufacturing and logistics companies in the area (looking for stable and qualified workforce) and to the decrease in the unemployment rate in the past 5 years.

Figure 6. Office space market for Bucharest, Warsaw, Prague, Sofia and Budapest



Source: data processed from What's up CEE? All you need to know about real estate in CEE, BNP Parisbas 2019 report and amendments

The upward trend of the indexes relevant for the investment market is manifested in all 5 capital cities selected from the Central and Eastern Europe. If Prague, Warsaw or Budapest acknowledged and strengthened their position of dynamic cities at European level which started to play an important role in the European Union, in the past years Bucharest have started reducing the gaps, due to the economic boom. If the cities in the first line start reaching their limits (either physical limits - the limitations imposed by available spaces, or social limits - the limited or unavailable workforce), it becomes a strong competitor by being able to meet precisely those needs. Its economic growth pace is an indicator of its profiling in the market due to lower rental prices and to higher investment yields.

2. DEVELOPMENT PROBLEMS/NEEDS AND TRENDS

This section is an X-ray of the territorial issues in Bucharest City, summarizing the conclusions of the sectorial analyses carried out in the previous stage. A series of key-issues are briefly presented in boxes - defining the current state of the city, the main strengths and weaknesses, as well as major development trends. Each box ends with a list of recommendations that will further be considered in the design of the development strategy, recommendations stemming both from the expert analysis, and from the public consultation process described in section 9.3.

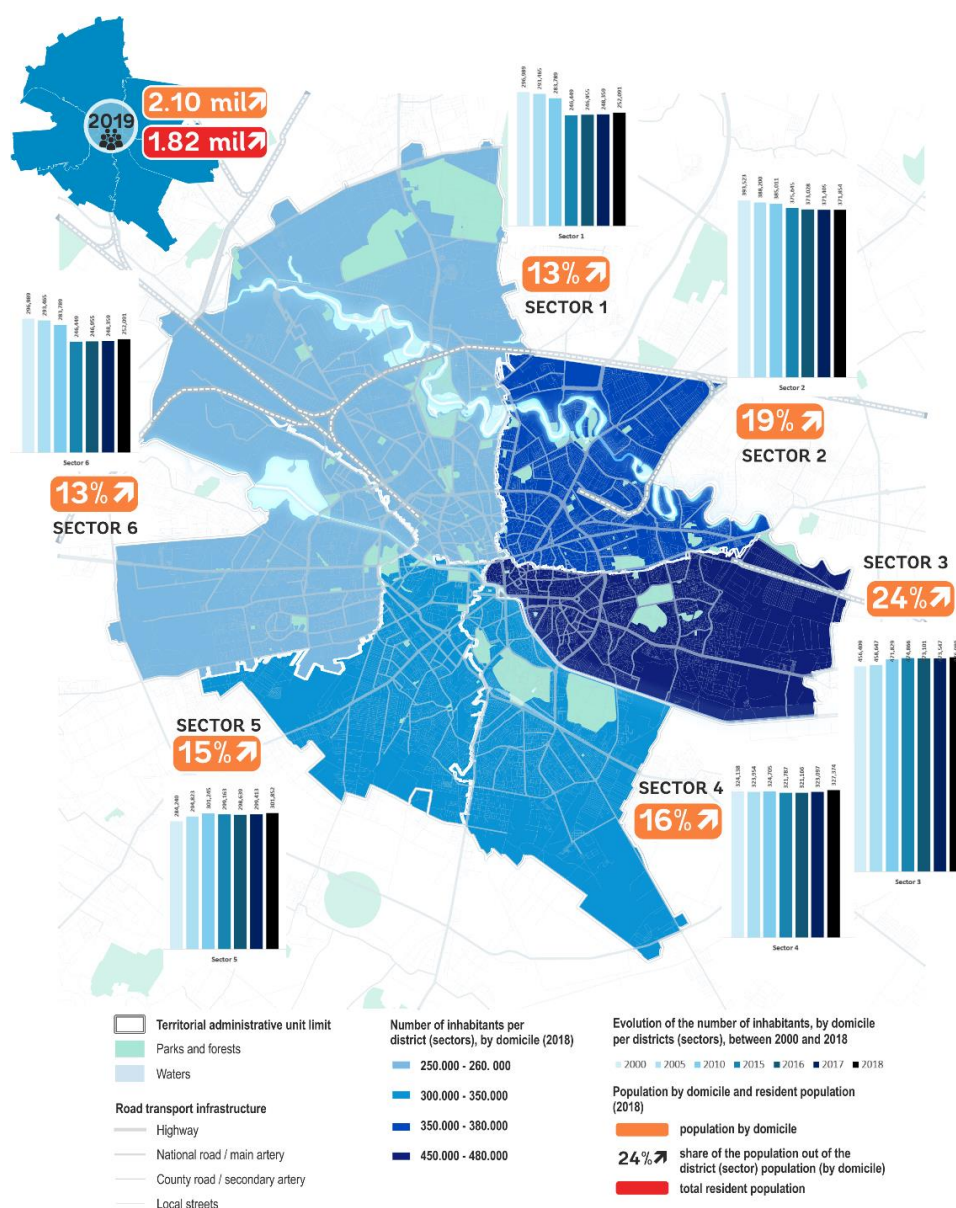
The boxes below are structured as follows:

- **Socio-demographic profile** - demographic structure and evolution, local development and communities
- **Economy** - economic profile, workforce, direct foreign investments and foreign trade, research-development and innovation
- **Spatial and functional profile** - housing and real estate market, public space and built heritage
- **Mobility** - road accessibility, rail and air accessibility, public transport, environmentally-friendly transport, traffic management
- **Public utilities** - drinking water supply infrastructure and services, sewerage and wastewater treatment infrastructure and services, electricity, thermal energy, public lighting and telecommunications, waste management
- **Public services** - education infrastructure and services, healthcare infrastructure and services, social infrastructure and services, cultural infrastructure, activities, events and services, sports and leisure infrastructure, activities, events and services, emergency response and public safety services
- **Environment, climate change and risks** - natural capital and green-blue infrastructure, environmental quality factors and (water, air, soil, noise) pollution, hydrological hazards and risks, climate hazards and risks, seismic risk
- **Administrative capacity** - local public administration, associative structures and cooperation, local budget and human resources, computerization and logistics

2.1. SOCIO-DEMOGRAPHIC PROFILE

2.1.1. DEMOGRAPHIC STRUCTURE AND EVOLUTION

Figure 7.
Evolution of the
number of
domiciled
inhabitants, by
sectors, between
2000 and 2018



Source: Own processing

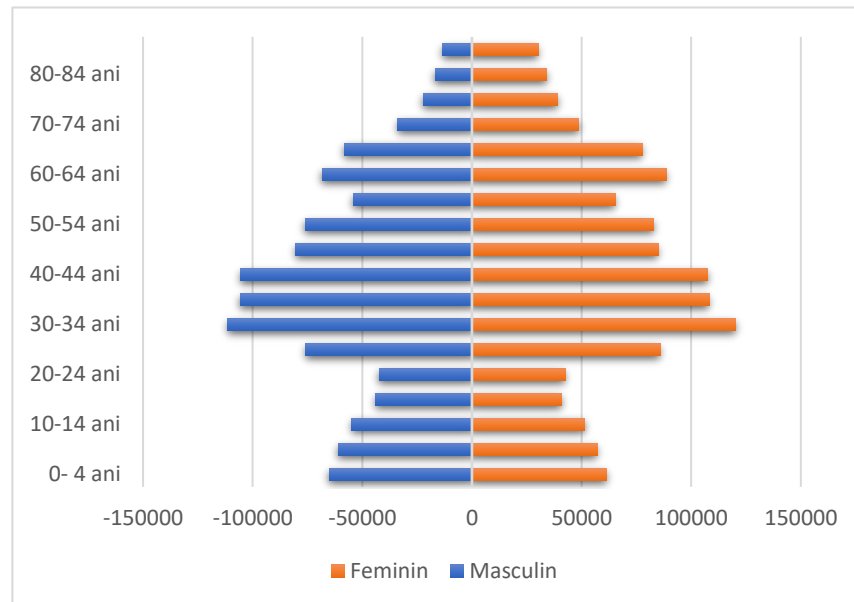
Key-issues

According to the data provided by the National Institute of Statistics (NIS), on July 1, 2019, the population domiciled in Bucharest City (the number of people that have in their identification card the permanent residence in the Capital) was 2,139,439 inhabitants, and the number of people residing (number of people that effectively live in Bucharest) was 1,829,897.

In 2011-2019, at the level of Bucharest-Ilfov Region, the population residing in the Capital decreased by around 53,000 people, and that of Ilfov County increased by over 96,000, resulting in a positive balance of 43,000 people, the most pronounced increase in the number of residents taking place in 2017-2019 (around 15,000 people/year). If this growth rate was also maintained in 2019, it can be estimated that the population of the Bucharest-Ilfov region reached about 2.33 million inhabitants in 2020, i.e. over 12% of the national population.

The structure of the age pyramid in the Bucharest-Ilfov region reflects a very high share of the population aged 30-45, but bottom of the pyramid is still very small, even in relation to the number of people aged 60-70.

Figure 8. Age pyramid of the resident population in the Bucharest-Ilfov region in 2019



Source: NIS. TEMPO Online (2019)

There are some demographic disparities between the six sectors of the Capital. Thus, the infant mortality rate is higher in Sectors 2 and 5, where the Roma population is also concentrated. Sector 1 registers a phenomenon of sharp demographic ageing, while in Sectors 3 and 5 the share of young families with children is higher.

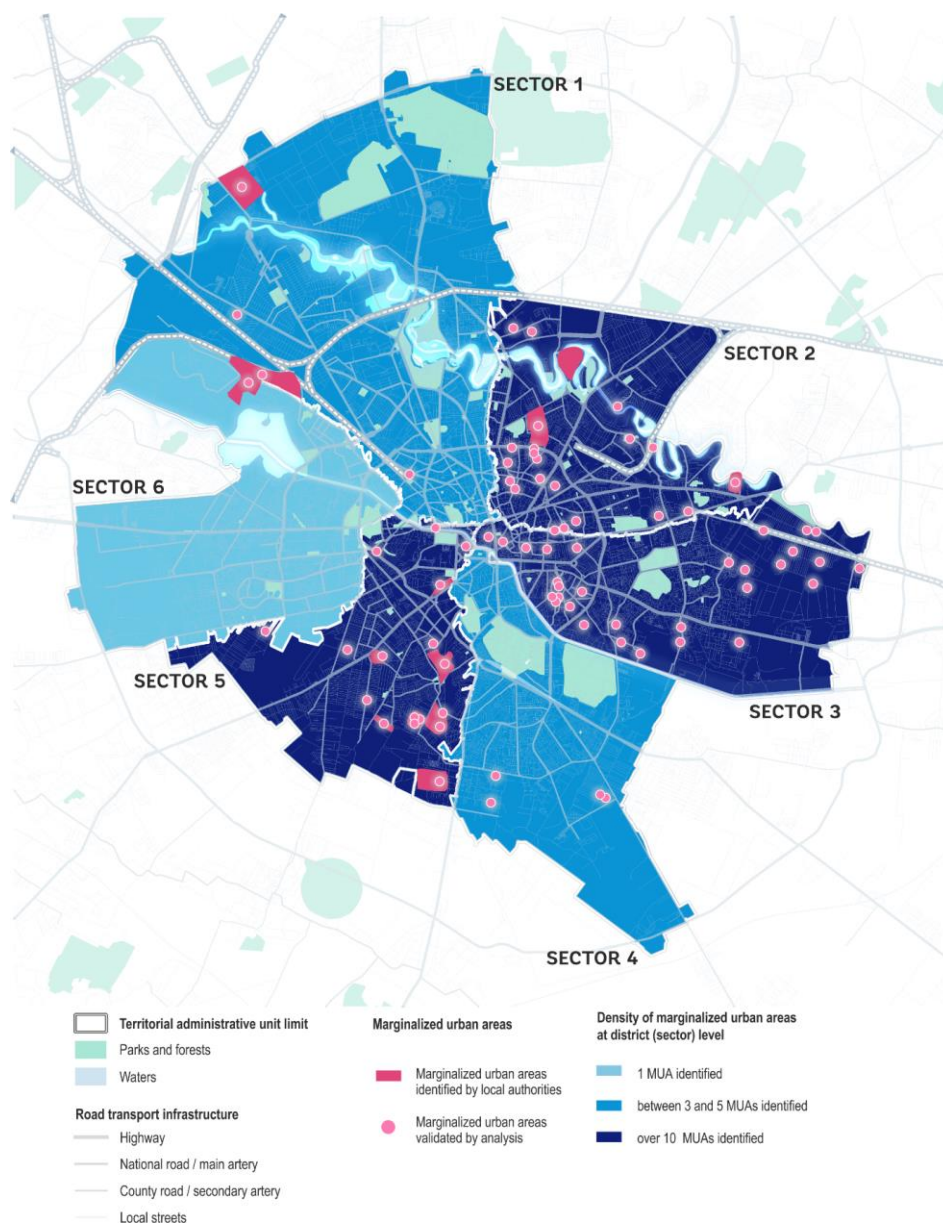
Strengths/ Weaknesses

- Together with the Ilfov County territory, Bucharest City is an important demographic pool and a workforce reservoir with a valuable contribution to the national GDP. This is the main attraction for companies and residents – whether they are short-distance or long-distance migrants – from all over the country.
- The relative stagnation of the population residing in Bucharest-Ilfov is important, taking into account that the Romania's population experienced a decrease of 15% compared to 1992, Bucharest still remaining a factor of demographic stability in a country which is increasingly exposed to external migration, natural population decrease and ageing.
- There is a declining and ageing trend among the Bucharest population who is fit for work, the NIS forecasts even showing that around 2050 it will represent only 50% of the city population, compared to 70% at present. The balance of temporary external migration is also negative, especially in the case of young people.
- The tendency for ethnic and confessional homogenization in the past century (approximately) has made Bucharest the least cosmopolitan European capital (over 95% of the Romanian inhabitants being Orthodox). Some ethnic and religious communities that have left a strong mark on the city's identity and that could play a key role in increasing its attractiveness for new residents and tourists, such as Jews or Armenians, are now in danger of vanishing from the city, along with

		their entire cultural, material and immaterial heritage.
Development trends		- The modest demographic growth of the Bucharest-Ilfov region in the last decade was based exclusively on the contribution of Ilfov County, where the number of inhabitants increased rapidly due to suburbanization. By contrast, the population of Bucharest continued to decline slowly. Forecasts show that this trend will continue in the coming years, albeit at low rates, generating multiple negative externalities. - The life expectancy of the population is increasing in Bucharest and is approaching the EU average of 81 years. This has implicitly led to a rapid increase in the share of elderly people, from 14.4% in 2012 to 16.9% in 2019. Forecasts for the future show that this percentage will continue to grow and even double around 2050.
Strategy recommendations		- Design and implement measures to encourage and support labor mobility to Bucharest from the neighboring counties. This may include, for example, implementing large infrastructure projects and a temporary accommodation policy for commuters coming from greater distances. - Design and implement policies and programs aimed at fostering the social integration of ethnic and religious communities and at capitalizing on their cultural specificity (by including the build heritage and the traditions of the different communities that live here into a tourist circuit). - Implement measures to actively support firms and local employers to employ local community members by considering the untapped potential of the poorest, marginalized groups (such as Roma) - Implement measures to encourage the attraction of new EU and non-EU residents to Bucharest in order to halt the demographic decline (e.g. measures such as raising the national ceilings for foreign workers, opening new foreign language schools, making public infrastructure more accessible to foreigners, developing the social services sector in order to integrate foreigners, developing an adequate housing fund for workers brought from abroad, etc.). - Design and implement a local strategy for the elderly and for the marginalized groups, taking into account a package of measures targeting different levels, such as: active ageing or volunteering activities for elderly and marginalized, inter-generational living/ housing, community gardening providing the opportunity to mix children from kindergartens, people from community centers for marginalized groups and people from elderly homes (socio-medical centers) in the neighborhood. - Metropolitan cooperation to implement measures that promote the concept of compact city, in order to limit the often chaotic phenomenon of suburbanization and its negative effects on traffic, land use, environment, municipal networks, etc.
Proposals stemming from the consultation process		- Creating a centralized system through which the single and elderly are taken into account and supported by home services about which the population is properly informed - Establishing social care centers where the lonely can socialize, feel like home and be treated with respect - Approaching a participatory policy in relation to the aging population, i.e. an urban policy that allows the city to anticipate needs, not only to punctually solve certain problems, to prevent some problems from getting worse instead of being forced to take crisis measures. "A city is friendly to the elderly if it promotes an active aging, optimizing the healthcare opportunities, participation and safety for improving the quality of life of its inhabitants as they get old" - Fighting against racism through school programs that promote diversity. - Promoting the principles of good citizenship (education must be seen as a key-factor) in a collaborative approach between public and private actors - Integrating the available but not used human resources in the labor market (developing special programs)

2.1.2. LOCAL DEVELOPMENT AND COMMUNITIES

Figure 9.
Marginalized urban areas



Source: Own processing

Key-issues

Since 2007, the Bucharest-Ilfov region has registered the lowest share of people at risk of poverty or social exclusion, well below the national average. The favorable position of the Bucharest-Ilfov region, and especially the one of Bucharest City, is a result of the predominance of the urban population, combined with higher incomes than in the other regions.

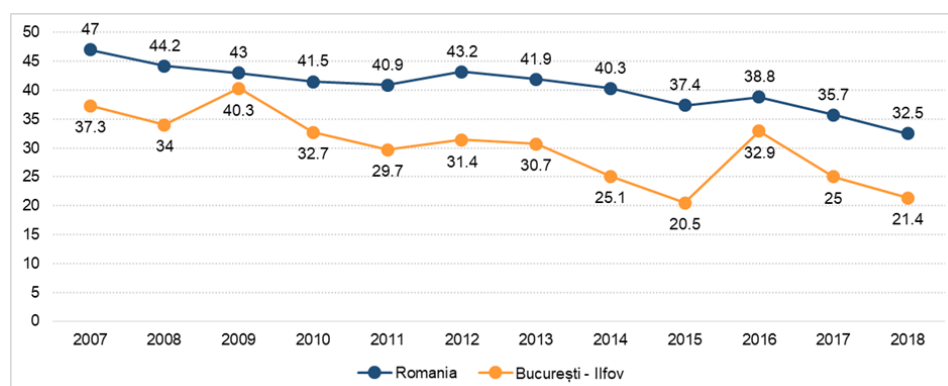
There are considerable discrepancies between the sectors of the Capital in terms of perceived poverty. 10-14% of the Roma adults in Sectors 3 and 5 consider themselves poor, while the share reaches 20% for the Roma in Sector 1, to almost 30% in Sector 2, and to the highest value of over 54% in Sector 4.

In the European context (according to Eurostat, Urban Audit Perception Survey 2015), the life satisfaction of the people of Bucharest is one of the lowest among the capitals of the EU-28 states. Although Bucharest is the most economically developed city, with

	the highest GDP per capita and the highest income in the country, Bucharest residents also have higher expectations, relating to European standards and not to the level of other regions or cities in the country and, as a result, they are less satisfied. However, the satisfaction with the Capital and its sectors is differentiated from one area to another, as shown by the social research data of IUDS from 2019. Satisfaction with the sector varies slightly, between about 7.9 for Sectors 4 and 3 and a minimum of 6.5 for Sectors 5 and 2. However, within the sectors there are neighborhoods that differ significantly, both in terms of satisfaction with their own sector and with Bucharest in general. Thus, while in Sectors 4 and 3 there are neighborhoods/areas with average ratings above 9, in Sector 6 and especially in Sector 5 there are neighborhoods/areas with a very low level of satisfaction, i.e. with average scores between 4 and 6. The marginalized urban areas (UMAs) validated in 2019 in Bucharest are areas that are known by the public authorities, but also by the representatives of the civil society, from at least two points of view: they are “historic” areas, “pockets of poverty” and areas where local public authorities are already present (in the case of the UMAs formed in social housing areas).
Strengths/ Weaknesses	• In absolute terms, Bucharest City has the lowest poverty and social exclusion rate at national level. There is also a low level of subjective poverty - only 2.6%. It is much more present among the Roma of Bucharest, compared to the inhabitants of other ethnicities (21.5% of the Roma consider themselves poor, compared to only 1.4% of other ethnic groups). • Bucharest UMAs consisting of blocks of flats are well integrated into the urban fabric and have good access to most public services (education, afterschool, health, shopping centers and markets, recreation and leisure, etc.). With regard to public safety, residents do not consider them dangerous in the traditional sense of the ghetto. • In Bucharest there is a significant number of people at risk of poverty, much higher than the sum of other 14 counties (with higher poverty rates). • The global life satisfaction of the inhabitants is lower than the national average and the population perception place Bucharest at the bottom of the European ranking regarding all public services and urban facilities. • UMAs of individual houses are insalubrious areas and exposed to climate risks such as heavy rains or floods, especially due to the poor infrastructure.

Development trends

Figure 10. People at risk of poverty or social exclusion (%) at national and regional level, between 2007 and 2018



Source: Eurostat data, AROPE indicator

- Compared to 2007, in 2018 the share of the population exposed to the risk of poverty and social exclusion decreased by about one third, reaching a rate of 21.4%, Bucharest-Ilfov region being well below the national average.
- Against the background of demographic aging and increase of the dependency rate for the elderly, the trend is expected to be capped and the request for supporting vulnerable groups and urban marginalized areas to be intensified.

Strategy recommendations

- Allocate targeted resources to poor people (or to those who are at risk of poverty and social exclusion) living in Bucharest, in order to reduce poverty; adjust the criteria for access to various social services/benefits or their value to the real costs of living in Bucharest.
- Establish day services/daycare centers and ensure free access for children in difficult/risky situations, and develop education or vocational training programs for adults.
- Develop support programs for poor people living in individual houses to provide them with support for specific home repair interventions or to connect them to public utility networks.
- Improve inter-institutional coordination between the social and medical fields and provide integrated support services to people in poverty or at risk of poverty.
- Develop participatory programs for children and young people; accessible and high quality services for preschoolers and early education; accessible facilities for sports and recreation; facilities for people with disabilities and accessibility of public spaces; or mentoring programs for children living in difficult circumstances.
- Carry out integrated interventions in the UMAs, covering all the dimensions of marginalization. They can follow the recommendations of CLLD-type funding, but must comply with the specificities of the identified UMA following in-depth analyses and be in line with the residents' wishes.
- Carry out interventions in UMAs with social housing blocks, aiming at a better management of social housing in terms of allocation/contracting of these dwellings & ensuring the complementarity between social housing services and social services and access to social benefits, especially with regard to identity documents.
- Carry out physical infrastructure development interventions in slum-type UMAs with individual houses located at the periphery, in order to improve access to services (including medical, social, educational services).

Proposals stemming from

- A community can be created based on a space organized so as to promote gatherings and social interactions, but also through a sustained effort that could

**the consultation
process**

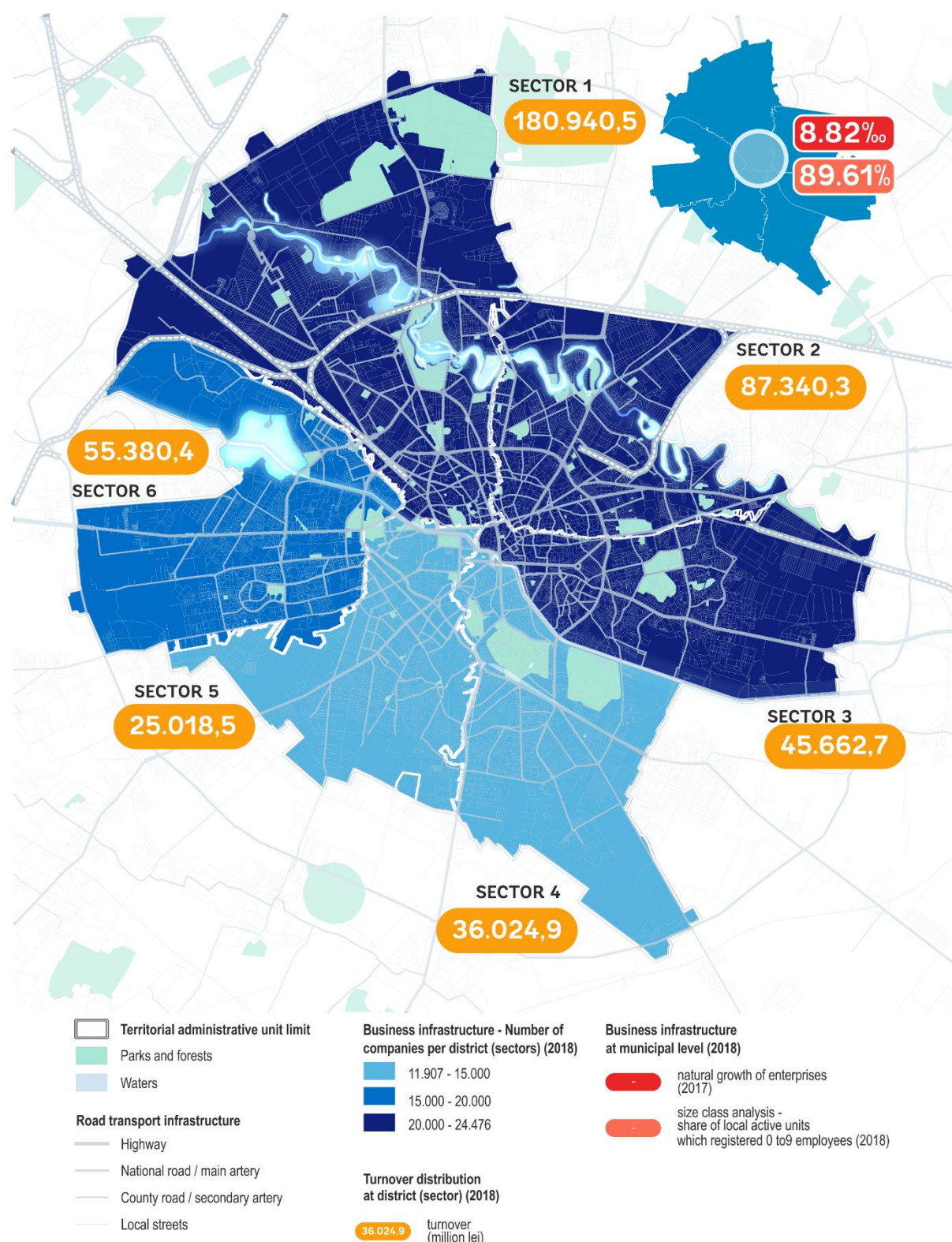
be made by the municipality, firstly by developing a successful model of a parent community, and then by replicating it in various other areas

- Development of hub-like institutions for parents to promote social interactions between people with common interests, by organizing activities that reduce the feeling of isolation and alienation arising from living in a big city.
- At the same time, the diffuse anxiety problem felt by parents can be managed by designing the materiality of the urban space to provide a sense of security, reducing the likelihood of criminal acts, intimidation or otherwise.
- Grant financial aid to cover the expenses for children going to school and support the retirees with their housing expenses
- Make education and anti-discrimination campaigns for both the population (e.g. information billboards), and the civil servants

2.2. ECONOMY

2.2.1. ECONOMIC PROFILE

Figure 11.
Distribution of
the turnover,
employees at
sector level;
direct foreign
investments at
Bucharest level,
2018



Source: Own processing

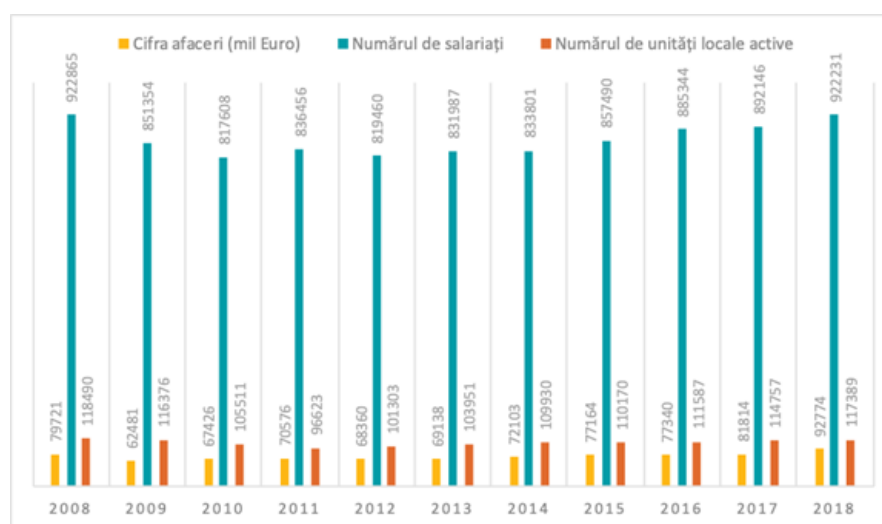
Key-issues

The evolution of the main economic indicators that describe Bucharest City's economy show an ascending post-crisis tendency (starting with 2011-2012) in respect to the average number of employees, number of active local units and turnover. However, the main indicators of private companies in Bucharest have registered relatively modest performances between 2008-2018. Thus, the turnover increased (in European currency) only by 16.4%, the number of employees has remained the same, and the number of active local units has seen a negligible decrease.

A contribution to this relative stagnation also belonged to the phenomenon of suburbanization of economic activities. Thus, Bucharest-Ilfov region indicators had a net superior evolution: turnover increased by 20% (below the national increase, of 25.5%), the number of employees increased by 5.1% (as compared to a 6.2% national decrease), and the number of active local units increased by 9.5% (as compared to the national 4.3%).

Bucharest City and its metropolitan region show a high degree of specialization in high-tech and knowledge-intensive services, the most representative in this respect being computer programming, consultancy and related activities. Nevertheless, harnessing these advantages is not yet a locally-assumed public policy, being left to the responsibility of the private environment.

Figure 12. Evolution of the main economic indicators (absolute values)



Source: The TEMPO NIS Database

The analysis of active local units density (no. of units/1,000 inhabitants) shows an increasing tendency. Bucharest City is followed by the Ilfov County, which also registered an increased economic development over the last years, possibly as an effect to recent years' suburbanization and development of office areas outside the Capital City (e.g. Pipera), logistics areas (nearby A1 highway) etc.

Disparities between sectors have increased, showing the companies' preference of locating in Sector 1 and the lower development level of sectors and neighborhoods in the southern part of the city. The northern side of Bucharest and the localities in the first circle of localities in Ilfov County record the highest entrepreneurial capacity, correlated to its access to the main connection routes to the territory. The headquarters of the main companies registered in the Capital City are focused in the northern and central regions, with a preference for the Piața Victoriei – Iancu de Hunedoara and Aviației – Barbu Văcărescu areas.

Strengths/ Weaknesses

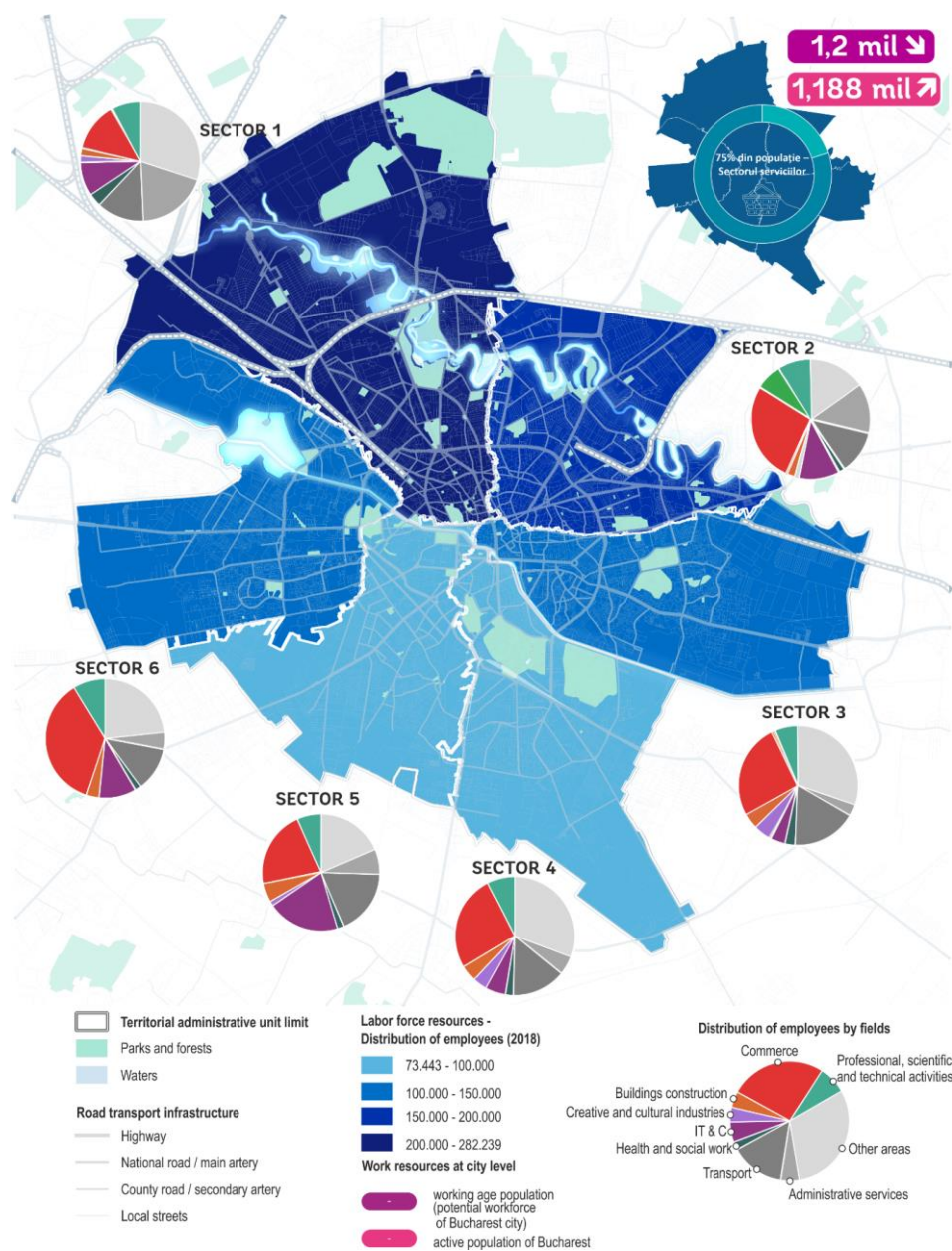
- Bucharest City together with Ilfov County represent Romania's most developed region, the Bucharest-Ilfov Region, ranked 25th among the European Union regions in terms of the GDP/capita value (PPS), accounting for 145% of the EU-28 average in 2017.
- We can see a tendency of decreasing competitiveness for the cultural and creative industries, which could have a negative impact on the Capital's competitiveness and attractiveness.
- Most of the population is not digitally literate and only carries out few digital operations; moreover, companies complain about the insufficiency of

	• The economic evolution of Bucharest was a remarkable one in a national context, as well, as it focused an increasingly higher weight of the national GDP. At the level of 2017, Bucharest City was contributing 32% of the national GDP and 89.6% of the regional GDP. • On a European level, Bucharest City ranks – alongside London, Madrid, Dublin or Budapest – in the top continental category (over 70,000 employees in the field) of the most active cities in terms of high-tech industry workforce. • Bucharest City is ranked second in the world in the top 3 cities with high quality office buildings holding ‘green’ certifications, which could contribute to positioning the Capital City on the international market and to attracting foreign investment.	“digital consumers”, according to the Digital Bucharest Barometer. • Public support for business development is relatively low in Bucharest, in the absence of coherent public policies aimed at attracting private investment and encouraging entrepreneurship. • The Capital City does not hold a business and exhibition center at European standards and has a low presence on the market of business fairs and events. • The dialogue between local public authorities and the business environment is little developed and is carried out punctually, reactively, as a response to the occurring issues. • Financing and access to capital, especially to start-up and early stage financing, remain a challenge and, for that reason, start-up founders turn to international investors.
Development trends	• The economy of the Capital City has a profile dominated by services; among these, knowledge-intensive services with a high added value contribute with over 20% to the total turnover and register increasing tendencies. • Decommissioned industrial platforms and areas, as well as unused land represent an important resource for the economic development of the Capital City, which needs a strategic approach. An important resource in this respect has been identified in the Antiaeriană area, in the south part of Sector 6, at the meeting of the Rahova, Ghencea, Pelungirea Ghencea neighborhoods and of the town of Bragadiru. The initiative of developing this area was initiated by the Sector 5 Municipality, under the name of Proiectul Centenarului (Centennial Project), with two development scenarios being subsequently developed with the support of the World Bank.	
Strategy recommendations	• Set up, within the Bucharest Municipality, a structure responsible with the planning and implementation of initiatives to increase the Capital City competitiveness and to foster dialogue at local and metropolitan level (consulting and ensuring the dialogue with the private environment, facilitating the dialogue between the private environment and the educational sector to support dual education, managing local financing mechanisms for SMEs, incubator programs, participation in fairs/events and promoting the city as a business destination, attracting CSR initiatives from companies, involvement in clusters, etc.) • Support the IT&C field through regional smart specialization instruments, supplement technical and IT&C specializations, connect IT&C with the traditional industries in order to create tech verticals. • Support innovative start-ups and develop specific support infrastructures for cultural and creative industries, either public or in partnership • Support the development of low cost services, such as: investment readiness schemes - for entrepreneurs who start a business and wish to improve their business plans; coaching programs for innovative start-ups and SMEs, held by top managers; soft landing schemes – for companies interested in internationalization; competitions of innovative business plans (especially in the smart specialization niches) for students etc. • Create business support public infrastructures, such as incubators, co-working spaces, makerspaces, etc., which should meet the entrepreneurs’ needs; • Create a metropolitan business/exhibition center (e.g. in the Măgurele area or edge city in the airport/Moara Vlăsiei area), in partnership between the Capital City and Ilfov County, or by upgrading and developing the ROMEXPO area. • Support angel investor networks and venture capital networks that would cover the financing deficit and resume the Bucharest Start-up City program or design other financing programs for the local entrepreneurs. • Encourage the development of new office and economic activities areas, outside the central and northern areas, mainly to the west of the city. For instance, the Antiaeriană area (Sector 5) shows a unique potential	

	on a regional level right now, having the possibility of somehow balancing the Capital's polarized north-south development. • Identify areas with a potential for economic development and make an inventory of unused industrial platforms/brownfields, which can be converted into service areas or mixed areas, as well as of other lands that can to attract investments. Adopt land development policies that support their development.
Proposals stemming from the consultation process	• Create a Board of Advisors for economic development in the private environment, which should support the public administration in its relationship with investors and entrepreneurs, and, respectively, in designing programs dedicated to them. • Encourage entrepreneurial/business tourism through events, financing opportunities, networking, conventions, etc. • Investing in increasing merchandise mobility (merchandise transport); • Development of business centers, co-working, hubs, research, innovation. • Tax regulations that should encourage business development and innovation; • Investments in quality infrastructure and public services, to make the city attractive for the Romanian workforce; • City planning regulations that encourage business development and innovation infrastructure; • Simplify the procedures for obtaining approvals and authorizations necessary for the location and operation of economic activities. • Develop a centralized online system regarding Bucharest buildings, their legal status and the land/buildings available for investments

2.2.2. WORKFORCE

Figure 13.
Distribution by territory and by main economic activities for Bucharest City employees, 2018



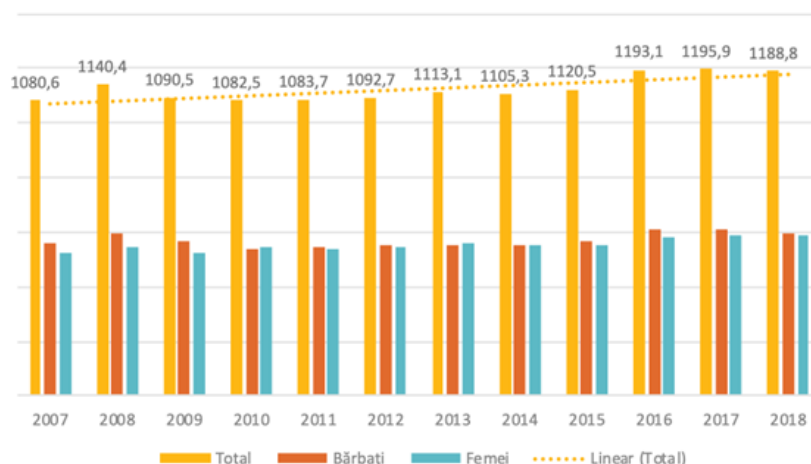
Source: Own processing

Key-issues

According to NIS, at the end of 2018, in Bucharest City were residing 1.206.700 people of working-age, which represented the Capital City's potential workforce and around 57% of the total population with permanent residence in the city. As compared to 2007, the city's workforce resources reduced by approx. 8%, against the background of demographic aging and of internal and external migration with a change of domicile, but also because of various changes occurring over time in respect to legal working-age. Bucharest City concentrates approximately 10% of the total national workforce volumes.

In 2018, the Bucharest City active population was estimated by the NIS at 1.188.800 people, increasing by approximately 10%, that is, around 108.2 k people.

Figure 14. Bucharest City active population, by gender, between 2007-2018, thousand people



Source: NIS, 2019

Bucharest City's functional urban area gathers a stable population of over 2.7 million inhabitants and attracts the highest share of commuters in the county – over 330.000 commuters, coming mainly from 7 counties (Călărași, Dâmbovița, Giurgiu, Ialomița, Ilfov, Prahova, Teleorman) and representing 22.4% of the total working population in the functional urban area.

Bucharest City has a low unemployment rate (1.3%), which suggests a potential labor deficit and a limited capacity to meet the needs of current and potential employers, which could also discourage large (foreign and Romanian) investors from investing in the local market.

On the other hand, the salary level recorded in Bucharest is higher as compared to the one in the other counties – of approximately 800 EUR/month, the Capital holding the highest weight of labor agreements paid with over 1000 EUR/month (16.2%). The competition for talents among companies, especially between the high added value ones, is extremely high and very often translates into a war of very attractive salary packages for the potential employees. Sector 1 is the Capital's largest workforce pole, focusing approximately 32% of the total number of employees, especially against a higher salary level.

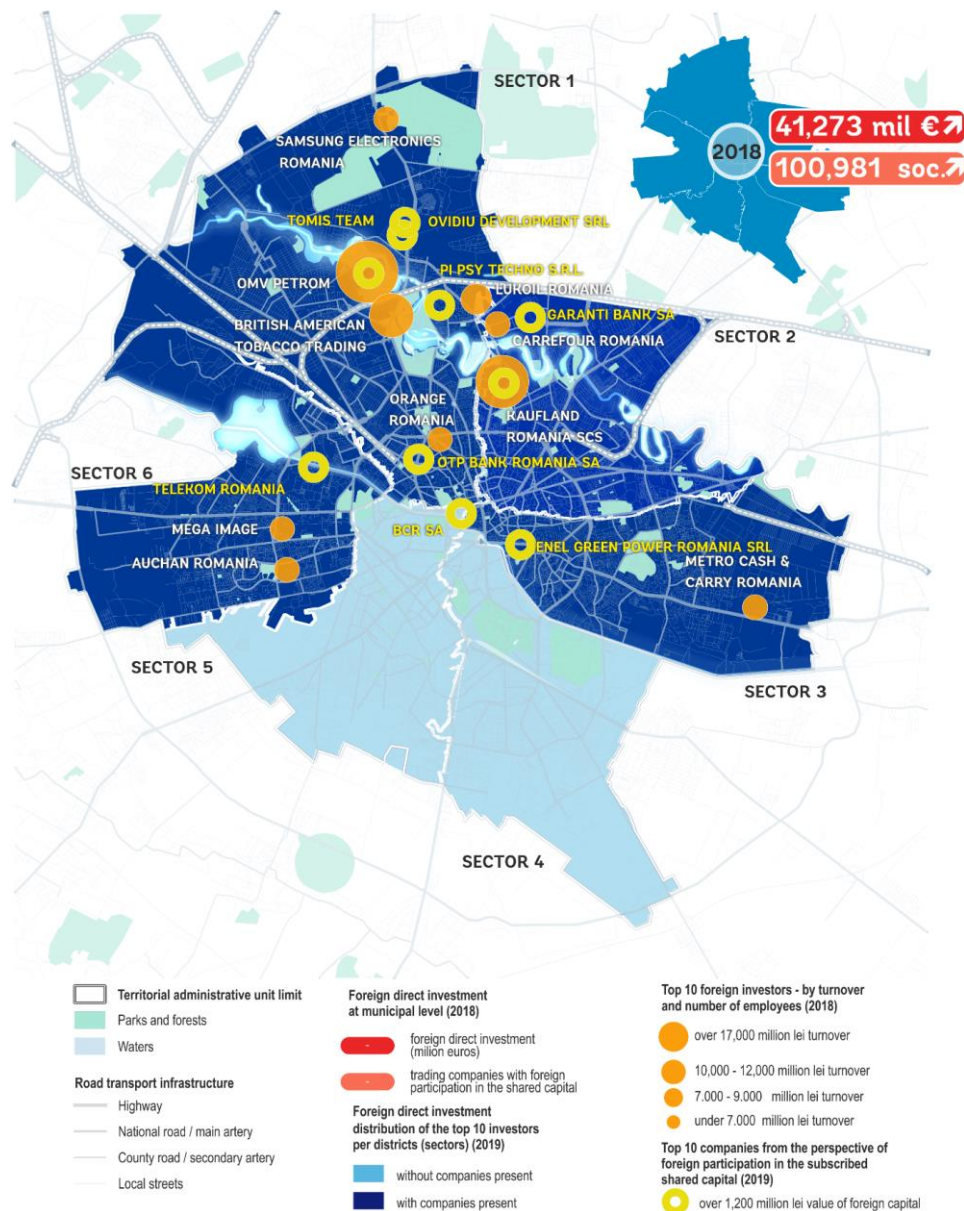
Strengths/ Weaknesses

- Bucharest City is efficient in using the workforce resources it holds, as the number of unused people on the labor market decreased during the analyzed interval, and the activity rate for working-age population was the highest in Romania.
- Bucharest City stands out by the highest workforce occupancy in Romania, especially in high added-value fields – IT&C, R&D, creative industries.
- From a specialization point of view, Bucharest is Romania's largest technological hub, with a most varied workforce that shows skills which are in high demand on the market.
- The lack of personnel competent in product management is an obstacle to the development and attraction of tech investors.
- As a matter of principle, Bucharest-located start-ups could benefit from the technical talent pool, as the Capital has competitive developers and marketers, but a vulnerability of the local tech ecosystem resides in the lack of business/entrepreneurship and product management skills, which are in high demand on the market.
- The insufficient specialized workforce, especially in terms of STEM staff (science, technology, engineering, mathematics) is one of the main

	demand on the labor market, being especially sought by IT&C companies or by companies in other high added-value fields.	problems reported by investors, especially by foreign investors.
Development trends	• In the context of the economy of the future, a large proportion of jobs run a high risk of automation. Sectors relying on STEM employees are subject to high specialization and require a higher and more specific level of qualification. This is also true for creative activities, which cannot be automated. Automation will transform jobs and will prove a challenge for the working population, which will definitely look different in 2030. • The highest unemployment rate was recorded in 2009, as an effect of the global economic crisis. The number of employees started to decrease as early as 2008, throughout the country. On the other hand, after the crisis, the unemployment rate decreased year after year, and the National Prognosis Commission estimates a continuous decrease by 2022, when the unemployment rate will be 1.1% in Bucharest City. However, in the new context of COVID-19, this estimation is likely to be unrealistic.	
Strategy recommendations	• Capitalize on the position to the neighboring counties that have workforce resources, through interventions aimed at improving the accessibility and increasing the quality of life, coordinated with investment-attracting measures. • Provide the services needed by commuters (e.g. public transport, information, etc.) to facilitate their access to Bucharest jobs. • Actively encourage immigration (from within the country and from abroad) by promoting the opportunities offered by the Capital City labor market and by establishing partnerships with other local authorities/institutions. • Organize specialization courses/informal schools, according to the market needs, organize accelerated 'bootcamp' programs to narrow the skills gap according to market requirements (they focus intensely both on programming and on entrepreneurial and business skills). • Facilitate the dialogue between the business environment and the representatives of the education system (high school and university), in order to adapt the educational offer to the employers' needs. • Develop skills by supporting access to tertiary education, correlating employment criteria with professional skills and supporting retraining/re-qualification. • Support the development of dual professional education, based on a more active involvement of the private sector in the process of initial training of the workforce. • Retrain people who could be adversely impacted by automation. • Grant facilities to companies, so that they invest in training employees on the job, and support apprenticeships.	
Proposals stemming from the consultation process	• Investments to improve employee mobility; • Investing in education and workforce training; • Promoting Bucharest as a regional and even global investment destination and attracting foreign workforce. • Grant vocational advisory and career guidance services organized in order to respond the real needs of the students. The municipality could also create a bridge between young people starting their career life and possible employers, by making an online portal for job opportunities addressed to new graduates, where the demand meets the offer and where their skills are visible.	

2.2.3. FOREIGN DIRECT INVESTMENTS AND FOREIGN TRADE

Figure 15. Top 10 companies in terms of foreign equity ownership and top 10 foreign investors



Source: Own processing

Key-issues

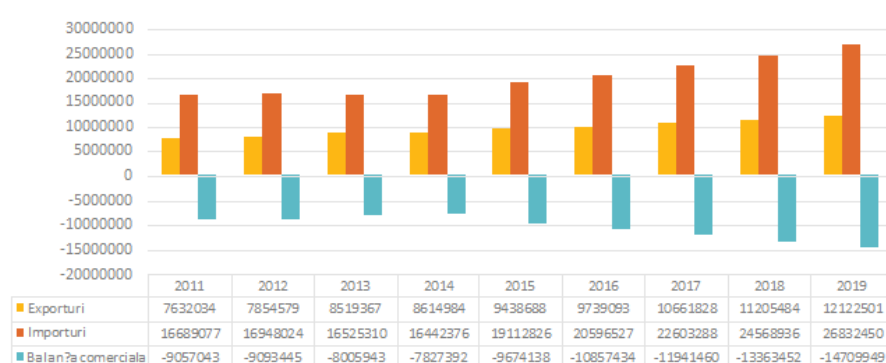
According to the study made by the National Bank of Romania, "Investițiile străine directe în România în anul 2018" (*Direct foreign investment in Romania in 2018*), in the Bucharest-Ilfov region, at the end of 2018, the value of foreign direct investment (FDI) was EUR 49,250 million, namely 60.7% of the total FDI. They were located by the registered office of direct investment enterprises, which is not always the place where the economic activity is carried out. According to the same study, Bucharest attracted FDIs worth EUR 41,273 million, which is 56% of the total FDI, 6.5% more as compared to 2017. At the beginning of 2018, the share capital subscribed by foreigners was EUR 24.3 billion, placing the Capital city first, with a FDI/capita value of EUR 11,552 k.

As compared to 2007, the number of companies with foreign capital has increased by 47%, and the share capital has tripled. In 2018, their number reached 100,981 companies with foreign equity ownership, and a total subscribed capital value slightly higher than in 2017 (more precisely, by 1%). According to estimates, the subscribed foreign capital value stands at approximately 36% of Bucharest City's GDP.

The Capital City is preferred mostly by investors from Cyprus, the Netherlands, Spain, Great Britain, Luxembourg, Germany, Italy, Austria or France, and especially for developing trade activities.

Bucharest foreign trade activity consisted, in 2019, of FOB exports of approximately EUR 12 billion, and, respectively, of imports of approximately EUR 27 billion. Therefore, Bucharest City's trade balance is negative over the analyzed interval, although it leads the top national exports, contributing by 17.6%. The Capital City has a comfortable lead in exports, a situation that is explained especially by the large number of companies with factories in Romania, but with registered offices in Bucharest.

Figure 16. Dynamics of exports and imports for Bucharest City between 2011-2019, thousand EUR



Source: NIS – Tempo Online, 2019

The highest demand on foreign markets was registered for telecommunication, computer science and informational services, products in the category of electrical machinery, devices and equipment, plant, mineral or chemical products.

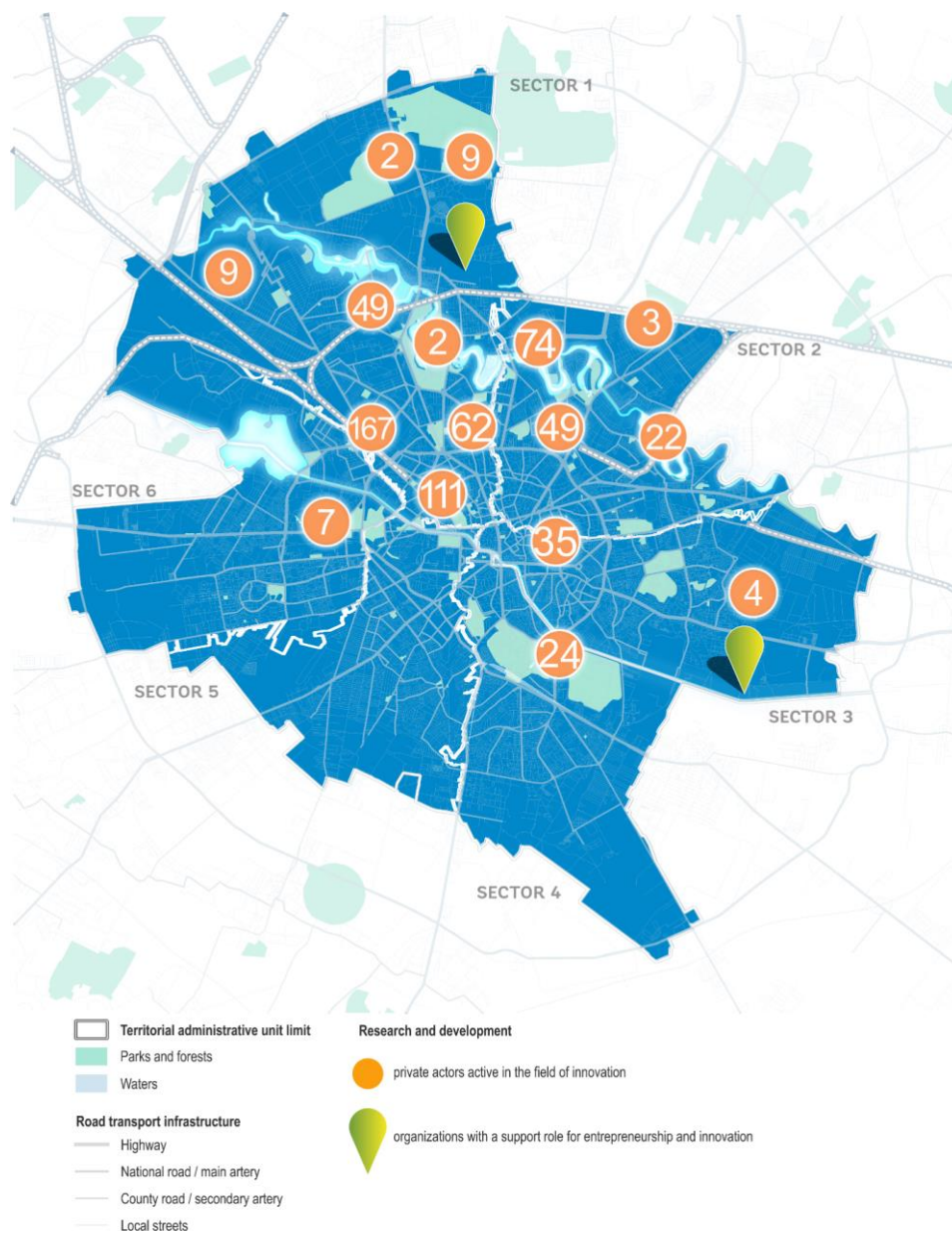
Strengths/ Weaknesses

- Bucharest City is the most attractive urban center in Romania for foreign investors, being ranked first on most economic indicators.
- Bucharest is endowed with a high quality digital infrastructure, and, together with the qualified human capital, these represent 2 attractiveness characteristics that are important to investors.
- Bucharest City leads the top of national exports, and their value has increased by nearly 50% during the 2011-2019 interval.
- The in-out ratio or private environment effervescence versus foreign capital companies ending their operations is higher for 2018 – 1.43%.
- There are a lot of de-registrations of companies with foreign equity ownership, which could mean that those companies did not manage to increase on the national market and ended their activities.
- Investments made by Romanian companies abroad (number of FDIs held by Romanian investors abroad) are very low, placing Romania last in the region.
- Most entrepreneurs are facing difficulties in the process of internationalization, due to the lack of knowledge, connections or information on the target market.
- The lack of an efficient and coherent economic representation instrument, of businesses with a potential to scale up and penetrate foreign markets, is a ceiling that limits the level of

		representativeness of Romanian companies on foreign markets.
Development trends	- The Capital City has a special potential for digital entrepreneurship and jobs of the future, which do not require physical in-office presence. The increase rate for the use of digital infrastructure is high, which may suggest that the business environment for digital entrepreneurs will see a significant improvement in the near future. - At the same time, the image Bucharest City has within the national and international business environment is a rather negative one, being associated with a low quality of life, crowding, corruption, etc. Together with a low presence on the European and global economic scene, it can lead to an increase of the number of de-registrations of companies with foreign equity ownership and a decrease of the FDIs.	
Strategy recommendations	- Create an identity for the city/metropolitan area and actively promote it – branding and marketing strategy - Create a structure/office for the relationship with foreign investors and (international) public relations, in order to attract foreign investment and to increase the Capital's notoriety at an international level. - Promote the Capital City as a business destination at international level, by participating in specialized networks and events and by “promotion packages”, defined based on an international marketing strategy. - Develop a one-stop-shop support platform for local and international companies, which should provide support in all the development stages of a business, and at the same time help out expats with useful information on Bucharest City daily life (e.g. https://viennabusinessagency.at/) - Support the development of economic promotion/representation offices on foreign markets, to promote the interests of companies and provide information on global markets - Develop a network of business incubators and accelerators, which should act by encouraging internationalization or granting support to the already-existing infrastructures, helping them diversify their service portfolio for SMEs.	
Proposals stemming from the consultation process	- Communicate and promote initiatives, projects and events in the city - Develop an online platform that enables the public administration to launch challenges and entrepreneurs to propose business solutions that might solve them (“online solutions competition”). - Support the internationalization effort by enhancing the visibility of universities and research institutes in promoting and city branding actions (from aspects related to the materiality of the urban area to those related to the development of tourist guides or the effort to attract investors)	

2.2.4. RESEARCH, DEVELOPMENT AND INNOVATION

Figure 17.
Bucharest RDI
infrastructures



Source: Own processing

Key-issues

In 2018, the Bucharest-Ilfov Region was focusing approximately 70% of the personnel in RDI organizations in Romania. Over the last year, namely between 2016 and 2018, the Capital saw a slight decrease in the number of RDI employees (-2.02%), while maintaining its leading position in the national top. Regarding RDI expenses, Bucharest City ranked first until 2016, but it was surpassed by Ilfov County as of 2017. In 2018, Bucharest City maintained the second position, with Ilfov County exceeding the Capital City expenses by 28%.

According to the Patronatul Investitorilor Autohtoni, based on the ratio between the number of labor agreements in the RDI sector and the total number of labor agreements (per 1,000 agreements), Bucharest City, together with Ilfov, Cluj, and Iași, show the highest innovation potential in Romania.

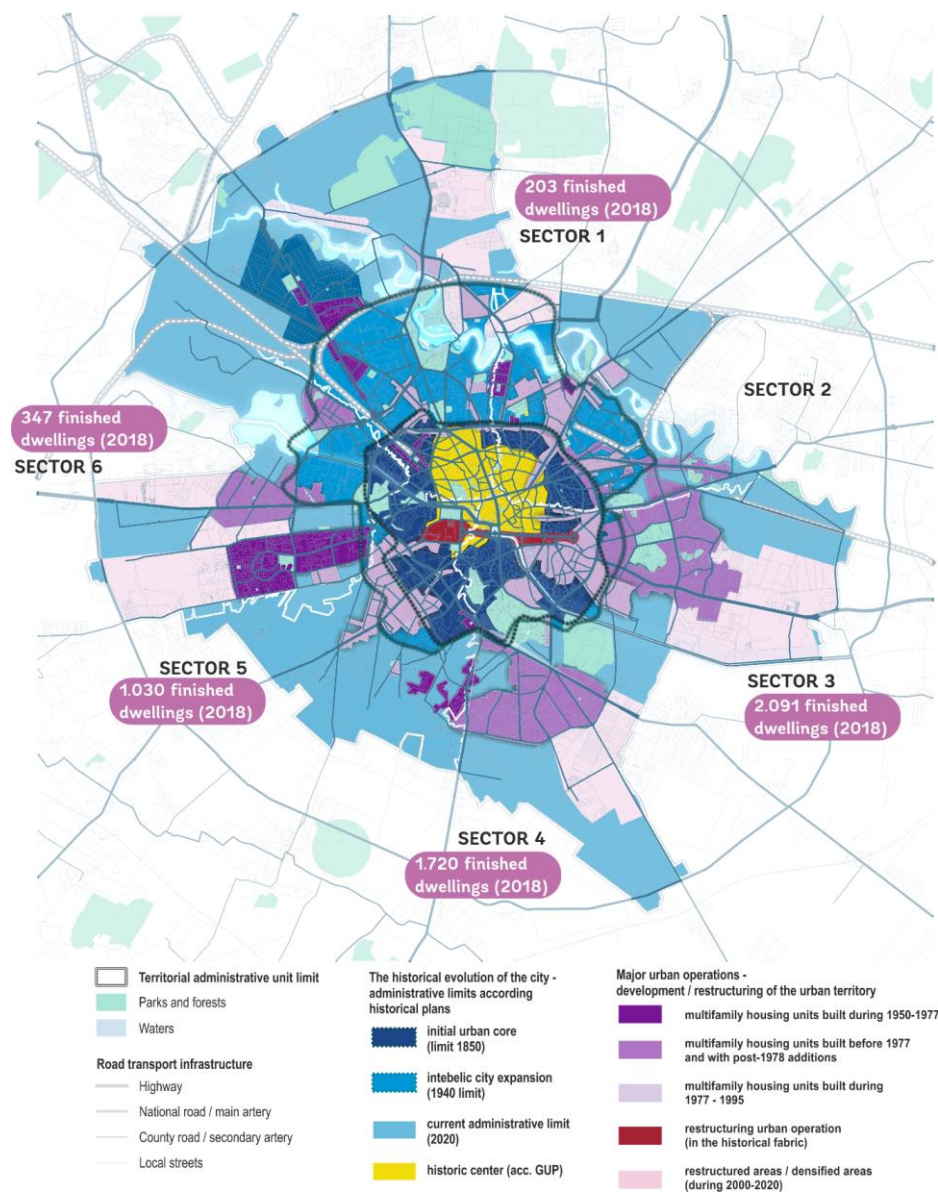
	Bucharest City stands out by the presence of several types of organizations carrying out RDI activities: research and development institutes, research centers, enterprises, technological transfer and technological information centers, and, respectively, innovation entities. They are completed by enterprise support infrastructures and services – incubators, industrial parks and a series of clusters in relevant fields, which local companies can join. Bucharest City is polarizing private environment actors, active in the field of innovation, organizations with a support role for entrepreneurship and innovation, and business and RDI events. They are concentrated mainly in the areas of Romexpo – the traditional area for fairs and exhibitions, the Barbu Văcărescu – Fabrica de Glucoză (Hotel Caro) area, the Politehnica University, the central area and hotels and high-capacity event halls (for instance, cinemas) for punctual events.	
Strengths/ Weaknesses	• Bucharest City is the most important national competitiveness pole in research, development, innovation (RDI), ranking first on a national level • The Bucharest-Ilfov region is characterized by a high contribution to national research, through the high ratio of the number of submitted patents or magazines with “ISI” indexing/citation • In the near vicinity of Bucharest (in the first circle of localities), Măgurele represents the most important national physics fundamental research pole, recognized on a European level	• Although Bucharest City is the main national competitiveness pole in research, development and innovation, the local RDI ecosystem is rather poorly developed, with a low degree of RDI cooperation and intensity, as well as with a modest quality of research institutes. • The cooperation between innovation actors (ideally a quadruple helix: public authorities, academia, the business environment, and the civil society) is relatively low, with organizations/institutes carrying out their own projects. • Over the last years the Capital City has seen a decrease in the number of specialized staff, albeit maintaining its leading position in the national top.
Development trends	• Considering Bucharest City's role of national economic center, as well as its attractiveness for foreign investment, the tendency to provide an infrastructure for fairs and exhibitions at European standards is manifested through initiatives related to the upgrade and development of the ROMEXPO area, building a new exhibition complex within the Capital or coordination with the Ilfov County Council to create a new exhibition and business center, for instance, in the Măgurele area. • The research platform in the town of Măgurele creates the premises of developing a state-of-the-art science park, which should facilitate the dialogue between research and development and the academia, on the one hand, and the entrepreneurial and business sector, on the other. The science park, currently in development, will contribute to the development of innovative entrepreneurship on a regional and national level, by creating connections between industry and research and by providing the necessary framework for the permanent dialog between the two.	
Strategy recommendations	• Promote and communicate the results of local research and encourage technological transfers, facilitate partnerships and active participation in processes of entrepreneurial discovery	

	• Develop “Partnership for innovation” programs (in a quadruple helix system, focusing on encouraging companies to cooperate with universities/research institutes to develop innovative solutions). • Actively support the development of innovation clusters (e.g. by organizing meetings between the administration, the local business environment, the academic and research environment, catalyst-organizations, by supporting wide research projects, etc.). • Develop programs that promote a career as a researcher among the young (starting in secondary school), organize study visits to research facilities for students (for instance, within the activities of “Scoala Altfel” – <i>The Different School Week</i>) • Create hubs for the STEM education of students, by PPP, endow school laboratories with state-of-the-art equipment and train the teachers to use it, including with the support of the private sector.
Proposals stemming from the consultation process	• Advisory services based on the involvement of the academic community in the collection of data necessary for studies supporting public measures • Research micro-grants system for academic community, allocated on competition basis and focused on an intervention field (applied research whose results could be used in local socio-economic development • Applied research is understood as an activity that could contribute to the development of the city, insofar as it identifies and develops a mechanism for systematic and rigorous data collection about Bucharest that, through scientific processing and analysis, could provide perspectives on solving local problems. • It is considered that research activities and the related results could target several fields in which constructive collaborations can be articulated between the municipality and the research sector in order to collect, process and analyze data that could be used both scientifically and in public policy. • Creating the premises for the development of a culture of interinstitutional collaboration and which, on the other hand, should support universities and research institutes in the internationalization effort. • Funding working visits to Bucharest, participation in academic conferences (as a keynote speaker) or participation in public events of prestigious international researchers, who are part of consolidated research groups and who benefit from scientific resources. • Organizing events to lay the foundations of partnerships between research institutions in Bucharest (universities, centers, institutes) and research institutions abroad.

2.3. SPATIAL AND FUNCTIONAL PROFILE

2.3.1. HOUSING

Figure 18. City development evolution



Source: Own processing

Key-issues

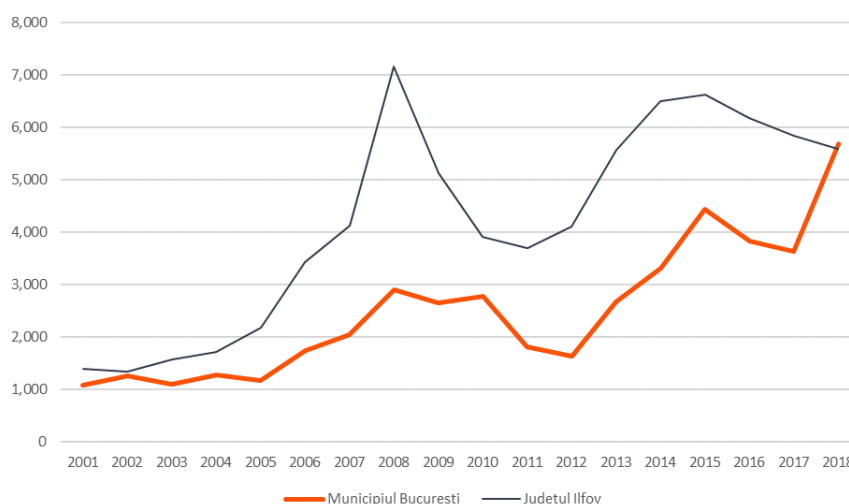
Bucharest displays wide variations in the organization of residential areas, from those encompassed by the individual housing network until the large residential ensembles, which equal the size of medium or large cities in Romania. This variety of residential areas requires carefully nuanced approaches on the use of public investments, first of all for public investments in the maintenance of infrastructure and communications networks, and on the guidelines for new residential developments established by the Local Urban Planning Regulations (LUPR).

Currently, except for the central zone, collective dwellings account for approximately 14% of the Capital surface, while individual dwellings account for 18%. The main areas of collective dwellings are in the inner side of the median ring, in the Western, Eastern and South-Eastern areas of the Capital. The individual dwelling areas tend to be located at the city outskirts or in the inner side of the median ring. In the meantime, due to the

	high accessibility and proximity to facilities and public institutions of municipal or national importance, the individual dwellings located in the inner part of the median ring took over the function of public services or catering. The housing stock age is directly correlated to the housing policies, especially those applied in the second half of the 20th century. Thus, the main category consists in apartment blocks built between 1945 and 1989, with a peak development after the 1977 earthquake, more specifically in 1978–1989. More than 50% of the housing stock in Bucharest is older than 50 years. Additionally, the fact that most dwellings are private property is a disadvantage for the implementation of the building rehabilitation policies, because it entails the existence of dedicated and efficient negotiation mechanisms between Municipality and property owners. The amenities for the residential ensembles were built based on the design principles of the '70s. However, their operational logic is currently affected by the large shopping centers and by their shop networks. Therefore, in the future they may be allocated more community functions, to turn them into viable neighborhood centers.
Strengths/ Weaknesses	• The typological diversity is the main feature of the residential building stock in Bucharest, whether we speak of age, building systems, or housing pattern. • Based on the indicators regarding the share of dwellings which comprise two or more households, for the main types of dwellings, it can be concluded that, on average, the housing stock of the Bucharest City does not display overcrowding trends. • There is no coherent urban policy on housing in Bucharest. • Given the share of housing stock developed during the socialist period in the total number of dwellings available, the average gross surface per person is significantly lower than in other European capitals. • Given the high population density in the large housing ensembles, the level of provision of adequate urban facilities is not satisfying. • There is a lack of public investment in the housing stock development, such as financial mechanism supporting the rehabilitation of the private property housing stock. • The demand for housing has led to uncontrolled expansions and the urban sprawl occurred both in the outskirts and in the peri-urban localities. The new developments were made without urban planning regulations and they were not accompanied by facilities and adequate street layout.
Development trends	• As regard the population age, the following trends can be seen at the city level: - The central perimeter includes areas with a relatively high share (more than 20%) of elderly population, living in the housing stock built before 1945; - The outskirts are characterized by uncontrolled expansion, with dwellings occupied by mostly young population;

- There are vast areas with undersized plots, but with a large share of young population, overlapping areas of extreme poverty.
- The outskirts expansion trends, with mainly individual dwellings, require the design of specific policies which should limit the uncontrolled expansion of low-density projects, because they lead to inefficient land use. Housing in Bucharest gradually becomes a problem of the entire metropolitan area.

Figure 19. Privately funded dwellings completed at the end of the year



Source: Processing of the LOC104B indicator, from NIS Tempo database [16.09.2019].

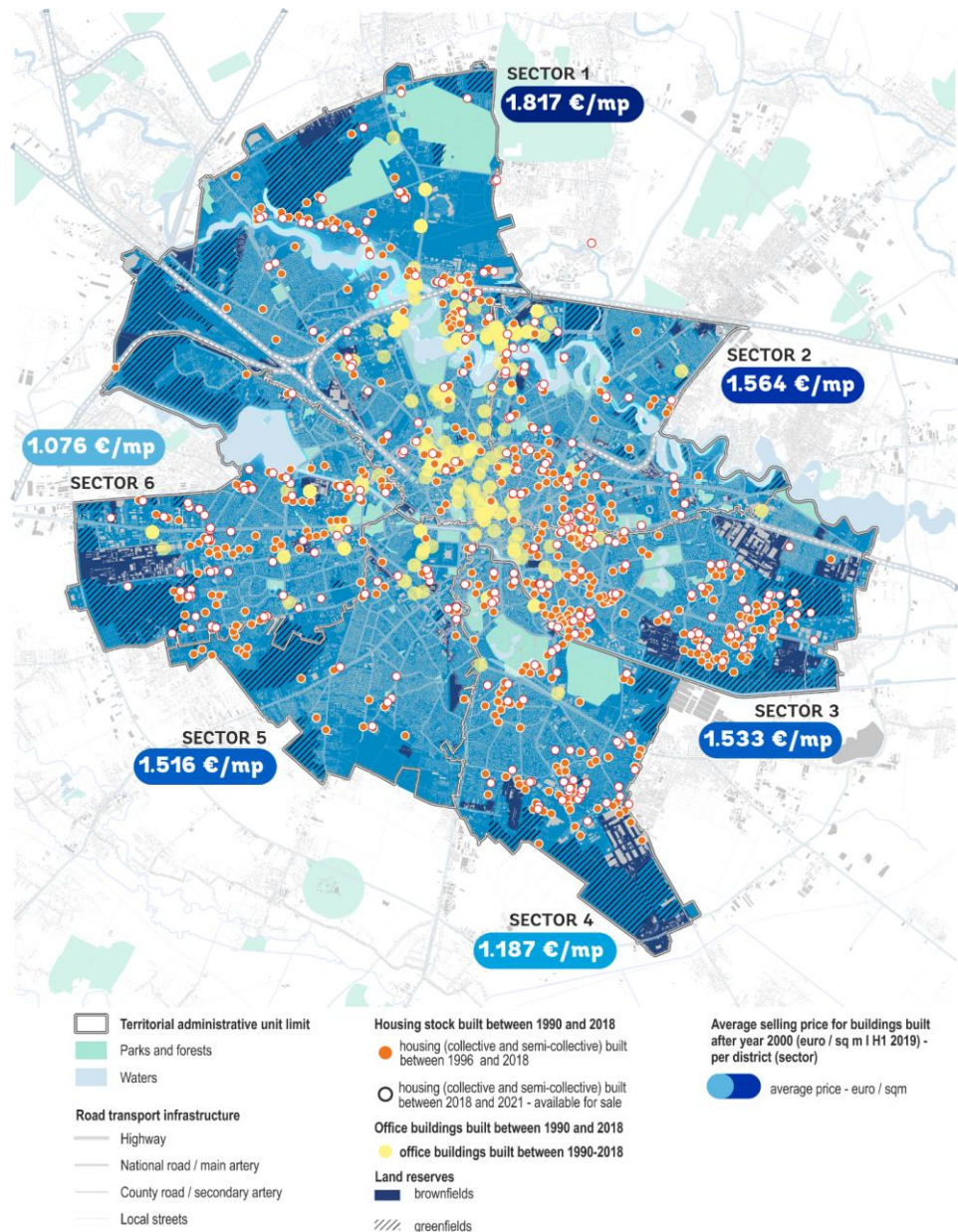
Strategy recommendations

- Developing a solution guide/catalogue by topics of interest for owners' associations, as follows:
 - The use of apartment block roof tops for joint outdoor activities, depending on the demographic and social structure of the existing ensembles in a given neighborhood;
 - Facilitation of vertical mobility for people with motor impairments, so as to encourage them to have an active life throughout the day, regardless the season;
 - Supplement and improve the bicycle and the running lanes so as to create coherent networks and loops, designed according to users' needs and level of training;
 - Provide options to diversify activities which involve outdoor exercising in the residential ensembles and neighborhoods;
 - Turn the proposals into modular, efficient, interesting and sustainable solutions.
- Design and test financial and non-financial incentives to encourage the adoptions of such solutions proposed in the catalogue.
- Identify the buildings owned by the public authorities and capitalize on such buildings to improve public amenities, especially for nurseries, kindergartens, schools or social centers.
- Identify and map the neighborhood amenities at the level of residential ensembles; identify abandoned areas, buildings or parts of buildings, as well as the owners of the areas or buildings that form the neighborhood amenities;
- Design and validate a minimum set of indicators relevant for typological analyses, for phasing capital repair works and for modelling the earthquake behavior of the various ensembles;
- Draft priority lists for those ensembles which require capital repair works and propose financial mechanisms to support owners in rehabilitation operations

	• Map the available land stock in each neighborhood, including both the identification of blocked land owners and of land plots with unidentified owners; • Design overtaxation mechanisms for blocked land, and property transfer mechanisms for plots with unidentified owners, so that the Municipality of Bucharest may gradually replenish the property stock; • Finalize a planning mechanism for the metropolitan area of Bucharest to define the strategic intervention areas, through a Intercounty Zonal Spatial Plan (ZSP-IC) or a Regional Zonal Spatial Plan (ZSP-R);
Proposals stemming from the consultation process	• Urban plan/planning for 20 minutes-walk neighborhoods - planned share of residential area, amenities, recreation etc. • Build collective housing compounds in PPP on unused lands (e.g. along railway lines) • Expand the rehabilitation program for apartment blocks throughout the city • Paint the facades of the apartment blocks at large scale, to change this aspect of the urban landscape (involving specialists in the field - artist, students etc.); • Renovate standardized apartment blocks built in the communist period: change the elevators, refurbish the facades of the apartment blocks • Solve the problems related to housing - provide social housing, clarify some cases of illegal housing • Encourage the citizen's feeling of belonging toward the neighborhood - e.g. stimulate groups of civic initiatives, owners' associations. - Municipal company in charge with the management of neighborhoods (Helsinki model - adapted to the local conditions)

2.3.2. REAL ESTATE MARKET

Figure 20.
Distribution of dwellings built after 2000 and of those with units available for sale; distribution of land buildings; land reserves



Source: Own processing

Key-issues

The analysis of the real estate market evolution during the past decade revealed a strong development of the Northern area which, due to the constant investment in retail or office buildings, strengthened the premium residential market. The North area is attractive especially due to the enhanced accessibility to the international airport, and to its important leisure and recreation amenities.

The residential market is growing, although with much lower return on investment than office and retail market. The sale price decline in 2008 was present until 2014 (reference year at national level) - when prices started increasing again, and this segment has witnessed an upward trend ever since. The outskirts are dominated by large scale residential ensembles, with the exception of the West and East sub-markets. The Southern market remains the least popular, especially Rahova neighborhood - where

	there are still plots of land located in accessible area, with growth potential. The West sub-market, due to the prospect of a newly finalized underground route, is very active. The office market in 2019 will be stable, due to the increase of prime rental values, with a decrease of vacant offices and increasing demand (since 2017 - reference year - when new peak values for space occupancy rates and minimum values for vacancy rates were reached). For Bucharest, prime rent values were maintained for 5 consecutive years at about EUR 18.5/m2/month, below the values registered for the main Western European cities and for other cities in the proximity, like Athens, Istanbul or Budapest. Consequently, there are development opportunities for Bucharest, both in terms of land or buildings availability and in terms of workforce. The demand for prime retail buildings is still growing in the retail market. Rent values in the top shopping centers have witnessed a stabilization trend along the year, with a significant gap between their prices and those of street retail units. Industrial/logistics spaces market is manifested through the tendency to locate dedicated facilities outside the city boundaries, along the main road or railway transport routes, and near intermodal nodes. With regard to the land market, in 2017-2018, the areas with the highest transaction volumes (in transaction numbers and value) remain the West and the North areas with a focus on office buildings development. 2019 was dominated by the residential segment, which favored the East area, supported by the development of the retail pole already defined (at the exit to A2 highway), but also Tineretului - Timpuri Noi area or Gara de Nord area. In the field of housing and hosting economic activities, the municipality does not provide an offer and a strategy worthy of a major player in the market, in the absence of a local public policy to attract and operate real estate in favor of small entrepreneurs and investors in a market competitive. Therefore, this real estate fund rather generates expenses associated with the resources involved in the conservation, maintenance and protection of the buildings in the property against vandalism. In other words, most of the houses owned by the municipality are found in old neighborhoods and heritage buildings, which require restoration, conservation and protection, while maintaining continuity in operation, creating the conditions for living in well-defined conditions, respectively of revenue generation for the municipality.
Strengths/ Weaknesses	• The total office building stock in Bucharest reached peak values in 2019, and together with the regional cities analyzed, it shapes the presence of a new rival in the Central and Eastern market. • Bucharest is highly attractive for its locations with logistics or retail functions, due to the financial capacity, the airport, transport infrastructure investment at metropolitan level, but also due to the production, retail and trade increase. • The real estate market is expanding beyond the limits of the city, influencing the development in metropolitan area. The first layer of • The Romanian residential market is lagging behind the Western market in terms of property structure, with more than 95% of the dwellings being individual property, which left the rental market undeveloped and unregulated. Similar to the average selling prices, Bucharest registers the lowest average rent values at European level, only Sofia reporting lower values. • The street retail units are at risk of disappearance, due to the lack of investments, rehabilitation and regeneration works, unattractive urban images in some areas and due to the electronic trade.

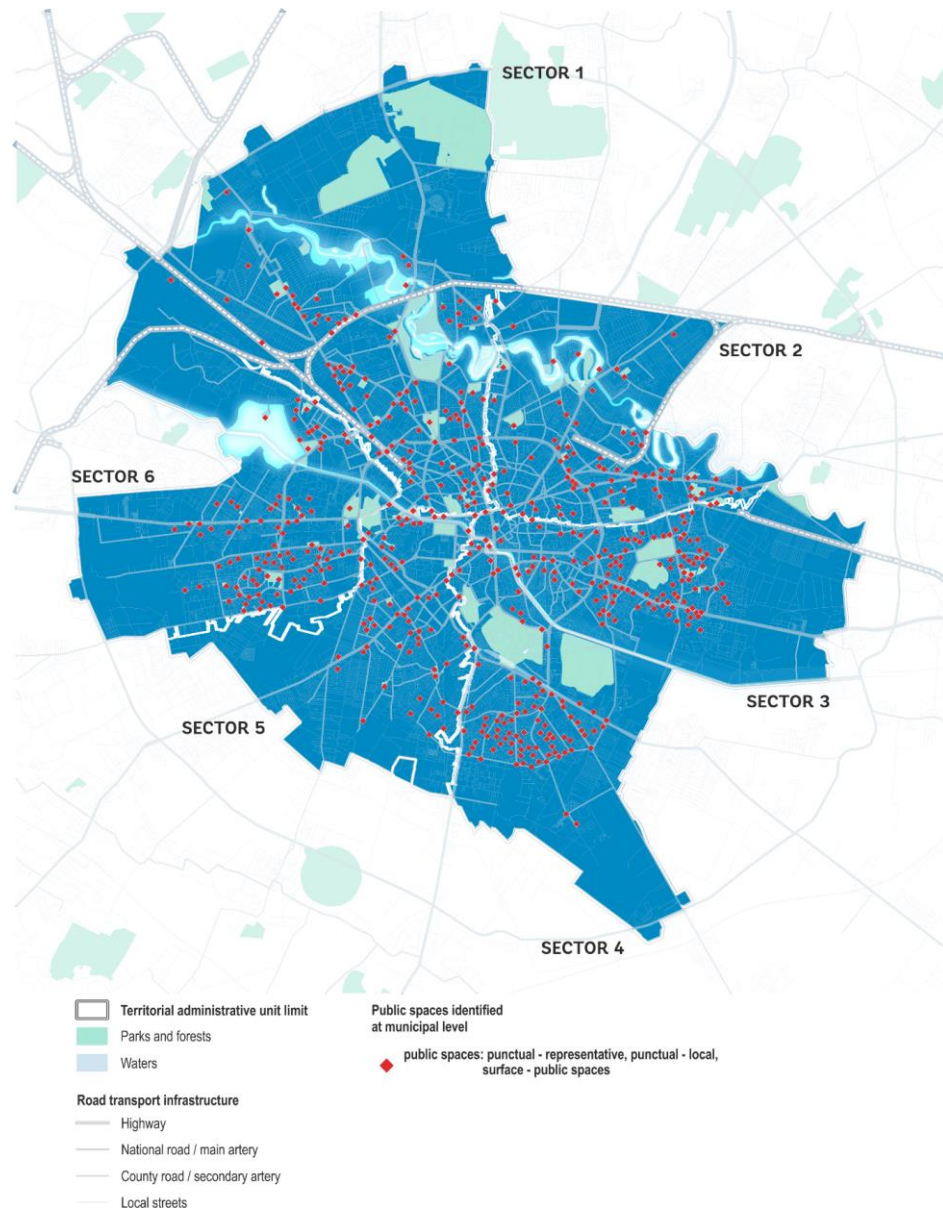
	localities around the city is the most impacted by the development of the real estate sector.	• The sub-markets analyzed are developed in an uneven and imbalanced way, with varying pace and intensity of investments, whether public or private; overcrowding of the North area and economic stagnation of the South area, by aggravated poverty areas, in Sector 5, for example. • The current urban morphology is affected by the numerous “additions” which changed the typology of certain areas dominated by individual dwellings or by the design of new ensembles in empty/undeveloped areas, with precarious amenities. • Property valuation and the current private property taxation system rely on the location of the building, not on its market value, which limits the local budget revenues. • Real estates develop in a very fast pace for the local authorities to control it (PMB or sector municipalities), their role in applying the urban planning regulations being minimal. • The real estate fund of the municipality is largely made up of degraded buildings and is not exploited to its full potential, this being an insignificant player on the local real estate market, both in the residential and commercial segment.
Development trends	• The investments announced for the forthcoming period, whether in the residential or office space markets, focus around those areas where there are (ongoing or future) infrastructure development projects. We note the expansion and diversification of the investment areas, with new development options in the West or East sub-markets. The South area still provides investment opportunities, both due to low prices and to the availability of land either free of constructions or occupied by non-operational industries (large plot of land, connected to all necessary utilities). We note increasing interest in the inner-city investments due to the limitation of travel time, and strengthening of ex-centric poles, like Timpuri Noi or Expoziției. • The office building market is among the most attractive markets for investments, and the attractiveness drivers are related to connectivity, mobility, accessibility in crucial fields like transport, IT&C or workforce attraction. Bucharest still has the chance to grow and develop in a smart way, supported by the economic strength and by qualified workforce specialized in areas of excellence. • Capitalization of the large urban agglomerations strengths, like Bucharest and its extended area, provides the opportunity to develop complex functional areas, where the retail sector provides the necessary support to adjacent office or cultural facilities. This provides an opportunity to generate ongoing consumer	

	and user traffic and, implicitly, to avoid the development of areas with no activities, in days off, for example. • The change in the behavioral patterns of buyers, companies, employees or tourists will reflect on the real estate market demand (with implications for all its components: residential, office, retail, logistics/industrial). The demand is no longer just for residential, office or retail facilities, but for attractive areas, where affordability, urban landscape, public spaces / green spaces, amenities are very important factors. The supply will also be influenced by the increasing construction costs, due to the rising salaries in the field, rising costs for construction materials and energy, to the workforce scarcity, to the stronger environmental and energy efficiency requirements, which will all contribute to increased selling prices.
Strategy recommendations	• Encourage the development of new office building areas and of economic activities outside the center and North areas, mainly in the South-West part of the city; currently, the Antiaeriană area (Sector 5) has a unique potential at regional level and could somewhat balance the polarized North-South development of the Capital; • Identify possible locations, mainly in the South (Rahova or Berceni neighborhoods, with large plots of land available), East or West, where new residential developments should be encouraged, by strategic partnerships with private investors who proved to be the main actors in the development of attractiveness areas, whether they are office buildings, retail or residential areas; • Increase capacity and develop the utility/infrastructure network - urban development planning, by limiting the uncontrolled urban sprawl, by using abandoned spaces and by renewing such spaces and providing them new functions; • Limit the uncontrolled urban sprawl and strike a balance between expansion, affordability and provision of utilities, by market regulation instruments such as the tax incentives and by encouraging the preferential development of certain areas in the city (e.g., Antiaeriană, Ghencea, Progresul/Giurgiului). • Capitalize on the buildings (including public) from the central-historical area of the city for profit-generating purposes (retail, office facilities), following the example of most European capitals, by improving the urban landscape, rehabilitation/restoration of heritage buildings (initially buildings with seismic risk which are part of the city identity); • Increase the attractiveness of existing residential neighborhoods, by rehabilitating the existing residential stock, with zero priority for buildings which exceeded their life cycle (more than 50 years old – Titan, Berceni or Militari neighborhoods). Introduce innovative systems and new technologies to reduce consumption and improve their overall efficiency; • Strengthen public-private partnerships whereby the local administration may use tax incentives for investors so as to contribute to the development of areas which are of economic or social interest, by creating attractive areas in terms of construction quality, urban landscape and by preserving the public interest (especially in the new real estate development areas like Pipera, Theodor Pallady or Militari). • Integrated approach on the development of the metropolitan area, which in the first phase involves a critical look at the peri-urban area of the Bucharest City, consisting in the first layer of localities around the city and especially in the North and South parts, which are highly active economically, with strong entrepreneurial capacity and an economic profile which fits the Capital profile. The real estate developments along the city limits (both inner and outer developments) require a set of joint integrated measures for the basic - territorial-administrative units (Basic TAUs) affected, to enable sustainable

	growth in the future (for example. areas like Prelungirea Ghencea, Militari or Berceni – Popești Leordeni); • Reform the current building taxation system, especially in premium areas, to perform property valuation and to differentiate property according to market value, mandatory measures for owners who fail to maintain their property and thus damage the urban landscape of a neighborhood / contribute to the decline of its attractiveness; overtaxation of abandoned land plots and of brownfields by the municipality, so as to stimulate their inclusion in the real estate flow (sale, development etc.). • Identify the demand for affordable/social housing - and create a quality public housing stock - which should support underprivileged categories in the process of home buying or renting, using specific mechanisms. Implement measures to support the concept of affordable housing, focused on vulnerable categories (to introduce subsidized rent or rent control, for example); • Rehabilitation of the real estate fund of the municipality, with priority of the heritage buildings, in order to their efficient exploitation, including for economic purpose, through a policy of support for small entrepreneurs and investors; • Facilitate access to funding for underprivileged categories - re-think the governmental program First House so as to actually support the more exposed social categories and to ensure their access to quality housing, in areas with access to urban amenities, services, infrastructure and facilities.
Proposals stemming from the consultation process	• Promote a development urban planning model that encourages mixed functions • Better urban planning to balance the development of different sectors. • Higher focus on real estate projects with mixed-purpose, by introducing incentives for the investors interested in this type of projects. • Introduce clear regulations regarding the rules for setting up the new parking areas for new buildings. • Developing parking apps for office hubs. • Centralized online system for real estates in Bucharest and their legal status

2.3.3. PUBLIC SPACES

Figure 21.
Distribution of
local and
representative
public spaces



Source: Own processing

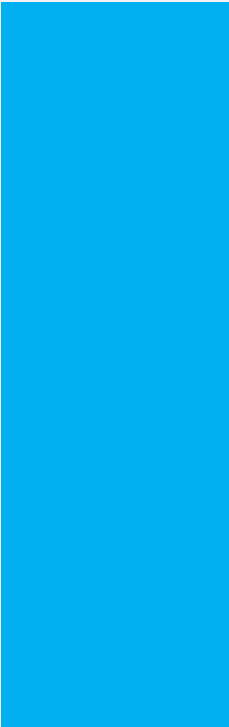
Key-issues

The point-like public spaces, usually represented by squares or playgrounds for children, are placed mainly in the center area or within collective housing facilities. The need for small-sized public spaces is felt especially in the areas with individual dwellings (Andronache, Industriilor, Cotroceni etc.). The lack of interventions in the public space is visible especially at the outskirts, where we find many of the new residential ensembles (mainly in the west and south-west areas).

Surface areas which cover the large parks of the city can be found mainly in areas with high population density, such as Pantelimon, Vatra Luminoasă, Kiseleff, Drumul Taberei, Balta Albă-Titan neighborhoods. Unfortunately, these vast areas are interventions performed prior to 1989. No major interventions to create representative public spaces at city level, whether parks or public squares, have been implemented in the past 30 years. There are no vast public spaces in the central area, mainly in the eastern part of the main traffic ring.

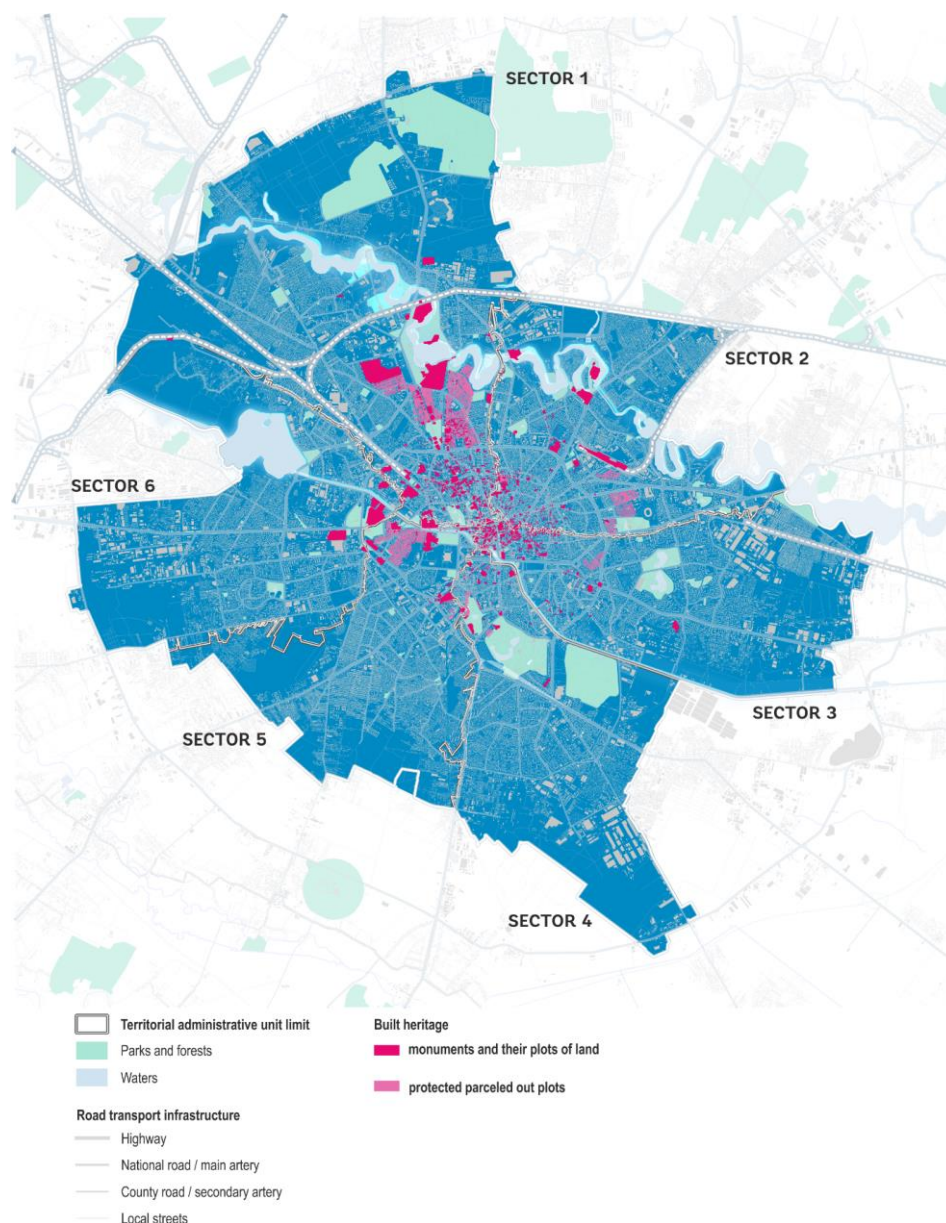
	Linear areas are located mainly along the large roads (Timișoara Blvd, Pantelimon Blvd, Ștefan cel Mare Blvd etc.). These arterial roads benefit from generous sidewalks, usually delimited by roadside vegetation, and host commercial and catering activities. Although their capacity matches the current pedestrian flows, the quality of the urban picture is rather poor. The pavement is degraded, the aesthetic quality of the first ground functions is poor, the urban furniture is damaged, there are no bicycle lanes to facilitate safe traffic both for pedestrians and for cyclists etc. On the other hand, the linear areas in the central area could take over the role of quality public spaces, but they are still blocked by vehicles parked on the sidewalk.
Strengths/ Weaknesses	• Although Sectors 2 and 6 lack vast planned public spaces like we see in the other sectors (Herăstrău Park, Tineretului Park, Titan Park, Văcărești Delta), they benefit from various medium- or small-sized parks (2-10 ha) which manage to serve with relative success most of the population. • Playgrounds account for a relatively high share of the small-sized areas. • Point-like public spaces are relatively well dispersed in the territory and have a diverse morphological structure which enables their renewal and integration into wider public area systems. • School yards are an important land resource for the city. They could be converted into semi-public spaces, accessible for communities after the school hours; • Many of the small-sized areas only benefit from minimal urban furniture and limited public lighting, and are not attractive for the residents in the area. • Uncoordinated outdoor advertising using building facades has a negative impact on the overall image of the public space. • Without a coherent art promotion program for the public space in Bucharest, art interventions are most often a conjectural presence in the public spaces, without bringing a significant contribution to enhancing their quality and identity. • In general, the public spaces network does not include large squares or pedestrian areas which could cater for events of interest for the community and visitors • The lack of interventions in public space is most visible at the outskirts, where most of the new real estate projects are located. • There is no unitary approach at city level to provide access to the city water elements (the chain of lakes and Dâmbovița). • The analysis of public toilets distribution and the analysis of types of water amenities indicate poor endowment of public spaces and parks with such essential amenities.
Development trends	• There is a still relatively high number of surface areas which need rehabilitation; architectural and urban planning competitions could be organized for this purpose. The areas identified for each sector are as follows: Bazilescu Park (Sector 1), Motodrom Park, Sticlăriei Park and Verdi Park (Sector 2), Constantin Brâncuși Park, Unirii Park, Cara-Titan Swimming Pool (Sector 3), Nature Park Văcărești (Sector 4), Centenarului Park, Romniceanu Park, Izvor Park (Sector 5) and the Morii Lake Island and Grozăvești Park (Sector 6). Some

	of these areas are already subject to a renewal process, which must be continued, finalized and, eventually, completed with other new areas. • Most rehabilitation interventions on small-sized areas were performed using improper materials, without a unitary concept and without attention to details. Such an approach will prove inefficient with time, because such areas will require higher maintenance costs. A large share of the point-like areas may be renewed by architectural and urban planning competitions or by urban acupuncture interventions promoted by the public administration. • Bucharest still has significant land stocks to further develop. There are approximately 1,523 hectares of abandoned or derelict industrial areas, which could be subject to a functional conversion process, together with approximately 2,984 hectares of undeveloped land. The biggest land stocks which could be developed are at the Southern outskirts. It is here where the lack of green areas is also most visible (especially in Sector 5), as well as the lack of amenities and the lack of jobs. Therefore, it is important that when planning land stock use, green areas and the introduction of functions other than housing, should be prioritized.
Strategy recommendations	• Develop a technical solution catalogue including the main execution details of interventions in public spaces, which should offer principle solutions for the interventions throughout the city, by types of public spaces; • Detailed mapping and assessment of areas with public access that cover less than 3 ha (point-like areas) and creating a minimum endowment package for the point-like areas, starting with the solution catalogue and good practice guidelines • Develop a comprehensive database at the Municipality level, with the up-to-date situation of outdoor advertising elements and an aesthetical guide for outdoor advertisement and for other types of commercial presentations for the historic center of the city; • Set up a dedicated department of the Municipality which should advise companies on shape, size and aesthetics of advertisement elements • Develop a structure for the public funding of urban art (similar to the European model “percentage for art”) and to allow for the occasional use of urban space to display contemporary art works; • Analyze the minor streets network and its use, to identify options to design a coherent bicycle lane network, which should provide safe connection with the nearest outdoor leisure facilities; • Design and test an instrument for the differentiated use of secondary streets: for example, for vehicle traffic during the week and for pedestrian traffic during weekends; • Map the abandoned spaces, which could provide viable connections in the current green space network, regardless their ownership regime, perform their typological classification, according to the activities they may host and to the improvements they may bring to the current ecosystem services portfolio of the Bucharest City; • In partnership with the Ilfov County Council, with the municipalities of the localities crossed by Colentina and Dâmbovița, and with the Romanian Order of Architects (OAR), organize an international competition for planning solutions for the Colentina and Dâmbovița bank
Proposals stemming from the consultation process	• Interventions to rehabilitate public spaces, in order to transform them in attraction points for inhabitants in the area

- 
- Map the areas in the property of the Bucharest Municipality and their state to allow the development of new cultural areas, including artistic residences (e.g. former schools).
 - Organize new events in the public space - e.g. performance events in subway stations.
 - Organize itinerant shows and educational activities (e.g. workshops) in performances / sports halls in schools to decentralize the cultural offer in the residential areas.
 - Capitalize decommissioned movie theaters in the Capital - their function can be chosen in relation to the development vision of the city.
 - Renew the libraries through microinterventions.
 - Capitalize Dâmbovița as urban axis and public space
 - Organize more cultural events (cabaret shows, teenager concerts, artistic events for all types of visitors), set up stages for music bands/beginner artists in weekends (“Jazz halls, opera concerts... in other words, newcomer bands can come and promote their music there, they can perform on a stage”), set up more terraces in parks, more sports fields, more playgrounds for children, areas for pets, sustained measures for park sanitation, running tracks and bicycle lanes, plant more trees, expand and maintain the green area in parks, organize movie screenings in the summer.

2.3.4. BUILT HERITAGE

Figure 22. Spatial distribution of monuments in LHM 2015 and protected plots



Source: Own processing

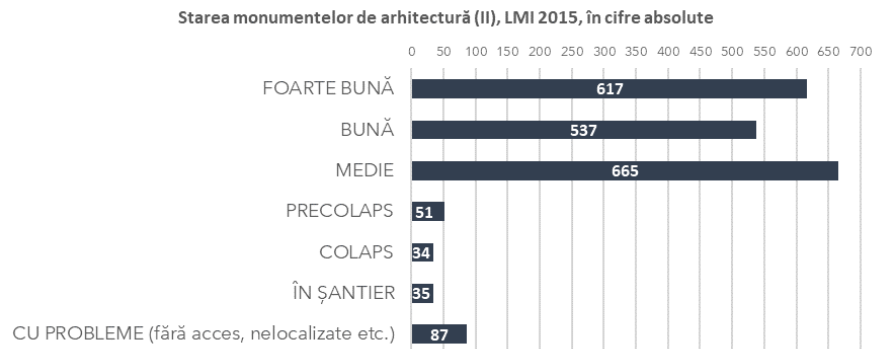
Key-issues

According to the List of Historical Monuments, 2015 (B LHM 2015), the heritage in Bucharest City is made up of: **186** Category I, **2108** Category II, **116** Category III and **241** Category IV monuments (positions in LHM 2105).

The analysis results on the architectural monuments in Bucharest showed that 1154 are in a very good and good state. Therefore, the Municipality should focus its attention on those monuments whose status is average or prone to collapse. Collapsed monuments need to be reviewed and then removed from the List of Historical Monuments, as most of them have been replaced by new buildings.

By analyzing the overlapping parts of the lists LBSR 2020, B LHM 2015 and "Inventory of assets in the public property of Bucharest City", volume 1/2008, we can conclude that there are 50 buildings assessed for seismic risk level and 56 architectural monuments are in the public domain of the Bucharest Municipality. 12 of the latter are architectural monuments that have been assessed for seismic risk level.

Figure 23. State of the architectural monuments in Bucharest City, in absolute numbers



Source: Authors.

Bucharest City has a total of 98 Protected Built Areas. Most PBAs are included in L2b functional subareas and are of the “Regulated plotting development” type. The areas included in L1b subareas (the “diffuse traditional fabric type”) are much less numerous. The urban planning documentation for 12 Protected Built Areas was updated in 2006. The update involved a rectification of the boundaries of the areas under review, as well as the compilation of an inventory of buildings, based on their protection level.

The Zonal Urban Plans for Protected Built Areas in Bucharest (PBA ZUP) and the related Local Urban Planning Regulations (LUPR) have a very high degree of similarity. This creates a need for standardization and probably also simplification, in order to eliminate or reduce as much as possible the tendency of managing such Protected Built Areas by issuing exceptions from the law.

Strengths/ Weaknesses

- Bucharest has a reach built heritage, of which around 56% of the architectural monuments are in a very good and good condition.
- The advanced state of deterioration of the built heritage is reflected by the abandonment of historical buildings, the erroneous interventions to rehabilitate historical monument buildings, as well as the failure to respect the character of high historical value areas.
- The financial resources and instruments available for the restoration and consolidation of historical monuments in Bucharest are not sufficient.
- There is a lack of an integrated urban policy for revitalizing the built heritage of Bucharest.
- The administrative capacity managing build heritage is limited and the number of specialists ensuring the protection of the historical monuments is not sufficient.
- The current format in which heritage data is provided makes any additional processing

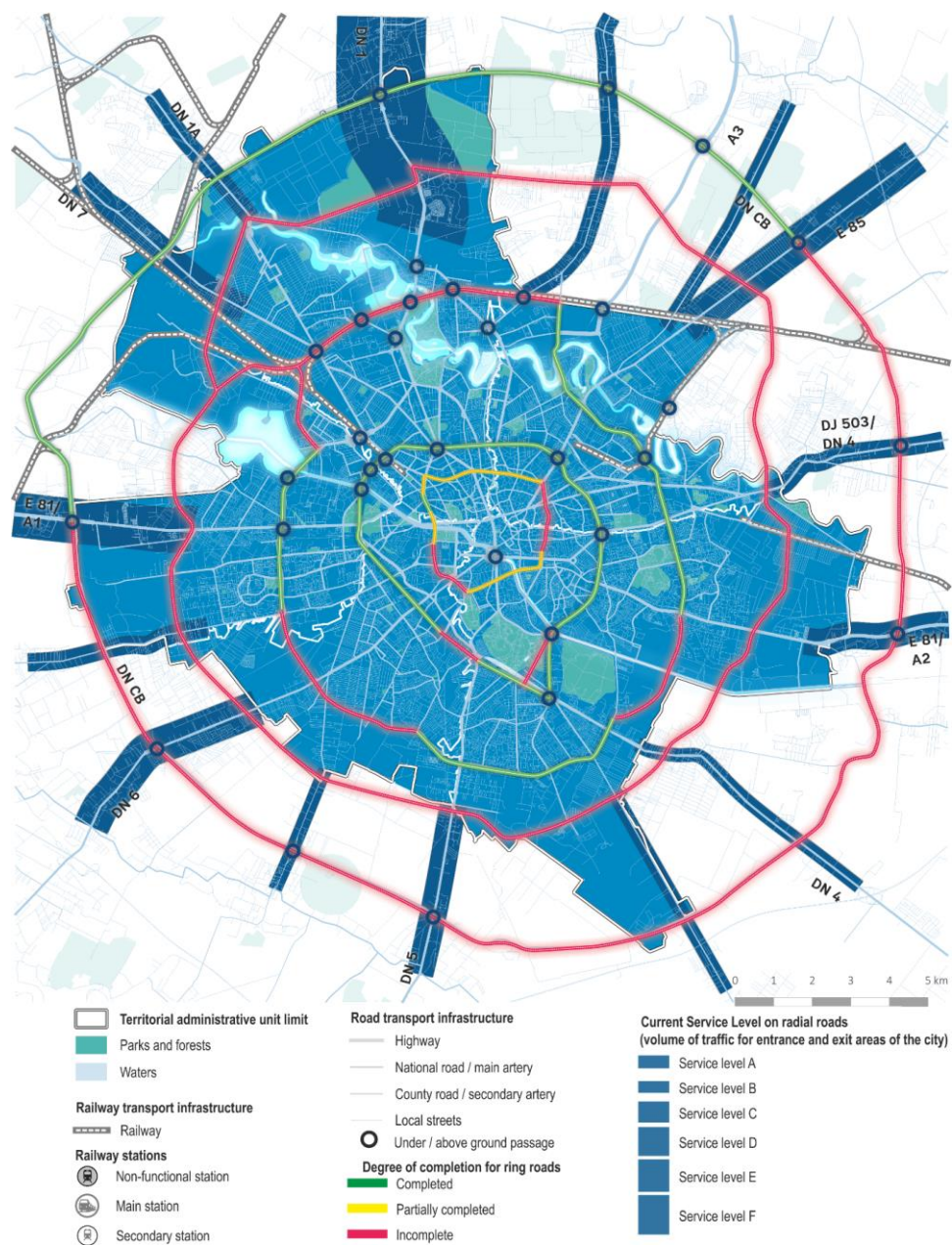
		cumbersome and prone to error. This concerns both the 2015 edition of the List of Historical Monuments in Bucharest City (B LHM 2015) and the List of buildings that have been assessed for seismic risk level (LBSR 2020), as well as the Zonal Urban Plans for Protected Built Areas (PUZ PBA).
Development trends	- Both the Cultural Heritage Code and the Spatial Planning, Urban Planning and Construction Code are currently being developed. The Cultural Heritage Code is more advanced, as the preliminary theses of the Heritage Code have been already developed and the sectoral analyses of the relevant legislation are already available. Both codes will put forward new instruments for planning and implementing the normative provisions. It is very important for them to be aligned, especially with a view to ensuring their effectiveness; - The portfolio of fiscal instruments available to the Municipality has become considerably richer due to the experience gained by cities such as Oradea or Craiova. Given the Bucharest City General Council Decision no. 384/2018, they can now be transferred to Bucharest and then adapted to the local context, at least until the clarification of the regime of infringements to the relevant heritage legislation.	
Strategy recommendations	- Transposition of B LHM 2015 into a database and spatialization of the list in order to provide a flexible and dynamic record tool over time. - Interventions on the built heritage of Bucharest prioritized on the basis of typological analyses, which should ensure a more balanced distribution of the available funding to groups of architectural monuments. - Review MO no. 562/2003 in light of the possibility to create a modular design for the Zonal Urban Plans related to Protected Built Areas and update PUZ PBA for a series of priority areas, such as: “Brătianu Boulevard” Protected Built Area (PBA 04); “Regina Elisabeta Boulevard and Mihail Kogălniceanu Boulevard” Protected Built Area (PBA 06); “Lascăr Catargiu Boulevard” Protected Built Area (PBA 12); “Calea Victoriei” Protected Built Area (PBA 16); “Carol Boulevard” Protected Built Area (PBA 05). - Critically review the resulting similarities between B LHM 2015, LBSR 2020 and the Inventory of assets in the public property of Bucharest City and select buildings for which the Bucharest Municipality, in partnership with Romanian Order of Architects (OAR), can organize architecture competitions; - Revise and update B LHM 2015 so as to reflect the current situation on the ground, in particular for the collapsing architectural monuments - Build or update the partnerships of the Municipality of Bucharest and the National Heritage Institute with universities that provide training programs in the field of heritage, to diversify the traineeship opportunities; - Set up an information group on urban culture and the significance of heritage in the administrative structure of the Municipality of Bucharest or partner with other organizations that already have considerable experience in carrying out such programs; - Establish a consultancy center for the inhabitants of Bucharest City, designed to provide technical solutions that are suitable for all types of interventions on buildings and historical areas;	

	• Compile technically and aesthetically correct guidelines and methodologies or adopt and improve the existing guidelines, such as those prepared by the Romanian Association for Culture, Education and Normality (ARCEN), for example. • Supplement Decision no. 384/2018 of the Bucharest City with fiscal instruments (additional grants, additional taxes etc.) for private interventions in Protected Build Areas considered a priority.
Proposals stemming from the consultation process	• Apply the ICOMOS principle of financing several monuments in an area than financing the restoration of a single monument with very large amounts of money; • Rules on consolidation should be adopted, such as the Seismic Design Code (P 100-3) whose draft has been proposed to the Ministry of Public Works, Development and Administration (MLPDA) about a year ago • Develop a system to attract heritage specialists to the local administration (MA programs and specializations in the heritage field) • More clear prioritization of procedures in the process of approving the technical documentation for historical monuments • More flexible procurement procedures, use of architecture competitions as a procedure that lend legitimacy to the Municipality interventions • Make a new inventory of the valuable buildings representative to the modern period of Bucharest and perhaps submit a proposal to classify them as historical monuments. • Educate the community to raise awareness of the value of the buildings they live in.

2.4. MOBILITY

2.4.1. ACCESSIBILITY BY ROAD

Figure 24.
Bucharest major
road traffic
infrastructure



Source: Own processing

Key-issues

Bucharest City is the most important road node in Romania, being connected to 3 highways (A1 to Pitești, A2 to Constanța and A3 to Ploiești), 8 national roads and 11 county roads. The traffic on these thoroughfares is taken over by the capital city ring road or road traffic network.

The highest traffic volume is found on the northern part of the ring road (DN CB). Only this section of the ring road is mostly widened to two lanes in each direction (the work on the DN2-A3 segment is still in progress). The southern part of the ring road is still undersized, with a single lane in each direction.

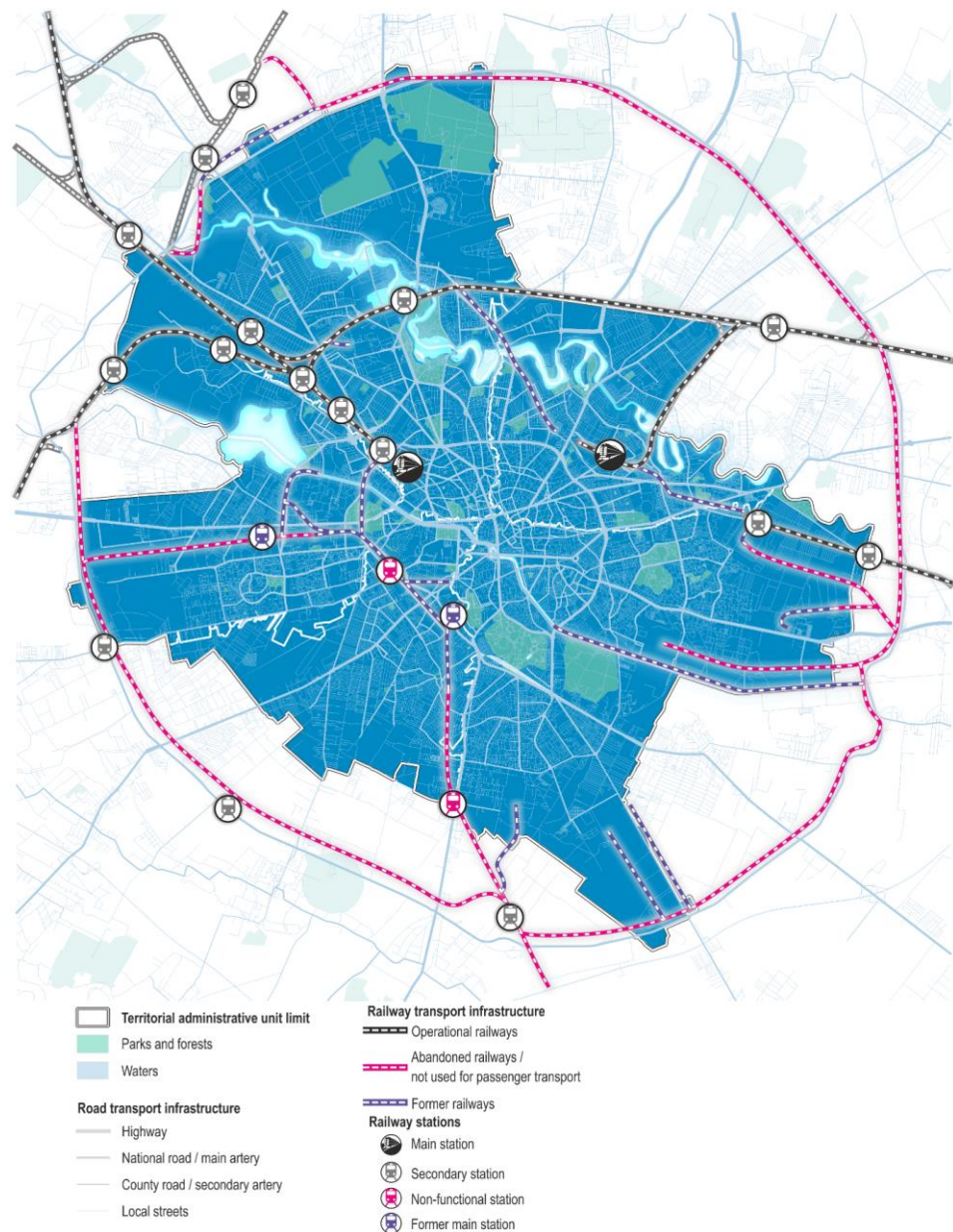
	The very high traffic volume passing the ring road puts pressure on the capital city street layout, situation most apparent on the penetration roads that continue from DN1, A3 (with the recently inaugurated connection to Șos. Petricani), A1 and DN2. The Bucharest road traffic network is a radial-concentric network, consisting of a series of major boulevards, mainly built in the interwar and communist periods, which connect the large residential neighborhoods with the central area. In addition, there is a street layout structured on a series of well-configured traffic rings that is incomplete. The Bucharest street layout is already stretched beyond its capacity and there are very few widening options. The vehicle ownership rate (523 vehicles/1,000 inhabitants) is very high and is constantly increasing. The expansion areas near the ring road face big problems in terms of connectivity and capacity of the street layout. In most cases, these are sporadic developments, for which the necessary transport infrastructure is not provided. Most streets are cat. IV and V streets (local streets) and intersect directly with cat. I or II streets. In the absence of collector roads, the frequent intersections with the main roads slow down the traffic.
Strengths/ Weaknesses	• The central ring is almost complete; there are only two sections where the connections differ from the technical solution proposed in PUG 2000 (Mihai Bravu - Olteniței and Olteniței - Progresului). In order to ease the traffic flow on the middle ring, major investments have been made in recent years to build overpasses/underpasses (Piața Sudului, Mihai Bravu, Basarab and Grozăvești) that complement the existing ones. • The middle ring has benefited from significant investments in recent years, which is why the connection between Șos. Pantelimon and Doamna Ghica area was considerably improved. The investment provides for a better connection between one of the largest neighborhoods in Bucharest and Pipera office area. • Major road infrastructure projects targeted the reduction of travel times on the main roads entering the city, road passageways were built in the Băneasa, Casa Presei, Șos. Pipera areas and new road connections were created, such as A3 - Petricani or the Ciurel overpass (work in progress). • The Bucharest road traffic network is still incomplete, especially in terms of circular connections. • The Bucharest ring road is overcrowded and causes a considerable part of the transit traffic to cross the city, while the middle ring is incomplete, making it difficult to connect the neighborhoods in the southern and the western part of the capital city. • According to TomTom Traffic Index, Bucharest was the fourth most congested city in Europe in 2019, after Moscow, Istanbul and Kiev, and the most congested city in the European Union. Moreover, the congestion level increased by 4 % in 2019 compared to 2018. Traffic is heavily congested on the ring road (on undersized segments) and at the ground intersections between the ring road and the main penetration roads (e.g. Domnești-Prelungirea Ghencea, Șos. Berceni or Șos. Olteniței). • Road traffic is also hindered due to streets blocked by freight vehicles that deliver goods to retail outlets or to various natural persons/companies, to the poor state of bridges and road passageways or railways (e.g.

		Constanța bridge) and to infrastructure quality. • Only 74% of all roads were modernized in 2018 (according to NIS Tempo). The new developments on the outskirts of the capital city face the biggest problems in terms of road infrastructure quality (local gravel or dirt streets). • A specific issue is the cat. III streets with tramway tracks. As the tramway tracks shared with the road traffic have not been modernized, traffic on streets such as Vasile Lascăr, Lizeanu, 11 Iunie or Traian is much more difficult.
Development trends		• In 2020, the Municipality of Bucharest will finance, according to the approved budget, the continuation of projects such as the Nicolae Grigorescu - Splai Dudesu penetration, the Ciurel overpass and the penetration to the A1 highway, widening the Fabrica de Glucoză Street, the Doamna Ghica overpass, the Prelungirea Ghencea-Domnești penetration, broadening of the Ghencea Blvd. and the Brașov Blvd. • Other mature investment projects considered by the Municipality of Bucharest are stage II of the Nicolae Grigorescu - Splai Dudesu - Vitan Bârzești penetration, the Avionului road node (part of the project for closing the Middle Ring), the Șos. Pipera – Dimitrie Pompei – Fabrica de Glucoză connecting thoroughfare, the Valea Cascadelor – Prelungirea Ghencea penetration, the Șos. Petricani – Voluntari overpass for grade separation, the Andronache - Voluntari overpass for grade separation, the rehabilitation of the Fundeni, Ciurel, Opera, Unirii underpass and Timpuri Noi bridges, the rehabilitation of the Chișinău Blvd. and the Pantelimon Blvd., broadening the Șos. București-Măgurele Street, the North-South axis (stages II and III), the reconfiguration of Unirii Square etc. The technical and economic documentation for most of these projects has already been drafted or is currently being drafted. • The sector municipalities also have completed, ongoing or are preparing projects related to the major transport infrastructure, such as: broadening the Turnu Măgurele Street, Berceni Street, Luica Street (Sector 4), extension of the Brașov Street between Șos. Alexandriei and Ghencea Blvd., the urban mobility corridor on Șinei Street (Sector 5), the Electronicii penetration (Sector 2), broadening the Calea Dudești Street, the underpasses at the intersection of Șos. Mihai Bravu with Calea Dudești and Calea Vitan (Sector 3).
Strategy recommendations		• Draft and implement multi-annual plans to complete the street layout in the expansion areas (cat. I, II and III), mostly in partially developed areas, in coordination with sector municipalities • Continue the major road traffic infrastructure projects that target the widening of DNCB, complete and close the median ring, penetrate and reconfigure intersections; • Develop and implement a multi-annual program for the modernization of bridges and under/overpasses

	Logistics strategy for a more efficient delivery system in the capital city, with a focus on identifying measures to reduce the impact on traffic: deliveries in certain time slots, special delivery vehicles in the pedestrian areas, electrification of the vehicle fleet, promoting bicycle deliveries, etc.
Proposals stemming from the consultation process	- Adopt a program that allows teleworking (e.g., from home) and introduce more areas for collaboration - Optimize the use of vehicles within a company by more employees - Measures to discourage corporations from offering company car and offer instead public transport subscriptions - Rethink the vehicle taxation system at city level; increase the level of taxation for each second car bought by the same person. - Street planning guide for Bucharest - Ilfov area (sort of a NACTO guide). - Action plan for interventions in neighborhoods already affected by an undersized layout: living streets or shared spaces and expropriations for layout reconfiguration, if needed, - Possibly an one-way street between Barbu Văcărescu and Calea Dorobanți (taking into account that there is a need for more connecting streets between the two) - Additional connections between Dobroești and Bucharest - Expand DJ300 from Petrăchioaia, an appropriate medium / long-term connection for residential development in Pantelimon.

2.4.2. RAIL AND AIR ACCESSIBILITY

Figure 25.
Bucharest railway network



Source: Own illustration based on: M. Mănescu et. al. 2003. Documentare privind enciclopedia gărilor din România.

Key-issues

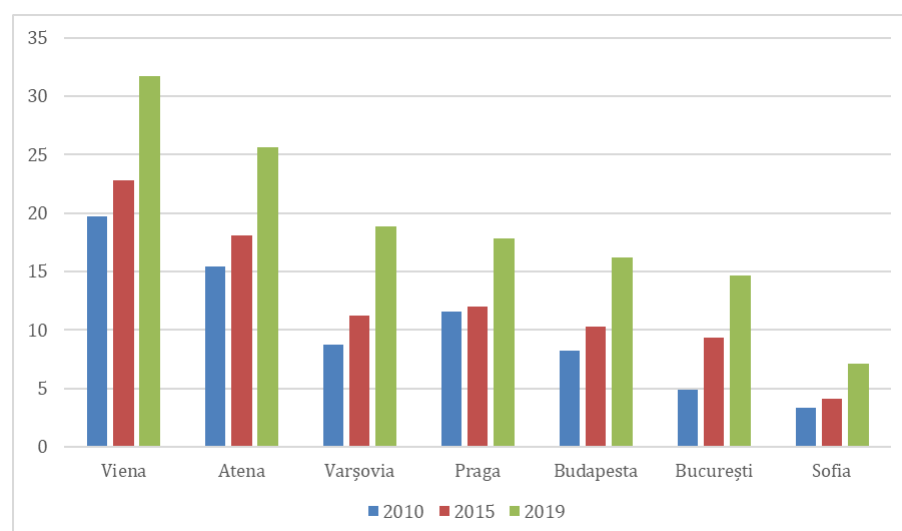
The railway system in Bucharest is declining, undergoing a continuous process of change determined by changing priorities at national, regional or local level. Only 44% of the capital city's railway network is made of electrified lines and only 28% are double-track lines. No new railway lines have been electrified, doubled or built in Bucharest in the last 12 years. Less than half of the capital city's railway network is still being used for passenger transport.

The Bucharest North Railway Station remains the main gateway to Bucharest by rail, while the Obor, Basarab or Titan Sud railway stations only serve regional trains. The Băneasa Railway Station was recently brought back into service and is used by a metropolitan train running on the Fundulea-Bucharest North segment.

Bucharest City is served by the most important airport at national level, Henri Coandă International Airport, and by a secondary airport (Băneasa), which is currently closed to commercial flights due to consolidation and modernization works.

“Henri Coandă” is a Category A airport in terms of passenger and freight traffic at European level, i.e. large community airports (over 10 million passengers and over 10 thousand tons of freight carried every year). At regional level (Eastern Europe), it ranks behind the airports in Warsaw, Prague and Budapest in terms of passenger traffic.

Figure 26. Total number of passengers (mill.) who transited through the airports in South-East Europe between 2010 and 2019



Source: ACI Europe

Strengths/ Weaknesses

- The current railway infrastructure ensures a series of strategic connections both nationally and at a metropolitan level, providing a potential of revival for increasing the mobility in the region.
- Henri Coandă International Airport is consolidating its position in the region through a constant growth in the last 9 years. The number of passengers carried between 2010 and 2019 increased by 199%, while the freight volume (in tons) increased by 52% during the same period.
- The ring railway is not used for passenger transport and is in an advanced state of degradation. Segments of the southern railways leading to the Filaret, Progresul and Cotroceni train stations still exist.
- The gradual decline of the regional connections and of the railway stations that they serve causes the rail transport to gradually lose its competitive advantage over road transport.
- Henri Coandă International Airport connections are limited only to public transport lines toward the historic center or Bucharest North Railway Station. For any other areas it is necessary to change the public transport line.

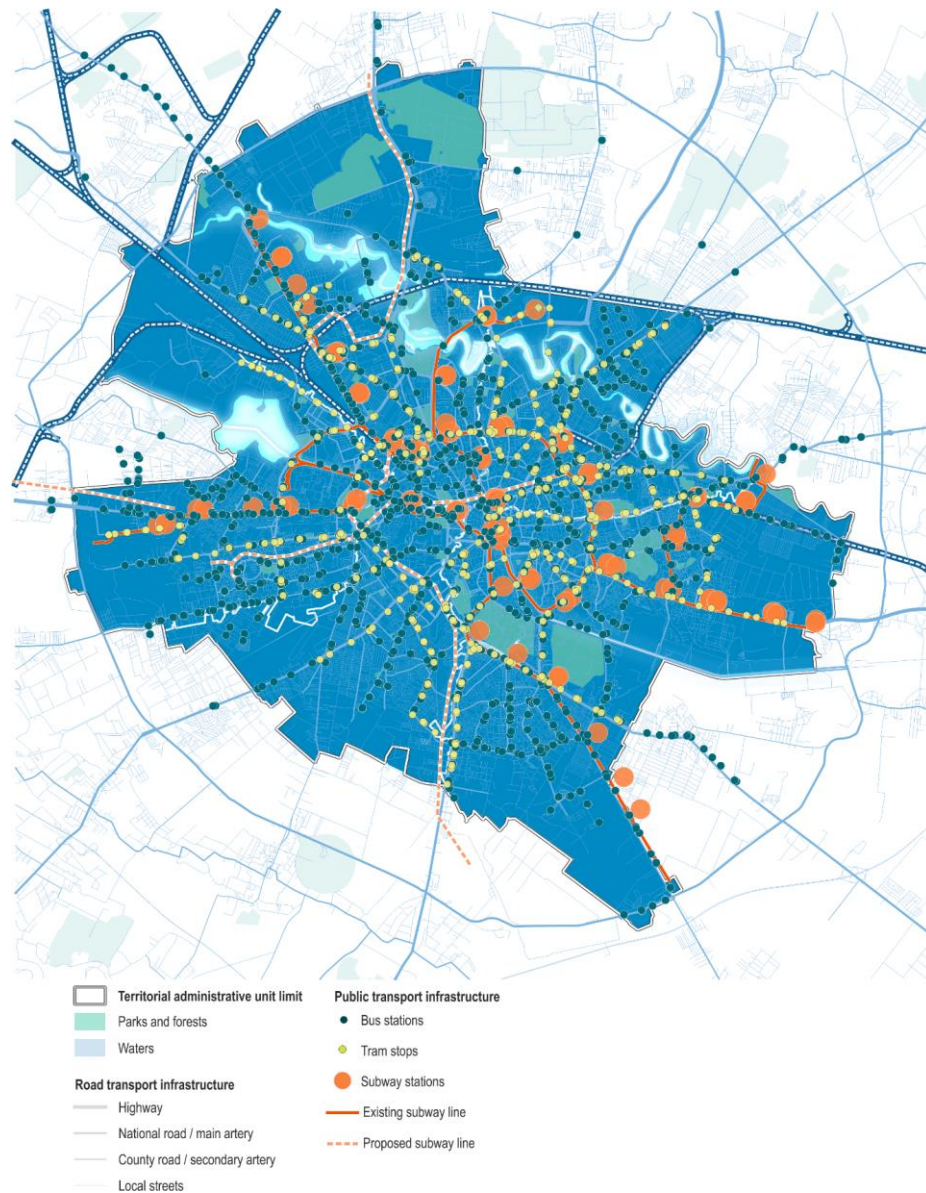
Development trends

- The main rail infrastructure projects are included in Romania's General Transport Master Plan. The modernization project for the 902 line to Giurgiu is seen as a priority, including the restoration of the Grădiștea bridge.
- Two other important projects for the capital city's railway network are the increase of the travel speed on the 900 main line to Videle and the connection between the Bucharest North Railway Station and the Henri Coandă International Airport, which is already under implementation.
- In the long run, the electrification of 902 line between Giurgiu and the Bucharest North Railway Station is considered after 2021 (including the

	southwestern part of the ring railway), along with the increase of the travel speed on the 901 line to Pitești. The modernization of the 500 main line between Ploiești and Buzău will also optimize the trips between Bucharest and the cities in the Moldova region. • The feasibility study for the modernization of the Bucharest North Railway Station was initiated at the end of 2019, which would enhance the urban regeneration process already seen in the Grivița - Buzești area.
Strategy recommendations	• Develop a metropolitan rail transport system with a component dedicated to commuter flows and the integration with the metropolitan public transport by road. The railways of strategic importance such as the connection to Progresul railway station (including the land on which the station is built), the ring railway or the one that connects the ring with the Cotroceni area should be preserved and protected from real estate developments. • Modernization of the Obor Railway Station (including increasing the frequency of metropolitan trains) - intermodal node with bus terminal, railway station, bike sharing, car sharing, scooter sharing, public transport. An easy connection (green corridor for non-motorized travel) with the Obor subway station is needed. • Reconstruction of the Progresul Railway Station as an intermodal node with Park&Ride facility (bus terminal, local public transport station - including expansion of the tramway tracks, regional public transport station, etc.) - the project depends on the modernization of the 902 line between Bucharest and Giurgiu. • Turn the abandoned railways leading to the central ring into sustainable urban mobility corridors or green spaces/linear parks. • Increase Henri Coandă International Airport (AIHC) accessibility by rail and public transport dedicated lines. • Expand the “Henri Coandă” International Airport (new passenger terminal, multimodal cargo platform, multi-story parking area, technology park and shopping area) – cf. Strategic Program for Airport Infrastructure Development at Bucharest Henri Coandă International Airport • Recommission Băneasa Airport (can be used for domestic flights) - problems with adjacent residential areas, pedestrian overpass needed to cross DN1 more easily.
Proposals stemming from the consultation process	• A study that also involves Giurgiu connection (including Grădiștea bridge) is in progress for the southern part of the railway ring up to Bucharest North Railway Station. • Opportunity to transform the former compromised railway lines (Filaret / Cotroceni) into green corridors. • The railway ring can work in the same way the 26 tram operated in the past. • Opportunity to develop a Terminal station in Justiției neighborhood • Protect railway routes through urban planning documentation and by not granting building permit • Build a railway station in Petricani with park and ride • Increase the frequency of trains on Domnești - Bucharest North Railway Station route (often the connection Bucharest - Videle is faster by rail than by road) • Use Obor railway station for regional / metropolitan transport => railway stations in Fundeni, railway passage over the chain of lakes • Develop the new railway station in Mogoșoaia

2.4.3. PUBLIC TRANSPORT

Figure 27. Public transport infrastructure - public urban transport stops



Source: Own illustration based on STB / Metrorex map

Key-issues

Bucharest City has one of the most complex public transport systems in Europe, given that it makes over 1.67 million trips per day. The 76 bus lines, 17 trolleybus lines, 24 tram tracks and 4 subway lines serve a population of over 2 million inhabitants, using a fleet of 1,977 vehicles (of which 83 are subway cars).

The capital city public transport network is complemented in the territory by the metropolitan public transport with 46 routes (of which 5 express routes) and by the railway network that makes the connection with the main workforce pools in the region (Bucharest-Ploiești, Bucharest -Târgoviște, Bucharest-Pitești, Bucharest-Constanța, Bucharest-Craiova).

Although an extensive process of modernization of the surface public transport vehicle fleet has been launched in the last 2 years, the main problem remains the network efficiency. Be it overlapping lines (subway + tram + bus or tram + trolleybus + bus) or the congestion that reduces the commercial speed, the surface public transport is not

	yet an alternative to traveling by private car (although the network serves 85% of the population, the modal share of public transport does not exceed 30%). The public transport system is divided between several operators (subway, surface transport, local transport, regional transport), which operate as parallel systems, with no integrated tariff system in place.
Strengths/ Weaknesses	• The public transport network covers a large share of the capital surface, the areas with the highest population or activity density being well covered by the public transport. • Positive results in terms of increasing the efficiency of the public transport network can be observed on those segments where dedicated lanes for public transport vehicles have been implemented, especially by the physical separation of the tramway tracks on the main penetration roads. • The access to information on the time the means of transport arrive at the station and on the routes has considerably improved, even though the displayed timetable cannot always be met due to traffic congestion. • The investments in the surface public transport operator were made especially for the transition to electric and hybrid vehicles. • Taxi and ridesharing services are an important alternative for people traveling to central areas where the number of available parking lots is limited. The quality and price of these services lead to an increasing demand for this type of services. • There are still developing residential areas not served by public transport • The tram network is undersized and not adapted to the new residential developments on the outskirts and 33% of the tram tracks are in a poor condition with problems especially with the switch points. • The trolleybus network is still incomplete and insufficiently correlated with the bus, tram and subway lines. • Lack of an operational e-ticketing system for the surface public transport system has a negative impact on the operator's economic performance and the planning of the transport network. • The underground transport network is stretched to the limit and does not yet serve densely populated areas (Drumul Taberei - works in progress, Rahova/Progresul - feasibility study, Berceni and Casa Presei Libere/Airport), which puts significant pressure on the surface transport system. • Many public transport stations are in a state of degradation, not properly arranged or even dangerous for the passengers. • Despite the ongoing procurement procedures that will significantly increase the operator's fleet of electric or hybrid vehicles and rolling stock, the STB depots have not been fully expanded or adapted.
Development trends	• The Municipality of Bucharest launched two projects with non-reimbursable funding under the Environmental Fund for the purchase of 100 trolleybuses with a length of 12 m (contract awarded in 2020), which will partially replace and expand the existing fleet of 181 trolleybuses, and of 130 hybrid buses (contract awarded in 2019). • The further optimization of the public transport services will require the network reconfiguration, the transition to an efficiency-oriented network, without multiple overlapping lines and the gradual development of multimodal passenger transport, primarily through the price integration between the surface and

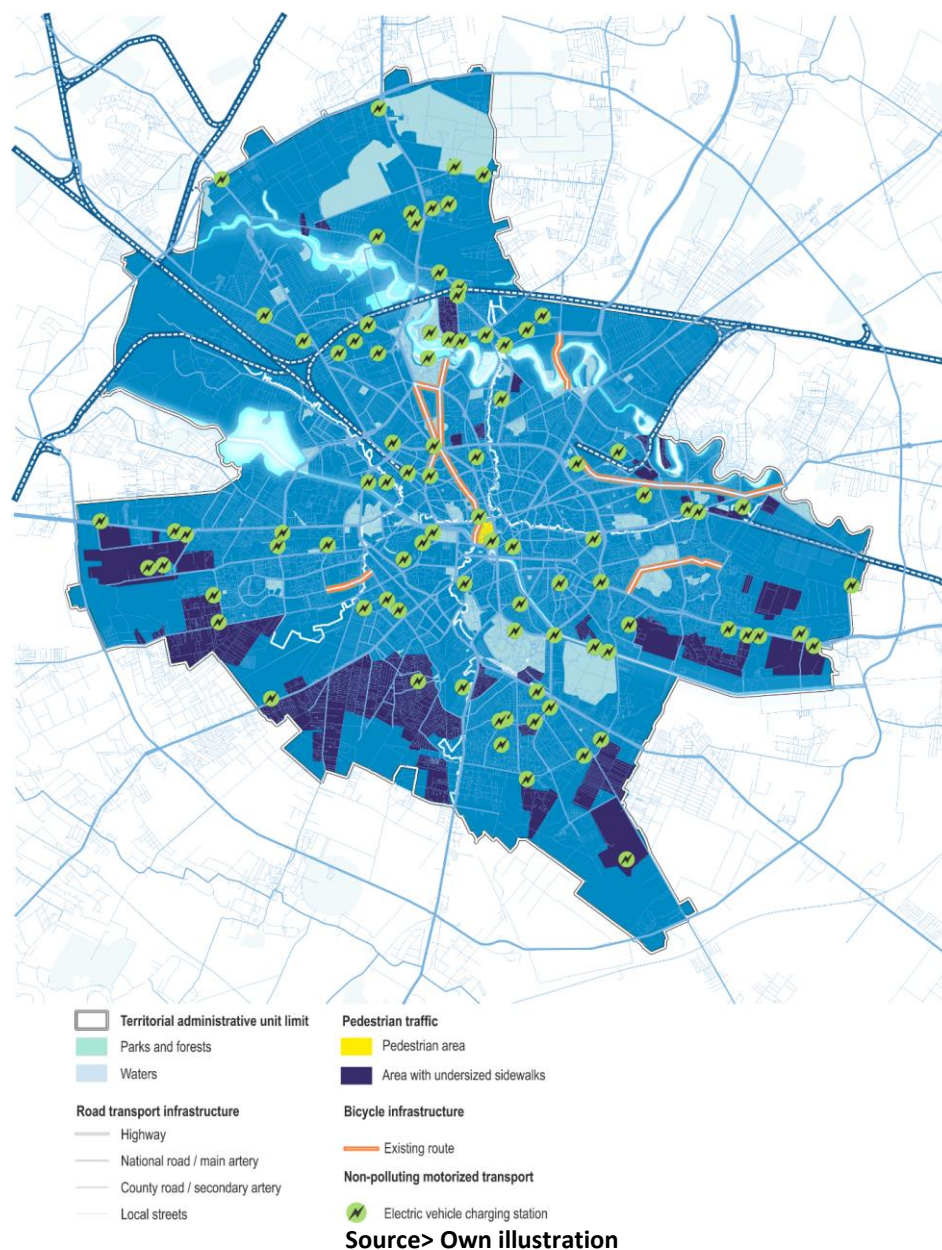
	underground public transport. However, all these must be based on the conclusion of a new contract for the delegation of the public transport service according to Regulation (EC) no. 1370/2007 - Regarding the investments in the underground transport infrastructure, the most mature projects (in 2020) are: - Commissioning of the M5 line (Eroilor-Drumul Taberei) – estimated for mid-2020. - Rehabilitation of the M2 line (Pipera-Berceni) – ongoing tender for the execution works, EU funded, consisting in the replacement of the double tracks over the entire length - Stage I of the M6 line, the 1 Mai-Tokyo Station (Băneasa Shopping City) section – which also benefits from approved EU funds; ongoing tender procedures for the design and execution works. There is also a feasibility study for Stage II – Tokyo-Otopeni Station; the launch of the design and execution tender is expected in 2020, funded from a loan granted by the Japan International Cooperation Agency. - Expansion of the M2 line (Berceni) with an aboveground station – there is a feasibility study developed by the Sector 4 Municipality and an ongoing tender for the design and execution works. - M5 (Eroilor - Piața Iancului) line – ongoing tender for the revision of the feasibility study, which could be funded from EU funds. The construction works could also be funded from EU funds, provided that the financing application is submitted by the end of 2021 and the stages of the project are defined. The project could be completed by 2027. - Expansion of the M4 line (Lac Străulești-Progresul Railway Station) – for which a pre-feasibility study was developed with Swiss funds and the EU funding application can be submitted until the end of 2020. The project could be completed by 2026. - Rehabilitation of the subway stations – preparation of the procurement procedure for design services, with the support of JASPERS. - The project list also includes the expansion of the subway lines to Buftea, Pipera – Petricani or to the A1 highway. These interventions would serve a large part of the peri-urban areas with the most intense development in recent years.
Strategy recommendations	- Reconfiguration of the public transport network in relation to the commissioning of the subway line, by gradually eliminating the inefficient secondary routes - Defining priority corridors with high-capacity subway-tram public transport (including in the central area) - Further investments in the public transport vehicle fleet (especially rolling stock, purchase of electric buses, etc.) - Modernization of the following depots: - Modernization of the tram tracks, prioritizing those in the central area and expanding to the areas with new residential developments - Complementing the trolleybus network - New licenses issued only for taxi drivers using hybrid or electric vehicles (extend the measure to include ridesharing services - Uber/Bolt/etc.). - Implementation of a correlated STB-Metrorex e-ticketing system, plus CFR in the long term (for metropolitan transport) - Expand the subway lines, modernize, optimize and expand the subway station capacity on the M2 line - Modernization of the public transport stops

**Proposals
stemming from
the consultation
process**

- Incentives to encourage public transport.
- Introduce more school buses.
- Green transport for public transport.
- Improve the coverage and quality of the public transports, especially in developing areas
- Increase the circulation period for the tourist bus and improve their state and displaying elements.
- Further delimitation of the public transport lanes and modernization of the tram tracks' switching points.
- Increase the price for tickets
- Strengthen the controls and measures to pursue the travelers to pay directly the tickets and not the fine that is not collected by STB
- Analysis of the opportunities to connect Dimitrie Pompeiu and Barbu Văcărescu lines and expand the tram tracks to Băneasa
- Recommission the 5 tram line and expand it to Băneasa Mall (with park and ride) - the line can also serve the ANL apartment building nearby the airport
- Modernization of the tram tracks, especially in the central area
- A Lane dedicated to trams on Regina Maria Blvd.
- Tram lines connection in Unirii Square - 2 scenarios: 1) ring surrounding the square or 2) a two-way street on the western side of the square.
- Set up a balloon loop in Piața Sudului or in M. Bravu area.
- Trolley connection Unirii Square – Universitate – Romană
- Trolley connection Bucharest North Railway Station (96 and 79 line connection)
- Continue the trolley line on Calea Griviței to Dacia Blvd.
- Decommission the 336 bus which totally overlaps (95%) with 61 trolley.
- Pipera, Dimitrie Pompeiu (16/36) with Barbu Văcărescu connection (line 5).
- Possibility to expand the tram tracks on Sos. Petricani to Voluntari (intersection with Sos. Pipera)
- Doamna Ghica passageway with tram track -> shapes a "median" ring with tram tracks: Petricani-Doamna Ghica-Pantelimon-Chișinău (or Morarilor)-1 Decembrie-N.Grigorescu-Iuliu Hașeganu-Turnu Măgurele.
- Brașov Str. and Șos. Alexandriei - Ferentari connection (it is important that the road proposed by Sector 5 municipality to have 3 lanes to allow a tram track).
- Expand the tram tracks on Prelungirea Ghencea street (not on Timișoara Blvd. where there are no developments yet)

2.4.4. ENVIRONMENTALLY-FRIENDLY TRANSPORT

Figure 28.
Infrastructure for
pedestrians,
bicycles and non-
polluting
motorized
transport



Key-issues

The non-motorized means of transport, together with the public transport and electromobility, are a priority for today's transport policies at global, European and national level. The low infrastructure costs, the much lower space requirements and the insignificant level of CO2 emissions are the main benefits of non-motorized travel.

In 2018, 683 electric vehicles were registered in Bucharest and another 63 in Ilfov County. The data for 2019 indicate a 250% increase, which means that the number of electric vehicles exceeded 2,000 units, which is still an insignificant share in the total vehicle fleet (less than 0.5%).

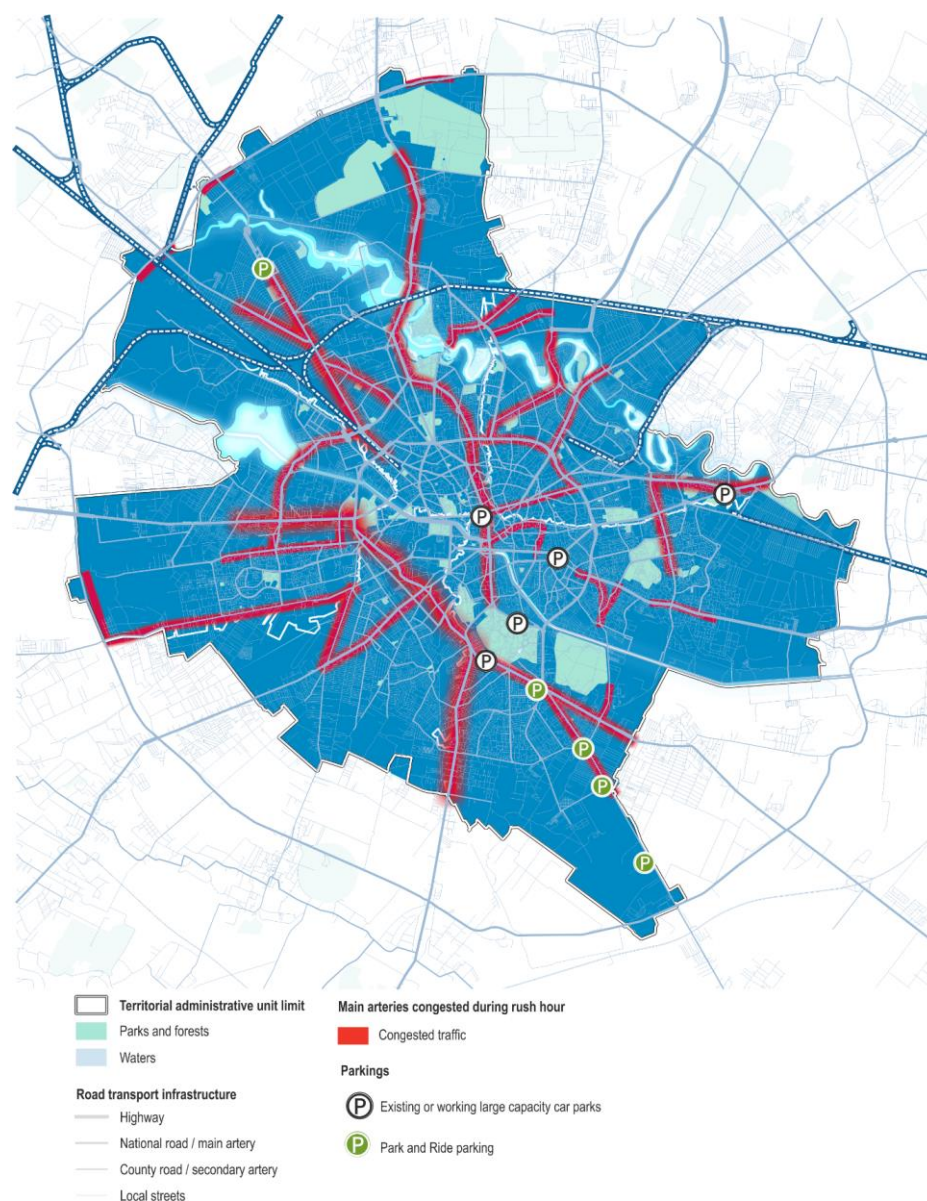
The area covered by pedestrian routes in Bucharest is already much smaller when compared to other European capitals of a similar size (London, Berlin, Budapest, etc.). Although part of the historic center was successfully pedestrianized, which contributed to the regeneration of a fallen area, the model has not been replicated in recent years.

	The capital city has difficulties in ensuring the minimum mobility conditions for people with locomotor disabilities or visual impairments. It is almost impossible for people with locomotor disabilities or visual impairments to get around in Bucharest without a companion. Although the street modernization process often includes ramps for people with disabilities, they do not comply with NP-051. Moreover, an estimation showed that only 30% of the public institutions in Bucharest were easily accessible in 2013. As in most cities in Romania, the cycling infrastructure in Bucharest is significantly underdeveloped compared to the needs of the residents of the capital city. Currently there is only one route in Bucharest with properly installed bicycle lanes, namely Regele Mihai Park (Pescăruș entrance) - Victoriei Square - with a branch to the intersection of Calea Victoriei with Regina Elisabeta Blvd. and to the intersection of Berzei-Buzești with Calea Griviței.
Strengths/ Weaknesses	• The financial support provided by the Municipality of Bucharest for the purchase of an electric vehicle is double compared to national measures, by means of vouchers to purchase non-polluting vehicles and charging stations for electric vehicles. • The pedestrian infrastructure supports a pedestrianization process that is successful among citizens, although it is made punctually. • Feasibility studies were prepared in 2019 for another 4 sections of the capital city bicycle lane network: completion of the north-center route, the north-western part of the central ring (Iancu de Hunedoara - Ștefan cel Mare - Mihai Bravu), connection between the lane on Calea Victoriei and Izvor Park via Splaiul Independenței and Victoriei Square. The preliminary proposals are based on the arrangement of cycling infrastructure to the detriment of vehicle traffic, thus observing the sustainable urban mobility principles. • The network of bicycle lanes and related facilities is still underdeveloped in Bucharest, although the number of cyclists has increased, especially with the introduction of bicycle courier services and scooters. There are no connections with continuous bicycle lanes longer than 2.5 km, but only fragments of a network. • The availability of parking areas for bicycles is still very low and there is a lack of a coherent program for setting them up. • There is no updated normative act or national standard on cycling infrastructure planning. • There are many areas with inadequate pedestrian routes in Bucharest, especially sidewalks that are undersized or occupied by illegally parked cars • Pedestrian routes and public transport stations do not provide access for people with disabilities or strollers. • The EV charging station network can hardly cover the needs of the growing number of registered electric vehicles.
Development trends	• The increasing demand for bicycle lanes will lead to projects that provide bicycle connections between the central area, other high job density areas and large residential areas (Colentina, Șos. Bucharest-Ploiești, Splaiul Independenței, Dimitrie Cantemir or Calea Rahovei). The entire cycling infrastructure will also support other means of transport that fall into the “micromobility” category - e.g. electric scooters.

Strategy recommendations	• Installation of bicycle lanes on the radial thoroughfares connecting the central area with the collective housing neighborhoods. All these projects must include cycling facilities, especially secured parking facilities. Self-care stations can also be installed/purchased. Cyclist counting devices must be installed for monitoring the use of the infrastructure, thus continuing the initiative launched on Calea Victoriei. • Installation of bicycle racks along the bicycle lanes and in the vicinity or the yard of public institutions (especially high schools). • Development of the bike-sharing system (only after the completion of a minimal bicycle lane network) - preferably, the expansion of the existing system by private operators. • Supporting cycling events. • Education program on the principles of sustainable urban mobility (pre-university education) • Compiling an inventory of all sidewalks in Bucharest City that are undersized or occupied by illegally parked cars and implementing measures to ensure pedestrian movement • Expansion and installation of pedestrian areas (in the historic center and in pilot neighborhood centers) • Sustainable urban mobility corridor - reconfiguration of Calea Griviței between the Bucharest North Railway Station and Calea Victoriei Following the interventions on Berzei-Buzești, the area is already in a slight revitalization process (especially the Bucharest North Railway Station-Buzești segment) – the project shall include a bicycle lane, as an essential connection between the Bucharest North Railway Station and the central area. • Intersection signaling (for the disabled) and installation of pedestrian bridges in high-risk intersections • Traffic calming on secondary streets • Program for the development of the EV charging station network correlated with those already installed by the private sector • Multi-annual program for the modernization of the public transport vehicle fleet - purchase of electric or hybrid vehicles
Proposals stemming from the consultation process	• Incentives to use bicycles • Develop a network of bicycle lanes in all areas of Bucharest • Develop renting and bike sharing systems, e-bikes, e-scouters • Expand the pedestrian area in the Old Town and set up pedestrian routes - e.g. on Calea Victoriei, Rosetti area, Unirii Square and Palace of the Parliament connection etc. • Set up a pedestrian bridge halfway between Izvor Park and Unirii Square. • Installation of tourist signs towards the main attractions, which also display the travel time. The digital info-points were not successful in the past and are not a necessary solution in many cases as the human interaction and the need to ask a wide-range of questions are still appreciated. • Enhance the accessibility of the historic center for people with motor impairments (e.g. for people using wheelchairs). • More tactile and audio markings, embossed maps for public buildings and other measures to easily access and use public buildings

2.4.5. TRAFFIC MANAGEMENT

Figure 29. Traffic and parking system congestion



Source: Own processing

Key-issues

The entity handling the traffic management system in Bucharest City is the Bucharest Traffic Management Municipal Enterprise (CMMTB SA), which implements three subsystems: the urban traffic control subsystem, the public transport management subsystem and the closed circuit video camera traffic surveillance subsystem.

Intermodality, a key element in today's transport systems, is still underdeveloped in Bucharest. Although several intermodal nodes and transfer parking areas are gradually being implemented in Bucharest, the small number and poor quality thereof hinder the optimal functioning of the transport system.

There were 1.4 million vehicles in use in 2019, while the total number of the residential parking lots communicated by the 6 sector municipalities was less than 200,000, i.e. 1 charged parking lot for 7 vehicles. The new shopping centers provide, to a large extent, the required parking lots for their customers, but they are mainly used and guarded during the day, more precisely during the stores' opening hours. The new office

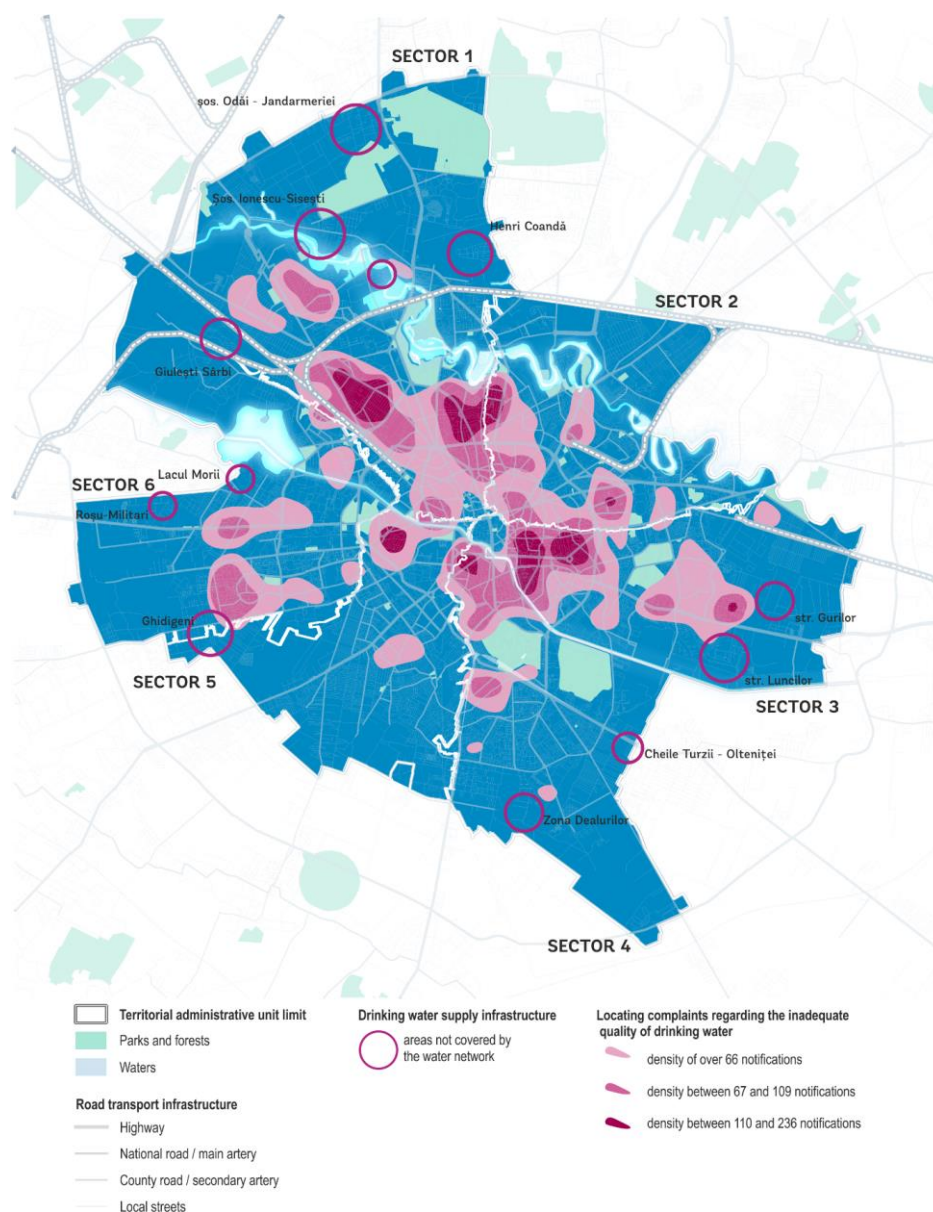
	developments also provide the required parking lots in most cases, but their insertion in areas where the street layout has a limited capacity leads to traffic congestion (especially in the central area).
Strengths/ Weaknesses	• The number of serious road accidents in Bucharest has been constantly decreasing since 2008, in most cases by half or even to one third (e.g. number of fatalities). • The intermodal structure of the capital city consists of the two international gateways and several intermodal nodes between the subway network and surface public transport, with transfer parking areas under construction. • To discourage stopping in the central area, the new pricing policy adopted by CGMB in 2019 stipulates an increase of the fee perceived by public parking areas managed by Parking company. • Bucharest hasn't got a well-defined multimodality policy yet and the level of integration between the underground and the surface transport, the network of transfer parking areas and the private mobility services are still inadequate. • The intermodal nodes and points concentrate several transport lines in the same area, but they lack facilities designed to ensure an easier transfer between the different lines/means of transport, bicycle facilities or appropriate waiting areas. • The transfer parking areas are still built at a slow pace; only 2 of the 19 main access roads are equipped with such facilities. • The current bus terminal network in Bucharest is inefficient (poor quality of bus terminal facilities, many of them are just improvisations, inefficient spatial distribution) • The Bucharest residents do not have easy access to sufficient information about the mobility services and the concept of ride-sharing is in an early stage of implementation. • Since the need for residential parking areas cannot be satisfied, parking on the sidewalk, on raw lands or even on the green spaces is quite common in the collective housing neighborhoods in Bucharest. • Taking into account all the problems related to parking areas, there are still no clear measures taken in Bucharest to discourage the use of private cars.
Development trends	• Bucharest Traffic Management Municipal Enterprise is considering a series of measures to improve the traffic management system in Bucharest, aiming at: the introduction of traffic management infrastructure in the road works approval process (in order to reduce the risk of damaging the fiber optic network and sensors by the road workers), the installation of traffic lights and the integration of new intersections in the system, as well as the modernization of their infrastructure (traffic lights, acoustic and light equipment, push-button systems for pedestrians, signs, markings, traffic controllers, etc.).

	• The Bucharest-Ilfov Public Transport Intercommunity Development Association (ADITP), responsible for urban mobility planning and for monitoring the implementation of the measures included in the Sustainable Urban Mobility Plan (SUMP) adopted in 2016, aims to update the transport model, which will be used for the mandatory testing of all interventions involving the use of European funds in the field of mobility, as well as all measures related to the field, regardless of the source of funding. Moreover, the traffic model should be integrated in the analysis of the opportunity for new developments, thus complementing and verifying the traffic studies carried out by developers during the approval process. • The shaping of an intermodal structure in Bucharest is an essential step in increasing the public transport efficiency, but also in the transition to more sustainable means of transport. This is to be done at the operational level, by implementing a common tariff system for the two transport operators (STB/Metrorex), but also for the services provided by STB in Bucharest and Ilfov County, along with major investments in shaping a network of transfer or “park&ride” parking areas.
Strategy recommendations	• Development of the integrated tariff system in Bucharest and Ilfov County (including regional CFR). The development of a “Mobility as a Service” app is considered in the medium term for the integration of all the mobility services in Bucharest-Ilfov (information and, subsequently, pricing) • Gradual shaping of a network of important bus terminals in Bucharest to absorb the flows on the main access roads • Investing more in intermodality projects, especially in the implementation of transfer parking areas at the intersection between the main regional/national traffic routes and the local ones • Integration of micromobility services - transition from intermodality to multimodality through the gradual integration of different mobility services is also needed: electric bicycles and scooters, taxi and ridesharing etc. • Reconfiguration of the intersections with large pedestrian flows and multiple means of transport (e.g. Victoriei, Tineretului, etc.) and revitalization of the intermodal nodes and points (covered station, benches, digital display of the time the means of public transport arrive at the station/digital map, point of sale, bicycle/scooter parking facility etc.) • Testing a Mobility as a Service app and campaigns to raise awareness about the benefits of alternative transport means • Reviewing the parking management system in Bucharest to avoid overlapping sanctions, promote a park sharing program and ensure residential parking lots using as little land as possible and at actual prices
Proposals stemming from the consultation process	• Promote intermodality between different means of transport (park & ride, bike & ride, subway-surface transport, etc.) in order to obtain an attractive mix that discourages car ownership • Build parking lots near public transport stops; introduce annual tenders for the allocation of residential parking areas; multi-story parking areas; address the issue of abandoned cars • Set up parking lots, including for coaches, nearby the central area. Additionally, set up drop-off / pick-up areas for a higher number of coaches, that also should be marked on a tourist map. • Better management of the existing parking areas: residential parking areas only between 19:00 and 08:00 and use of the supermarket parking areas. • Testing / piloting of “car communities” and ride-sharing to stop using the car.

2.5. PUBLIC UTILITIES

2.5.1. DRINKING WATER SUPPLY INFRASTRUCTURE AND SERVICES

Figure 30.
Localization of
complaints
regarding the
drinking water
and of the areas
not served by the
water supply
network



Source: Own processing

Key-issues

Although in the Bucharest area lies the largest deposit of drinking water in the country, currently the underground catchment fronts are kept in conservation status because of some problems with the water quality. The main water sources of Bucharest City remain the Argeş and Dâmbovița rivers, the raw water being caught from the Dâmbovița River through the Brezoale water intake, and from the Argeş River through the Crivina water intake, both needing rehabilitation.

In addition to the 7 city pumping stations in operation (Nord, Grivița, Drumul Taberei, Preciziei, Uverturii, Grozăvești, Sud), the drinking water distribution system consists of 29 functional pumping stations (40 in total) and 108 functional hydrophore pumping stations (200 in total), which allow to raise the pressure in tall buildings (higher than GF+4) in the areas where they are located. They are interconnected in a ring network with several power supplies, which increases the level of security of supply.

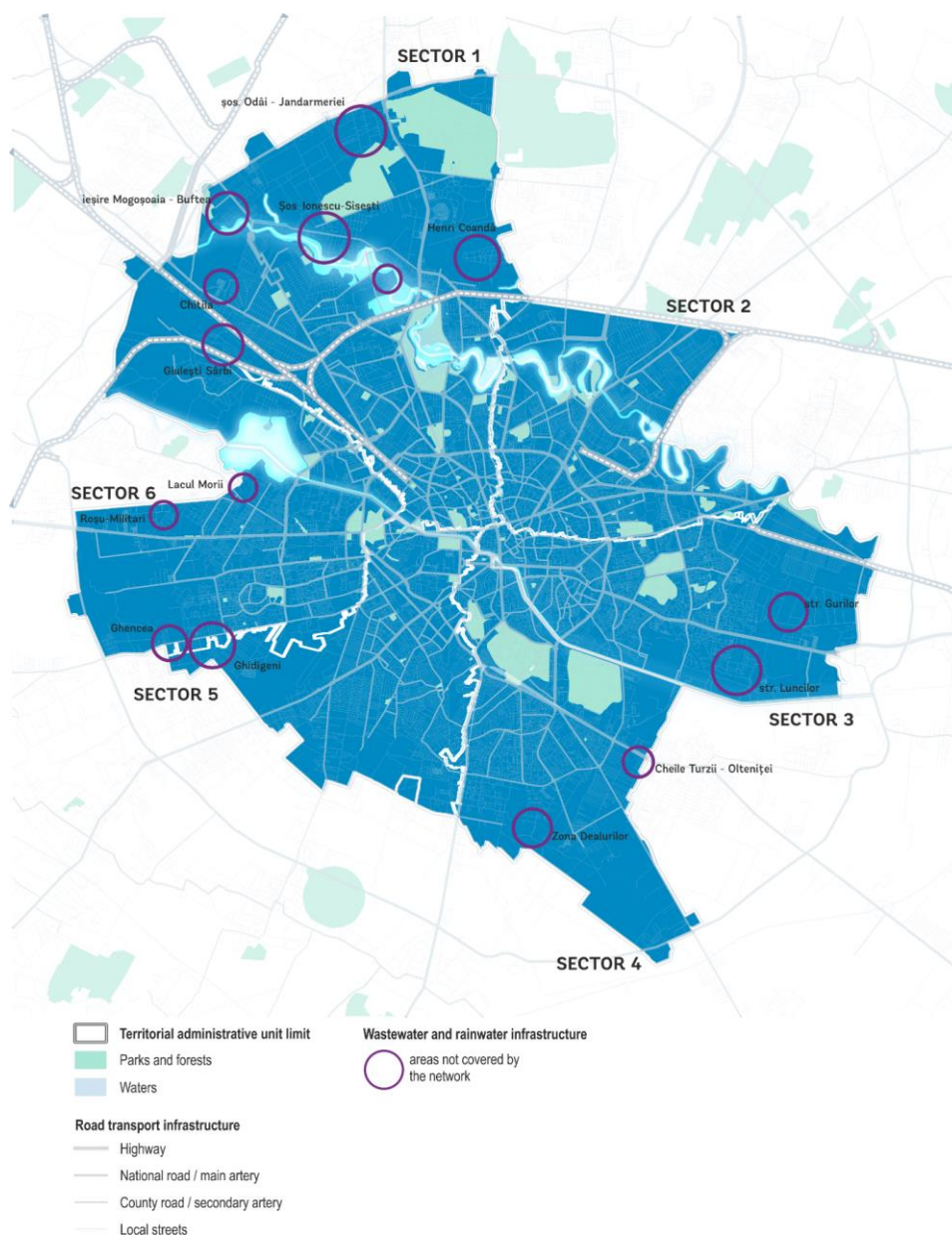
	The distribution network consists of about 682 km of main pipes (250-1,000 mm diameter), the rest being distribution pipes with a diameter below 225 mm. The material analysis indicates that 38% of the network (approximately 970 km) is still made of cast iron and ductile iron, while 42% (1,066 km) is a newer or modernized network made of polyethylene. In 2008-2018, there was a constant decrease in water consumption, in 2008 it was about 130 million cubic meters (decrease by about 24 million cubic meters compared to 2008 - about 15%). During the same period, the water consumption for household use decreased by about 20%, reaching the level of almost 92 million cubic meters (about 43 cubic meters/inhabitant/year), while the non-household water (companies, institutions, etc.) decreased by only 2%. The degree of connection of the population to the water supply service increased from 82.3 % in 2011 to 92.3% in 2016, according to data from Apa Nova Bucharest. For 2018, the NIS data indicate a number of 1,771,000 Bucharest residents served by the drinking water supply system, an increase by 71,000 (+ 4.2%) compared to 2008, representing 96,8% of the residents of the capital city as of July 1, 2018.
Strengths/ Weaknesses	- According to INSSE data, the capacity of water production facilities in Bucharest City is very high in relation to the current consumption (below 500,000 cubic meters), being between 1.5 and 1.43 million cubic meters per day in the period 2008-2018. - The evolution of the drinking water distribution network was marked by important extensions in the period 2008-2018 (+309 km, in absolute terms, + 14%, in percentages, respectively), achieved especially with the beginning of the Bucur program for water and sewerage network extension, in 2009. - The decrease in consumption can be explained by the increase in the efficiency of the distribution network (continuous decrease in the volume of water lost). Thus, the average water consumption decreased from 161 liters/inhabitant/day to 148 liters/inhabitant/day (according to the Master Plan). - The efficiency of the network, expressed as the ratio between the billed water and the water introduced in the network, is currently about 77%, according to the data from Apa Nova, which ranks Bucharest's water supply network in the first places in the country, in terms of efficiency. - Although the operator Apa Nova makes significant investments from its own sources, the tariffs are lower than in 33 major cities in the country. - About 34% of the drinking water distribution network consists of pipes over 50 years old, which should enter a rehabilitation program. In fact, about 54% of the failures registered in the period 2015-2019 were on cast iron distribution pipes. - About 80% of failures on arterial mains (drinking water pipes) occurs on steel pipes. - There are still areas in Bucharest not covered by the water supply network: in Sector 1 (Henri Coandă , Giulești-Sârbi neighborhoods), in Sector 3 (Luncilor and Gurilor areas), in Sector 4 (Progresul area), in Sector 5 (Prelungirea Ghencea) and in Sector 6 (Military - Roșu). - There are asbestos-cement pipes (66 km) in the area of Șos. Chitilei – Bucureștii Noi, but also in parts of the Titan, Berceni or Militari neighborhood. - There are high values of water age, over 12 hours in areas such as Bd. Theodor Pallady, Apărătorii Patriei or Timpuri Noi. The most affected area is the eastern area, as it is located furthest from the points where water chlorination is performed. - The perception of Bucharest population regarding the quality of drinking water is still a negative one.
Development trends	According to the Master Plan for the Water Supply and Sewerage Service in Bucharest City, it is recommended to build new wells in the catchment fronts from Ulmi and Arcuda to ensure a flow of 0.63 m³/s, as well as 35 new wells in Bucharest, evenly distributed within the city's surface, to ensure the water supply for the population in case of need (for example, massive pollution of surface waters).

	- Over the time horizon of the Master Plan (30 years – 2047), it is recommended to resize/replace the drinking water distribution pipes made of cast iron (almost 1,000 km, in total), as well as to resize the steel drinking water transmission arterial mains. (Ring 1 area, Bd. Unirii, Splaiul Unirii, Calea 13 Septembrie, Vitan neighborhood, Bd. Pache Protopopescu, Șos. Iancului, Calea Griviței). - Additional Act no. 11/2020 to the concession contract concluded by the municipality with the private operator that manages the water supply and sewerage services includes a Mandatory Investment Program (IOP), through which the latter undertakes to finance and make investments and works in total value of 230.9 million Euros for a period of 11 years. The implementation of the IOP started in October 2020. - In 2019, the budget approved by the General Council of the Capital included works to expand the networks, including water supply and sewerage, in the Henri Coandă neighborhood (lots I and II). Amounts for this objective are also provided in the budget for 2020, along with the extension and rehabilitation of networks in the areas of Ghidigeni, Olteniței, Cheile Turzii. For these investments PMB attracted EUR 68 million financing from European funds, through LIOP 2014-2020.
Strategy recommendations	- Identification, evaluation and monitoring or closure of wells that collect water from the Frățești strata, existing on the territory of Bucharest City, in order to avoid groundwater contamination - Development of a system that allows to capitalize on the strategic groundwater source, which should be activated in case of force majeure (e.g.: a major pollution on surface waters). - Building a pollution alert station upstream of the Arcuda treatment plant. - Rehabilitation of the dam system at the Brezoale water intake and continuation of the rehabilitation program in the case of the Crivina intake. - Modernization of the sludge separation system at the Red treatment plant. - Use of the industrial water supply network to serve the south-eastern area (including neighboring localities: Popești-Leordeni, Jilava). - Building a new pumping station in the eastern part of the city. - Resizing/replacing cast iron pipes more than 50 years old (526 km) which are located mainly in the central and northern part of the municipality. - Resizing the steel drinking water transport arterial mains, located in the Ring 1 area, Bd. Unirii, Splaiul Unirii, Calea 13 Septembrie, Vitan neighborhood, Bd. Pache Protopopescu, Șos. Iancului, Calea Griviței). - Extension of the water supply network in the areas located at the city's administrative limit, as well as in the areas of Gurilor, Luncilor, Dealurilor, Ghidigeni. - Replacement of the remaining asbestos-cement pipes in Bucharest's water supply network. - Building a chlorination plant within the new pumping station proposed in the eastern part of Bucharest. - Extension of water facilities on the entire territory of Bucharest, in order to increase the thermal comfort in the summer season and to ensure an easy access to drinking water in the public space. - Design and implement measures to ensure critical infrastructure resilience (make sure that pipes are seismic resilient)
Proposals stemming from the consultation process	- Coordination of intervention works on municipal networks - Expansion/rehabilitation of water supply infrastructure - Carrying out extensive information campaigns on the quality of system's drinking water.

2.5.2.

2.5.3. SEWERAGE AND WASTEWATER TREATMENT INFRASTRUCTURE AND SYSTEMS

Figure 31. Areas not served by the sewerage network



Source: Own processing

Key-issues

In Bucharest, the collection of wastewater and meteoric water is done through a network of service canals and sewers. The wastewater box culvert, the general collector, is located under the landscaped bed of the Dâmbovița River, has a length of 17.6 km (from Morii Lake to Glina Wastewater Treatment Plant) and takes over the wastewater and meteoric water brought by the 12 main collectors and 12 secondary collectors. Total length of collectors is about 118 km.

The Apa Nova data indicate a total length of the sewerage network, in 2018, of 2,469 km, to which are added approximately 930 km related to the 126,000 connections (including the Apa Nova network on the territory of Popești-Leordeni). Of this length of the network there is a separate rainwater collection network along only 89 km (3.61%

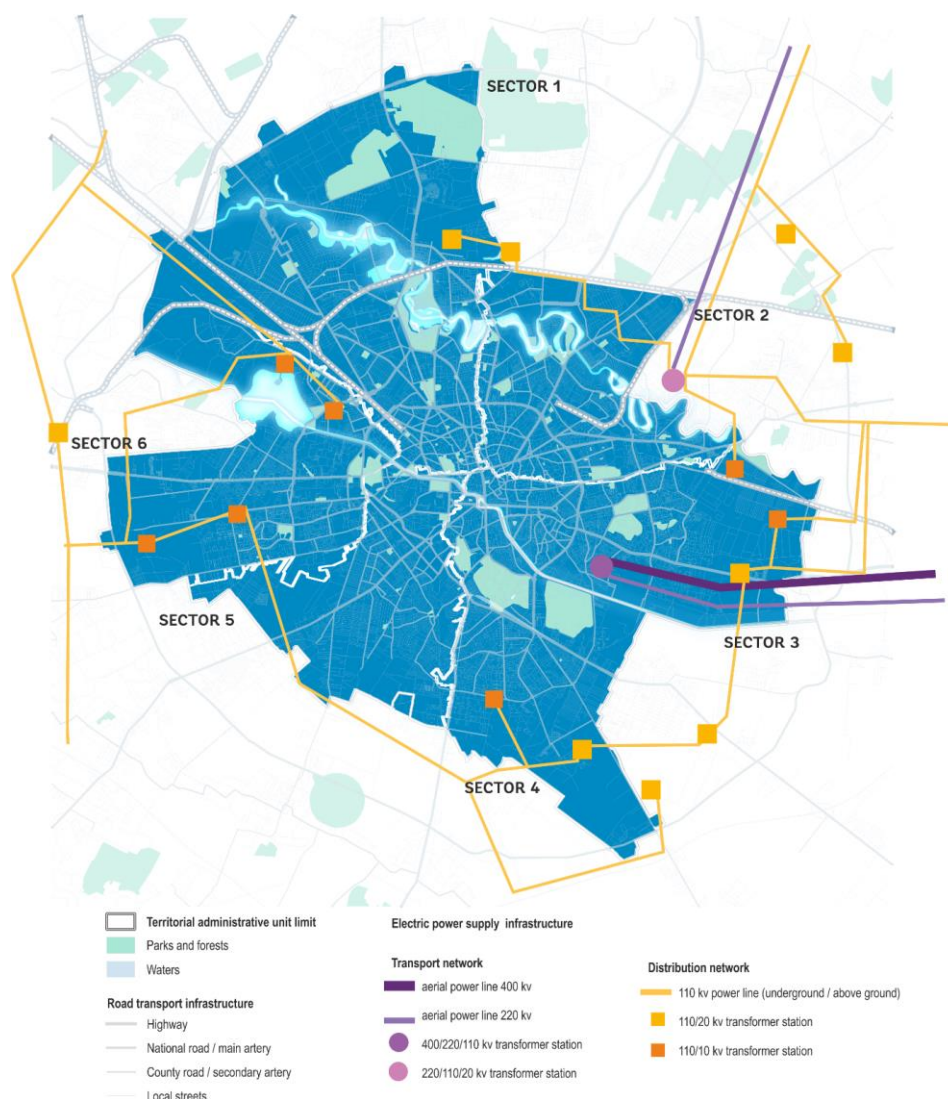
	of the network), and the separate domestic water collection network is currently only 78 km long (3.16% of the network). The separate network for collecting rainwater and domestic water had been developed either in older areas, where the expansion of sewerage networks was done in a separation system (Andronache, Tei-Toboc, Fundeni, Giulești-Sârbi neighborhoods), or in more recent developments (Brâncuși, Străulești neighborhoods, Șos. Bucharest-Măgurele). There are also several important arteries where a separate rainwater collection network has been set up: Bd. Unirii Boulevard (partially), Bd. Decebal, Bd. Burebista or Bd. Constantin Brâncoveanu. The box culvert transports wastewater and domestic water to the Glina Wastewater Treatment Plant (WWTP), located in Glina commune, 11 km southeast of Bucharest. For stage I (put into operation in July 2011, with ISPA funds), the treatment plant has the capacity to partially (mechanically) treat up to 10 m³/s, of which only 5 m³/s complete treatment (biological and tertiary).
Strengths/ Weaknesses	• The degree of connection to the sewerage system increased from 81.5% in 2011 to 92.2% in 2016. For 2018, NIS data indicate a number of 1,771,000 Bucharest residents connected to sewerage and wastewater treatment systems (with tertiary stage), which means a degree of service of about 96,8% for the Bucharest residents (as of July 1, 2018). • PMB is currently carrying out, with European funds (through LIOP 2014-2020), projects to extend the sewerage network in the areas of Ghidigeni, Olteniței, Cheile Turzii, Henri Coandă, to build the drainage system on the right of the box culvert below Dâmbovița River and the one of Titan, Tineretului and Carol lakes, rehabilitation of the main sewer collectors (A0 and B0), rehabilitation of the box culvert and of the main drainage system on its left side, rehabilitation and replacement of sewerage network, respectively the construction of secondary drains in the Cotroceni, Regina Maria and Tineretului areas. • Glina WWTP is dimensioned for a 1,728,000 p.e. (population equivalent), but currently the project for the second phase is being implemented, which will expand the capacity to 2,417,000 p.e., will ensure the mechano-biological treatment with removal of nutrients and sewage flows of 12 m³/s for the primary and biological stage, • The low drainage speed of wastewater (below 0.7 m/s) does not ensure the minimum self-cleaning speed, in dry weather, for all collectors. • The sewerage network (including the size of the wastewater box culvert) is dimensioned in the 1980s, for a lower degree of waterproofing and a lower intensity of precipitation compared to current time. • Almost 93% of Bucharest's sewerage network operates in a unitary regime. Considering the increase of the waterproofing degree and the accentuation of extreme phenomena (heavy rains), this fact poses important problems in the operation of the network and treatment systems (frequency of flooding of underground infrastructure elements, in case of heavy rainfall). • Over 50% of the sewerage network is in as an advanced state of degradation, requiring frequent interventions to remedy local problems. • There are areas not served by the sewerage network: the area in Sector 3 located north and south of Bd. Theodor Pallady (Gurilor and Luncilor area), but also in the northern area and in the Henri Coandă, Giulești-Sârbi neighborhoods or in the Prelungirea Ghencea area. • An average wastewater flow of about 3 m³/s (about 40 %) passes only through the primary treatment

	respectively rainwater flows of 12 m ³ /s for the mechanical stage.	stage, generating important problems related to the quality of water in Dâmbovița River, downstream of Glina WWTP.
Development trends	- The Master Plan envisages, in the long-term investment plan, the intervention in the case of critical areas, such as the passages in Bucharest (rehabilitation and modernization of rainwater drainage facilities in the underground passages Mărășesti, Lujerului, Jiu, Victoriei and Unirii). It is also proposed to build retention basins in the area of the parks Izvor (reservoir volume 11,000 cubic meters) and Opera (reservoir volume 15,000 cubic meters), as well as the landscaping of Lake Văcărești, with a view to store rainwater in the southeastern part of the city. In a broad sense, in addition to the investments made for the rehabilitation of the sewerage network, one can also study the possibility of using the Colentina valley (and the lake chain) as an emissary for rainwater collected in the northern part of the capital (after making separate systems). - The long-term investment plan in the Master Plan provides for the resizing of large sewer collectors, approximately 100 km requiring rehabilitation works due to age and significant existing malfunctions. There is also a proposal to build new collectors: on Bd. Uverturii - Str. Orșova (southern area of Morii Lake, L = 1.5 km) and in the southern area (L = 9 km). - Other important intervention areas, where it is proposed to resize the existing sewerage network, are the areas of Cotroceni (replacement of about 6.5 km of concrete pipes), Regina Maria (replacement of 7.4 km of concrete pipes) and Tineretului (replacement of 1.6 km concrete pipes), but also the area of Slobozia street (Gramont plot), where new collectors are proposed (about 7.8 km), a bi-compartmental retention basin with a total volume of 9,300 m³, as well as a pumping station for emptying basins - Other investments are proposed in the Master Plan: - Building sewerage network of divisor type in Henri Coandă neighborhood; - Building a unitary sewerage system for taking over the domestic and rainwater wastewater from the Ghidigeni street basin; - Extension of sewerage networks of divisor type in the north area (Sos. Odăi – Șos. București-Ploiești – Str. Jandarmeriei – Șos. Ionescu-Sisești – Șos. Bucharest Târgoviște); - Extension of sewerage network in Luncilor, Gurilor, Dealurilor, Chitila, North right, Ghencea, the exit area to Mogoșoaia - Buftea, Morii Lake and Giulești-Sârbi areas - Design and implement measures to ensure critical infrastructure resilience (make sure that pipes are seismic resilient) - Completion of the second phase of the Glina Wastewater Treatment Plant project is also recommended, which provides for the expansion of capacity to 2,500,000 l.e. and the possibility of biological treatment of a volume of wastewater of 8.3 m³/s.	
Strategy recommendations	- Identification of solutions for periodic hydraulic wash of collectors. - Adaptation of the sewerage system to a calculation frequency, in case of rains, of 1:10. - Providing alternative power supplies for all wastewater pumping stations. - Realization of an integrated system for rainwater management, at municipal level:	

	- Extension of the separate rainwater collection network, directing them directly to the outflows after pre-treatment, where this is possible (for example, along the Colentina River valley). - Building retention basins and arrangement of green areas to allow rainwater storage. • Rehabilitation and upgrade of stormwater drainage facilities from the underground passages Mărășești, Lujerului, Jiului, Victoriei and Unirii • Rehabilitation of 100 km of large sewer collectors, which need rehabilitation. • Resizing the sewerage network in the areas of Cotroceni, Regina Maria, Tineretului, and Slobozia street area. • Extension of the sewerage network in the areas located at the administrative limit of the municipality, as well as in the areas Luncilor, Gurilor, Dealurilor, Giulești-Sârbi or Morii Lake.
Proposals stemming from the consultation process	• Restore the sewerage system in the entire city; • Complete the construction of the Bucharest treatment plant • Coordination of intervention works on municipal networks

2.5.4. ELECTRICITY

Figure 32. Power transmission and distribution networks



Source: Own processing

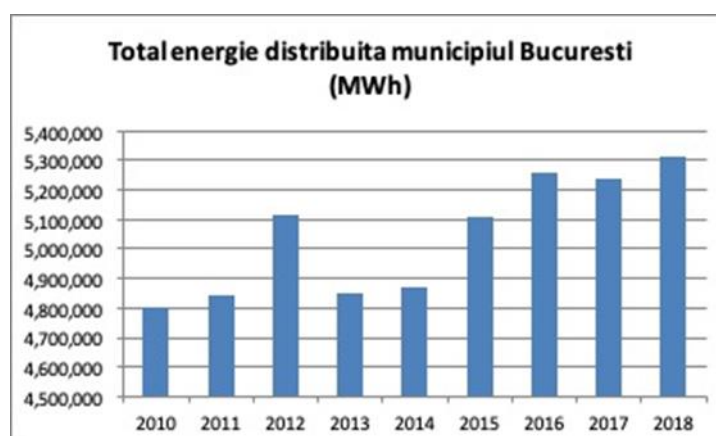
Key-issues

The economic development of the city of Bucharest has led to an increase in electricity consumption higher than the national average, exceeding 1500 MW at peak load in winter 2017-2018. This represents approximately 65 % of the injection capacity from the electricity transmission network to the electricity distribution network in Bucharest and leads to reaching the limit value of injection capacity on each of the power supply areas inside Bucharest, the network not operating in loops.

The users of the electricity distribution network (EDN), mostly consumers (end customers), are directly connected to the electricity networks of public interest managed by E-Distribuție Muntenia S.A., a private company, part of the ENEL group.

In terms of the performance of the power supply service, in 2018 there were 22 incidents, representing 55% of a total of 40 internal incidents in the network of the distribution operator E-Distribuție Muntenia. These incidents were caused by failures of the network elements (defective cables and cords, bypassed insulators, defective equipment in the electrical substations), being predominant the failures of the electric power lines in medium voltage cables.

Figure 33. Dynamics of the electricity consumption in Bucharest City, between 2010 and 2018



Source: ENEL

Strengths/ Weaknesses

- Development of generation from renewable sources, especially from Dobrogea and from the areas adjacent to Bucharest, has as a consequence the increase of the power flows that transit the electrical substations that supply electricity to the Capital
- In 2019, E-Distribuție Muntenia carried out investments from its own funds for the transition to 20 kV of the 6 kV and 10 kV network in the areas Bucharest South - Jilava (in stages), Drumul Taberei (in stages), Cotroceni (in stages) and Floreasca - which serves about 34,500 consumers. Also, more than 120 transformer substations and a series of transformer points throughout the city have been modernized, including them in a remote control and automation system, which allows remote operation and isolation of faulty areas.
- Most network elements are older than 35 years, fact that leads to the technical depreciation of materials, under standard conditions or at the end of life of assets in electricity networks. A small part of the total energy capacity has been rehabilitated or modernized.
- The reported incidents in the power supply service lead to interruptions in the supply of users and to the decrease of the continuity indicators of the power supply, corrective maintenance measures being necessary.
- The security of consumers' supply decreases in summer because this is when the total shutdowns for annual overhauls take place in the CHPs that supply electricity and heat to the Capital.

Development trends

- On the territory of Bucharest City, development works are intended in the North area: Henri Coandă HV/MV electrical substation - located in the neighborhood with the same name, Mircea Eliade HV/MV electrical station - located at the intersection of Calea Floreasca and Str. Mircea Eliade and the new HV/MV electrical substation in the Industriilor area.
- In the future, the forecast is that electricity consumption in Bucharest will increase, especially in the residential sector. In this conditions, the development of electricity supply infrastructure must take into account the lack and cost of land available for development works, the existence of users with a high degree of susceptibility to the quality of electricity supplied, the high number of cable supply lines, the decommissioning of generating sets in Bucharest, the increase of the power transit through Transelectrica substations in Bucharest coming from the Dobrogea area and supplying other areas of the country.

Strategy recommendations

- In the short term, the flexibility of the 220/110 kV Fundeni substation to increase the safety in supply of consumers in the north-east part of Bucharest and the installation of a new AT 220/110 kV 200 MVA, the installation of a new 400/110 kV 250 MVA transformer in the Substation Bucharest South.
- In the medium term, in the Bucharest area (Grozăvești) it would be opportune to build a 400/110 kV substation in the central area, connected by two underground 400 kV power lines with the Domnești substation, respectively București Sud
- In the long term, considering the continuous increase of consumption, it would be necessary to build new 400 kV or 220 kV electrical substations and to build a 400 kV overhead/underground power line from the București Sud transmission substation to the Domnești substation, including the construction of a new 400/110 kV transmission substation in the northeastern area of Bucharest, in one of the localities Otopeni, Tunari, Voluntari, connected by the 400 kV UPL with the București Sud 400 kV substation and by the 400 kV OPL with the Brazi Vest 400 kV substation.
- Design and implement measures to ensure critical infrastructure resilience (improvements on energy supply reliability should include seismic and storm resilience –measures such as bolting down substations so that they don't move in an earthquake)
- Installation of power plants with the possibility of energy storage leading to increased energy efficiency and flexibility of operation.
- Installation of renewable energy sources (photovoltaic panels) on the roofs of buildings so as to have neighborhoods/areas with excess of energy (local annual production higher than consumption in the area).
- Arrangement of electric charging stations for e-bikes/e-scooters and for electric vehicles and electric buses on the main traffic arteries.
- Cogeneration bonus scheme - the cost coverage scheme, started in 2011, must be extended from 2020. It is predicted that in 2025-2026 new capacities can be put into operation. RADET & ELCEN integration and new power plants can be built in Titan, Aviației, Colentina, Casa Presei areas.
- Preventive maintenance program developed and investments in network elements to reduce the number of interruptions;
- Modernization of the installations for increasing the quality of the power supply service; replacement of 110 kV UPL with increased capacity cables, such as the route Bucharest North-Center, Militari-Răzoare, Militari-Grozăvești, Răzoare-Grozăvești, etc.; new 110 kV/MV electrical substations in the Drumul Taberei area, Băneasa

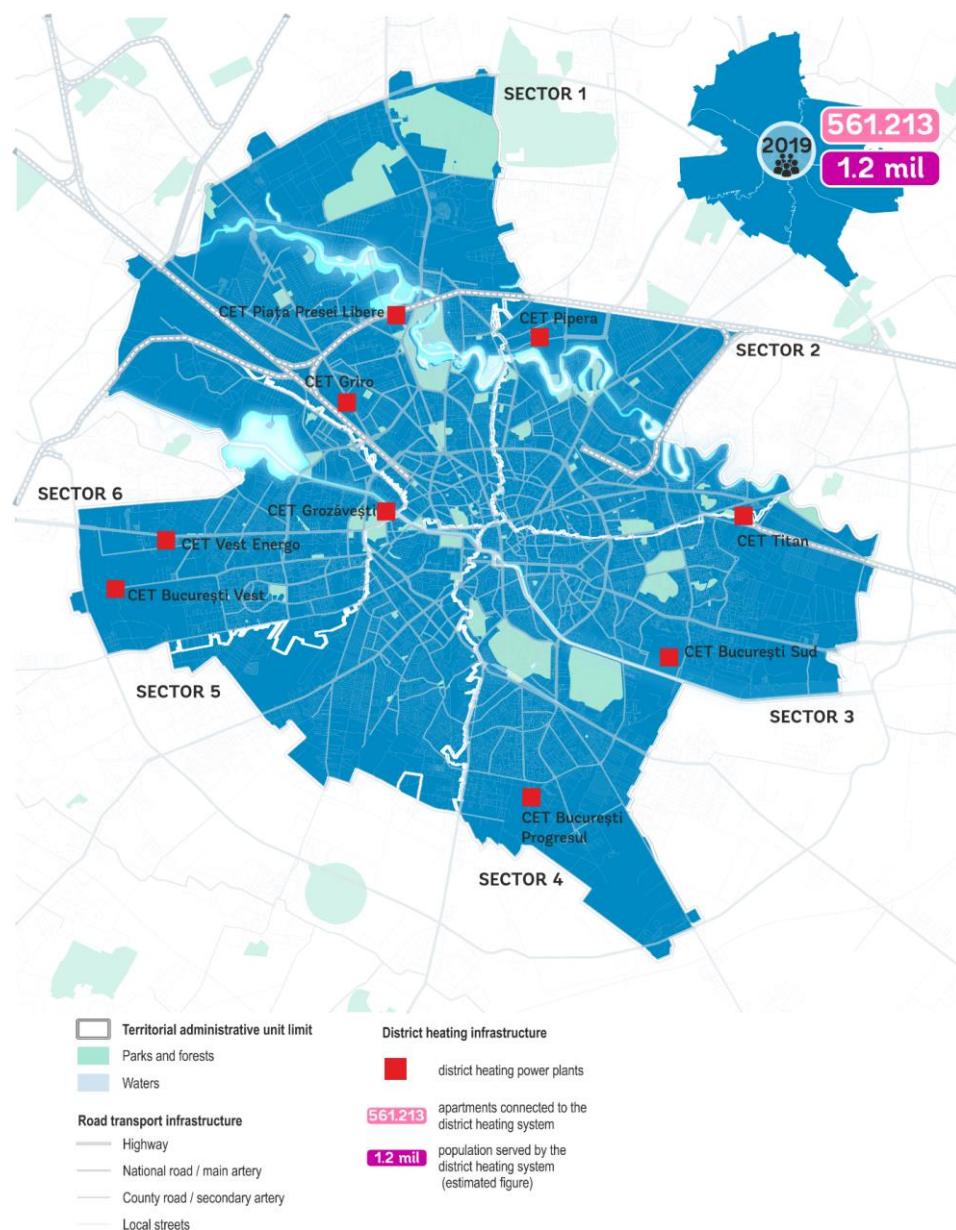
Proposals stemming from the consultation process

- Bucharest South substation - additional transmission injection project from the transmission network to the distribution network - term 2022-2023
- Fundeni substations - project to expand the substation by making an additional injection from the transmission network to the distribution network
- Consolidation problems, Bucharest South + Fundeni substation
- Building a substation in Grozăvești area
- In 5-10 years, a substation in the capital city consumption center + underground network routes
- Local energy production for the decongestion of the power supply system
- Raise awareness of the benefits of using green energy.
- Introduce policies and incentives to promote, encourage and allow the use and capitalization of renewable energy.

2.5.5.

2.5.6. THERMAL ENERGY

Figure 34.
Heating network



Source: Own processing

Key-issues

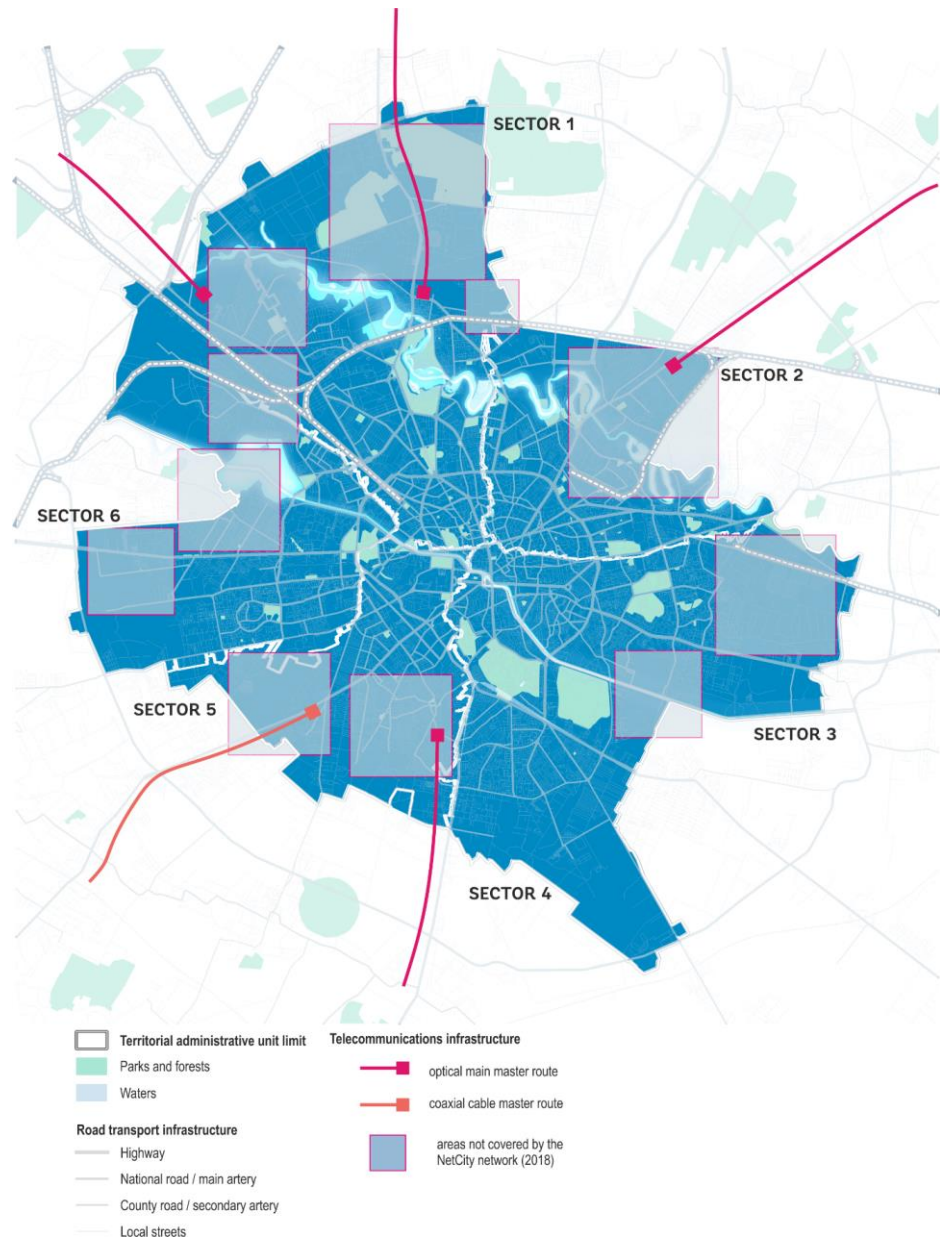
Bucharest has the largest district heating system in the country, with 561,213 apartments (approximately 1.2 million people) connected in 2018, representing about 50 % of the total heating consumers in centralized system in Romania. The system provides heat for 8,200 apartment blocks and 320 individual buildings, plus 5,400 non-residential consumers (public institutions, social entities, schools, hospitals, commercial buildings, industrial consumers, etc.). The district heating system in Bucharest concentrated in 2018 about 41 % of the total heat demand in Romania, respectively 48 % of the total connected households. In Bucharest, the district heating system currently covers 72 % of the total heat demand (residential and non-residential), of which the residential heating represents 88 %.

	The network (transmission, distribution, substations, small heat producers for reheating water after transport) was managed until November 2019 by RADET, a semi-commercial entity ("autonomous administration") subordinated to PMB. The network consists of 954 km of primary network and 2963 km of secondary pipelines. After RADET was declared bankrupt, the operation assets previously managed by this company was transferred, from December 1st, 2019, to the municipal company Termoenergetica, which has PMB as majority shareholder (99.9 % of the share capital), to which are added the commune Chiajna and the town Popești-Leordeni. As regards the generation capacities, over 90% of the heat in the district heating system is produced in 4 CHPs owned by ELCEN, a state-owned company whose shareholder is the central government (currently the Ministry of Economy, Energy and Business Environment). The rest of the thermal energy is produced in two small CHPs (one private – Vestenergo, and one owned by a sector municipality – CHP Grivița, Sector 1), a small CHP owned by RADET (Casa Presei), plus 46 block plants owned by RADET.	
Strengths/ Weaknesses	• The number of official disconnections in Bucharest is low, about 1% over the last 5 years (8% since 1990) or less than 1,000 apartments per year. 99.7% of the buildings have a meter for each block entrance and about half of the apartments are equipped with heat cost allocators. The rate of receipts from consumers is very good (over 97%).	• The central heating system in Bucharest is oversized physically and morally worn out, most of the production capacities and networks being from 1960-1989, with about 30% losses in networks , both for heat and water. The 4 big public CHPs that serve the Capital operate based on derogations with deadlines in 2020 and 2023, conditioned by investments in compliance with environmental requirements. • District heating in Bucharest is currently in a state of accelerated degradation, with failures of increasing duration. • The encumbrance of the district heating system by the PMB arrears on the payment of the subsidy to the district heating operator, respectively by it to ELCEN, including penalties, which amount to RON 3.8 billion (approximately EUR 850 million). Also, the municipality did not pay in full the subsidy for the winter 2019/2020. All these arrears led to the bankruptcy of RADET and the insolvency of the main producer, ELCEN.
Development trends	• Despite the existing problems, abandoning the centralized district heating system can be difficult in terms of ensuring the energy needs of Bucharest, given that they are based on integrated electricity and heat power plants, as the number of those connected to the system is more than half of the total city population. • Scenarios on how the system should look in 10 years are being discussed: vertically integrated monopoly or competitive market with non-discriminatory	

	access to a network regulated as a natural monopoly, with no decision in this respect. This lack of vision means that the operators in the area of energy generation and distribution, the first being subordinated to a ministry, and the second to the General Council, have uncorrelated investment plans. In addition, the scenarios proposed so far have rarely been discussed with final consumers (captives, considering the complicated disconnection procedures) and have not taken into account their needs.
Strategy recommendations	• Preparation and submission for financing, from the existing European programs in the programming period 2014-2020, respectively 2021-2027, of the projects for rehabilitation and upgrade of the thermal energy distribution network (about 500 km in total). • Providing financial resources from the PMB budget for continuing the network replacement works (other than those covered by European funding) and upgrade of block plants carried out by the operator under its subordination. • Completion of compliance investment works initiated by ELCEN at the level of CHPs, and implementation (total or partial) of its investment plan, including after the transfer of its assets to another entity. • Making an urgent decision on the scenario for the district heating system, especially considering the approval of ELCEN restructuring plan, which provides the transfer of the producer's assets by the end of 2020, either by the municipality or by the Ministry of Economy in the form of a new entity, or to any private investor. • The gradual settlement of PMB debts to ELCEN (either by mutual agreement or following a lawsuit), so that the energy producer in turn honors its outstanding payment obligations to suppliers, creditors, etc. • Reform of the PMB thermal energy subsidy system, adapted to the real resources available to the Municipality and aligning the percentage of the price borne by the final consumer at least to the level of other cities in Romania.
Proposals stemming from the consultation process	• Switch from a centralized district heating system to personal power plants / or plants that cover only one sector. • Rethink the subsidy policy to better support vulnerable people. • Make the power network efficient by allowing private heat providers to enter the market • Develop cost-benefit analyses, feasibility studies and comparative assessments to rethink and improve the centralized system • Initiate public consultations on the future of the district heating system • Draft a well-designed public investment plan to modernize the centralized district heating system, in case of a decision to maintain it in the long term. • Cogeneration bonus scheme - the cost coverage scheme, started in 2011, must be extended from 2020. • New power plants can be built in Titan, Aviației, Colentina, Casa Presei areas.

2.5.7. PUBLIC LIGHTING AND TELECOMMUNICATIONS

Figure 35.
Telecommunication network



Source: Own processing

Key-issues

Currently, 86 % of the network for the public lighting system is underground. Since the start of the delegated concession contract for the public lighting system in Bucharest, the upgrade works have included the undergrounding of the power supply network for the public lighting system and the creation of its own electricity network.

Switching on and off the lighting fixtures in Bucharest is done through almost 600 ignition points, most of them over 10 years old. Only 53 % of the poles related to the public lighting system in Bucharest belong to PMB, while the rest are owned by the electricity distribution and public transport operators.

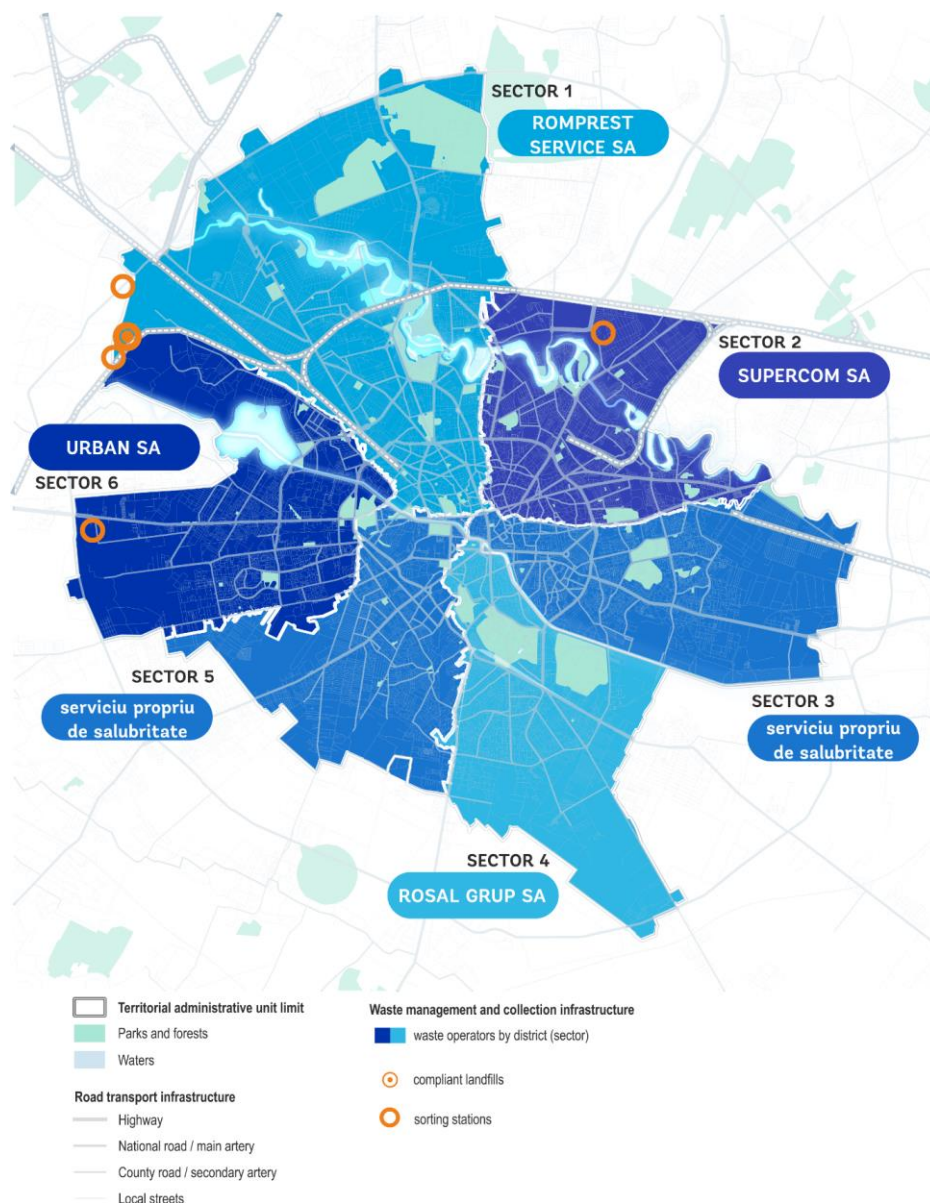
In 2017, public lighting in Bucharest was provided with LED, sodium, metal-halide lamps, equipped with ballast/igniter equipment and was made up of 121,383 public lighting fixtures.

	The assets used for the provision of public lighting services are owned or managed by several public service operators, as follows: The Public Service Operator (for light points, consoles, poles, distribution network, ignition points and measurement points); S.C. E - Distribuție Muntenia S.A. (for poles, distribution network and measurement points); Bucharest City (for light points, consoles, poles, distribution network and ignition points); R.A.T.B. (for poles); Telekom (for poles). Eurostat and NIS data on the use of information and communication technology show that, in Bucharest-Ilfov Region, 96% of households have Internet access, and 89% of those had internet connection at home (35% with narrowband connections, 14% with mobile broadband connections, 17% with fixed broadband connections). In October 2019, in Bucharest there were two operators providing 5G telecommunication services: Vodafone (since May 2019: Unirii, Kogălniceanu, Izvor, Pipera-Voluntari areas) and Digi (since June 2019: pilot area in the Old Town Center). In October 2019, only 7 countries in the European Union still have commercial 5G coverage (according to Ookla 5G Map).
Strengths/ Weaknesses	• An integrated remote control management system has been implemented in the Dorobanți area, as well as on Splaiul Independenței, but there is a proposal to develop this remote control management system for the entire lighting system in Bucharest. • Bucharest has an important competitive advantage in terms of broadband internet speed (fixed connections) and telecommunication network coverage. • Currently only about 15 % of all public lighting fixtures use LED technology with powers from 5 W to 225 W • In some areas of the Capital there is an increased potential for collisions between vehicles, between vehicles and pedestrians, cyclists and other road users, or between vehicles and immobile objects due to low illuminance levels. • The consumption and cost of electricity per light point has decreased slowly in recent years, but remains high because of the high share of luminaires based on sodium vapor, generating over 1 % of the total energy consumption in Bucharest. • There are still areas/neighborhoods not served by the Bucharest's underground telecommunications network (optical fiber cables): Ferentari, Andronache, Tei, Doamna Ghica neighborhoods, Șos. Chitilei - Bucureștii Noi, Giulești neighborhood, the northern part of the Militari neighborhood or Cotroceni neighborhood • Reduced access to free WiFi connections in public spaces of Bucharest.

Development trends	• The trend of development and expansion of the public lighting infrastructure did not take into account the need to optimize the technical and functional parameters of the system and its upgrade needs. The performance of the public system is limited to the following: maintaining its infrastructure in working order; response times to citizens' complaints for putting in safety mode the system's failures; ensuring the system's safe and secure operation. • An improvement in the coverage of Bucharest City with the underground telecommunication network is expected following the investments made by NetCity Telecom. The expansion plan includes 537 streets, which would cover most of the areas still not served: Șos. Fundeni, Șos. Andronache, Șos. Gherase (for the northeast area), Șos. Chitilei, Bd. Bucureștii Noi, Șos. București-Târgoviște, Șos. Ionescu-Șisești (for the northern area), Bd. Lacu Tei and Bd. Ghica Tei (for the Tei neighborhood), Bd. Pieptănari, Bd. Uverturii, Bd. Eroilor and Bd. Dr. George Marinescu (for the Cotroceni neighborhood).
Strategy recommendations	• Replacement of all existing sodium or metal-halide luminaires with LED technology, which will result in an increase in energy efficiency. • The implementation of dimming solutions at night in areas with low traffic over certain periods of time, in compliance with the standard lighting requirements, may lead to a reduction in the amount of electricity used by the luminaires by more than 15 %. • Compensation of the reactive power factor with the help of compensation batteries, in order to reduce the reactive power factor (contractual obligation of the operator). • A remote control management system ensures the individual control of each street lighting fixture, so that the condition of each equipment (operation/non-operation) can be checked in due time, as well as the operation time or the electricity used. • Establishing a dispatcher for the control and monitoring of lighting and creation of automation panels related to the ignition point to ensure the centralized control of lighting in the central dispatcher (contractual obligation of the operator). • Building a lighting system for the pedestrian crossing area that involves the increase of the illuminance level by at least 50% compared to the rest of the road, which would lead to a decrease in the number of accidents. • The use of photovoltaic lighting systems in parks and parking lots, which would lead to a decrease in the total electricity consumption of the public lighting system of Bucharest • Extension of 5G coverage to the entire territory of Bucharest and installation of a WiFi network in public spaces (parks, markets), with free/open access for users.
Proposals stemming from the consultation process	• Develop a GIS data base for public utility networks.

2.5.8. WASTE MANAGEMENT

Figure 36. Waste management system



Source: Own processing

Key-issues

Municipal waste in Bucharest is stored in three ecological landfills, two of which are located in Ilfov County (Glina – its integrated environmental permit expired in 2017 and Vidra – authorized with an annual visa in 2018) and one in Bucharest – IRIDEX landfill, located in Sector 1 of the Capital, on the Rudeni – Chitila road. According to data from the Ilfov Environmental Protection Agency, the Glina landfill has 32% of the 26 million m³ capacity covered, while the Vidra landfill has 61% of the 11.5 million m³ capacity covered. The IRIDEX landfill has a capacity of 4,500,000 m³ out of which 1,229,000 m³ are available.

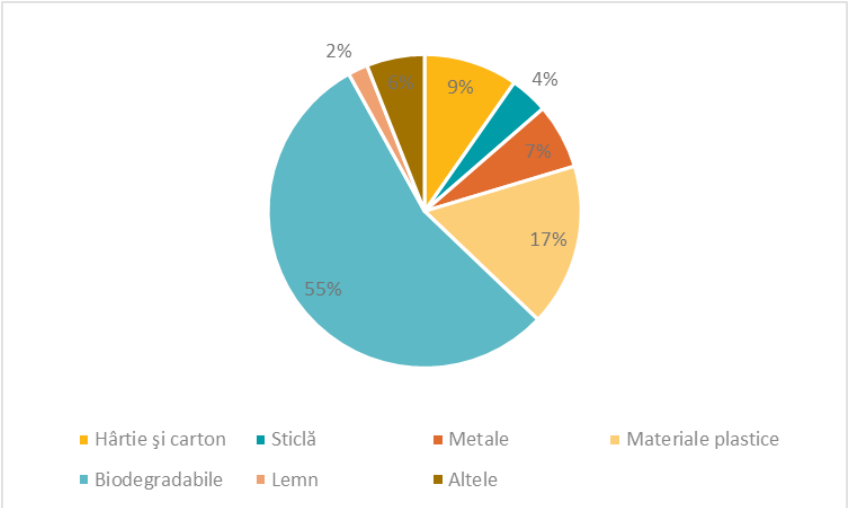
According to the Master Plan data, the treatment of municipal waste in Bucharest is carried out in the following facilities:

- 7 sorting stations for mixed waste collected and separately collected recyclable waste, with a total capacity of about 871,000 tons/year (8 stations with the one at the Vidra landfill).

- two composting stations, with a total capacity of 2,400 tons/year: the operators are the BLPRA (Sector 5 – although it is declared to be a composting station, it only has one branch shredder with a maximum capacity of 60 tons/day, with no biological treatment facilities) and SC 3R GREEN SRL (green waste composting – 2,400 tons/year).
- a biological treatment facility, with a capacity of 40,600 tons/year (SC IRIDEX GROUP IMPORT EXPORT SRL).

The annual Environmental status report prepared by the Bucharest EPA indicates for 2017 a quantity of waste collected by the specialized operators and services of the municipalities of 914,538 tons (479,539 tons of waste generated by the population, 271,121 tons of similar waste, 163,848 tons of waste from public services). Thus, the municipal waste generation indicator was 500 kg per capita/year, above the EU average which is 476 kg per capita/year. The domestic waste generation indicator is about 1.05 kg per capita/day, significantly higher than the national average indicator for the urban environment (0.66 kg per capita/day).

Figure 37. The composition of domestic (and similar) waste – 2017



Source: 2017 Environmental status report, Bucharest EPA

**Strengths/
Weaknesses**

- In Bucharest, the sanitation services are managed, in each sector, by private operators (except for Sector 3), and there is a 100% degree of connection to the sanitation services.
- Each sector has a separate waste collection infrastructure made up of above-ground points with containers of different types and sizes (even though this infrastructure is unevenly distributed and poorly developed).
- Given that a large part of the system components (warehouses, sorting stations) serving Bucharest are located in the administrative territory of Ilfov County, there is no integrated waste management planning in Bucharest and Ilfov County.
- Sector municipalities have not concluded contracts with the sorting station operators, and they currently operate at less than 40% of the total capacity.
- Although about 5% of the collected household waste is biodegradable, the degree of recovery for it (as well as for waste from gardens and parks)

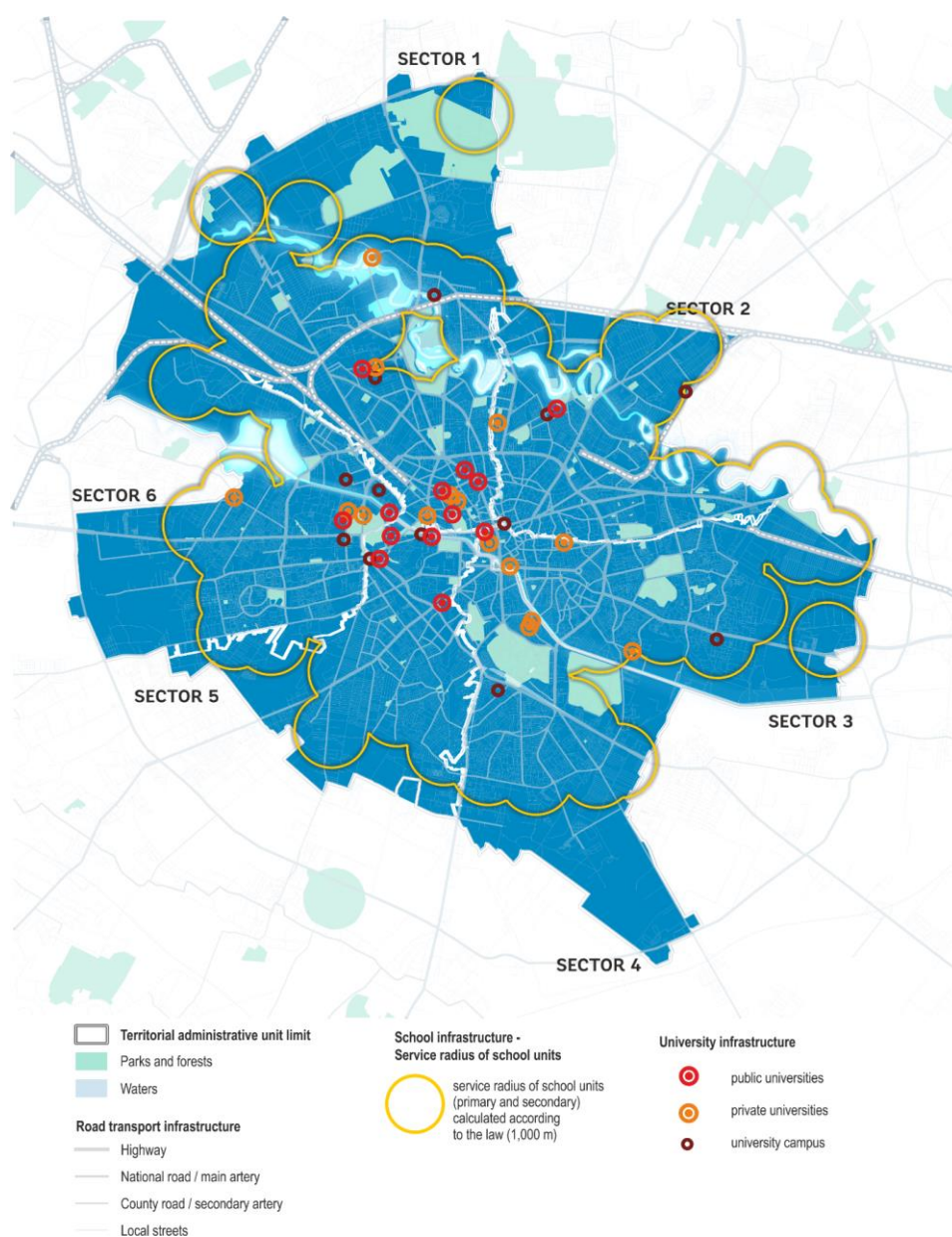
		remains very low. For this reason, the target of reducing the amount of biodegradable waste landfilled by 65 % until 2017 is not met. • The separate waste collection infrastructure is poorly developed and little used by waste generators (residents). Only 27,000 tons of recyclable waste were collected separately in 2016 and only 19.15 % of municipal waste collected was recycled - well below the 50 % target imposed by the Waste Framework Directive by 2020. • In Bucharest-Ilfov region there is a lack of a waste treatment plant for waste from construction and demolition, as well as an system implemented for the separate collection of domestic hazardous waste. • The index of WEEE collection on the territory of the city is low (1.2 kg/inhabitant/year, compared to the target provided by the national legislation of 4 kg/inhabitant/year).
Development trends	• Considering demographic and economic forecasts, the Bucharest integrated waste management system Master Plan presents projections of the amount of waste generated by 2046. The average scenario predicts a slight increase in the total amount of municipal waste by 2020 (from 1,040,900 tons in 2017 to 1,048,100 tons in 2020), but followed by a decrease of about 10% by 2025 (922,100 tons) and by almost 20% by 2046 (up to 836,100 tons). This projection translates into a decrease in the domestic waste generation indicator from 0.91 kg per capita in 2017 to 0.82 kg per capita in 2046. • In this respect, the Master Plan for 2046 proposes the implementation of an integrated waste management system in the Capital, whose main components are: - a waste-to-energy incinerator with a capacity of about 235,000 tons, whose achievement deadline is 2023; - the extension of the system for the selective collection of recyclable and biodegradable waste – from domestic, similar and market waste; - the construction of an anaerobic digestion plant; - the construction of a biological treatment plant for the waste from mixed waste sorting stations; - the expansion of the storage capacity.	
Strategy recommendations	• Cooperation between the two administrative entities, by setting up an Intercommunity Development Association for the integrated waste management.	

	• Clarification of the contractual and institutional aspects regarding the waste sorting method, in order to increase the quantity of recovered waste. • Construction of a composting station for the recovery of waste from parks and gardens • Development of facilities for the recovery of biodegradable waste (including composting stations - anaerobic digestion plants). • Implementation of a selective waste collection system in Bucharest, with at least 4 fractions (biodegradable waste, paper-cardboard, plastics, glass/metal), (preferably) collected using buried or semi-buried containers. • Implementing a system and informing the population on how to manage domestic hazardous waste. • Increasing the frequency of WEEE collection and more effective promotion of collection campaigns at the level of residents.
Proposals stemming from the consultation process	• Carrying out information and awareness campaigns in schools and at the level of owners' associations. • Implementing a mixed system of fines and facilities to encourage a change in the behavior of citizens regarding the selective collection of waste. • Use of municipal waste for energy production through a waste incinerator • Develop the regional network for waste management taking into account the principles of the circular economy • Raise awareness of the importance of recycling and circular economy. • Improve the selective waste collection infrastructure. • Develop an app for reporting various issues to the local administration, especially in this respect.

2.6. PUBLIC SERVICES

2.6.1. EDUCATION INFRASTRUCTURE AND SERVICES

Figure 38. School and university network coverage



Source: Own processing

Key-issues

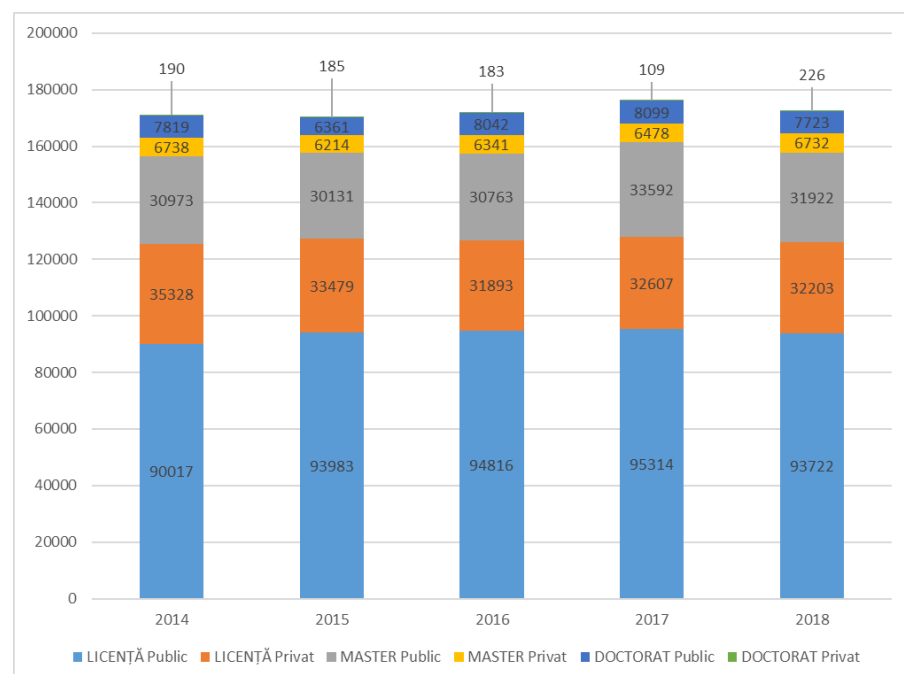
Bucharest has the biggest school network nationally, including both public and private structure and covering the territory in a relatively even manner. The areas where the Bucharest School Inspectorate found insufficient education units are Băneasa, Herăstrău, Dorobanți, Iancului, Titan, Big-Berceni, Tineretului, Militari, Rahova, Military Academy, and the new residential areas from the Bucharest City exits.

As far as the qualification of teaching staff is concerned, in the 2018 - 2019 school year, 98.26% of all teaching positions were filled by trained staff, and out of the 290 teachers without specific training for the job, 165 had completed an university education, 75 were in training, and 50 had completed secondary education. Moreover, around 69% of the teaching staff had tenure with full time employment, which indicates a high degree of job security in pre-university education.

In 2016-2017, dropping out rates in middle education in Bucharest City was 1.2%, among the lowest figures recorded nationwide. In terms of the high school and vocational education, the Bucharest – Ilfov region recorded a school drop-out rate of 2.1%, also among the lowest at national level.

The city of Bucharest is the most developed university hub of Romania, with 31 universities, out of which 15 public and 16 private. Most universities are located in the central area, but there are several universities in the northern half of the city as well. Public universities account for a large part of university capacity: 68%, as compared to 32% of the capacity provided by private universities. As far as the presence of Romanian higher education institutions in international classifications is concerned, the Shanghai Ranking (Global Ranking of Academic Subjects 2018) includes the following Romanian universities in the first 1000 positions: the Bucharest University (places 801 to 900), by study areas, in the first 200 positions, the Bucharest Polytechnic University (places 151 to 200 in the area of Engineering – Automation&Control).

Figure 39. Evolution of student numbers in Bucharest City in 2014-2018



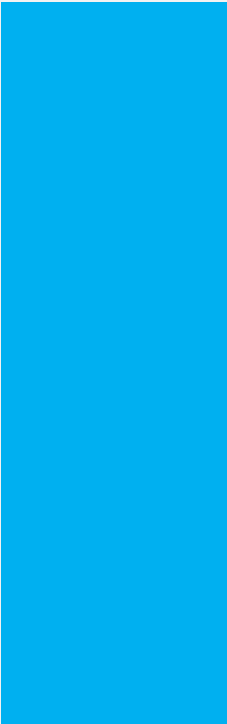
Source: Tempo Online database of the National Institute of Statistics

Strengths/ Weaknesses

- Around one quarter of the pre-university educational infrastructure has been rehabilitated and modernized to the EU educational standards through the Program for the rehabilitation of education units, with the support of the European Investment Bank and the Municipality of Bucharest.
- All schools and high-schools are provided with video surveillance equipment and school medical offices
- School population grew steadily against the background of evolving birth rates and migration movements, as the infrastructure fails to keep up with the growing population and causes unprecedented situations, at least 14 schools being critically overcrowded, where classes are held in two and even three shifts.
- Despite the rehabilitation programs, there are education units with no fire prevention authorizations, health authorizations or that need further rehabilitation.

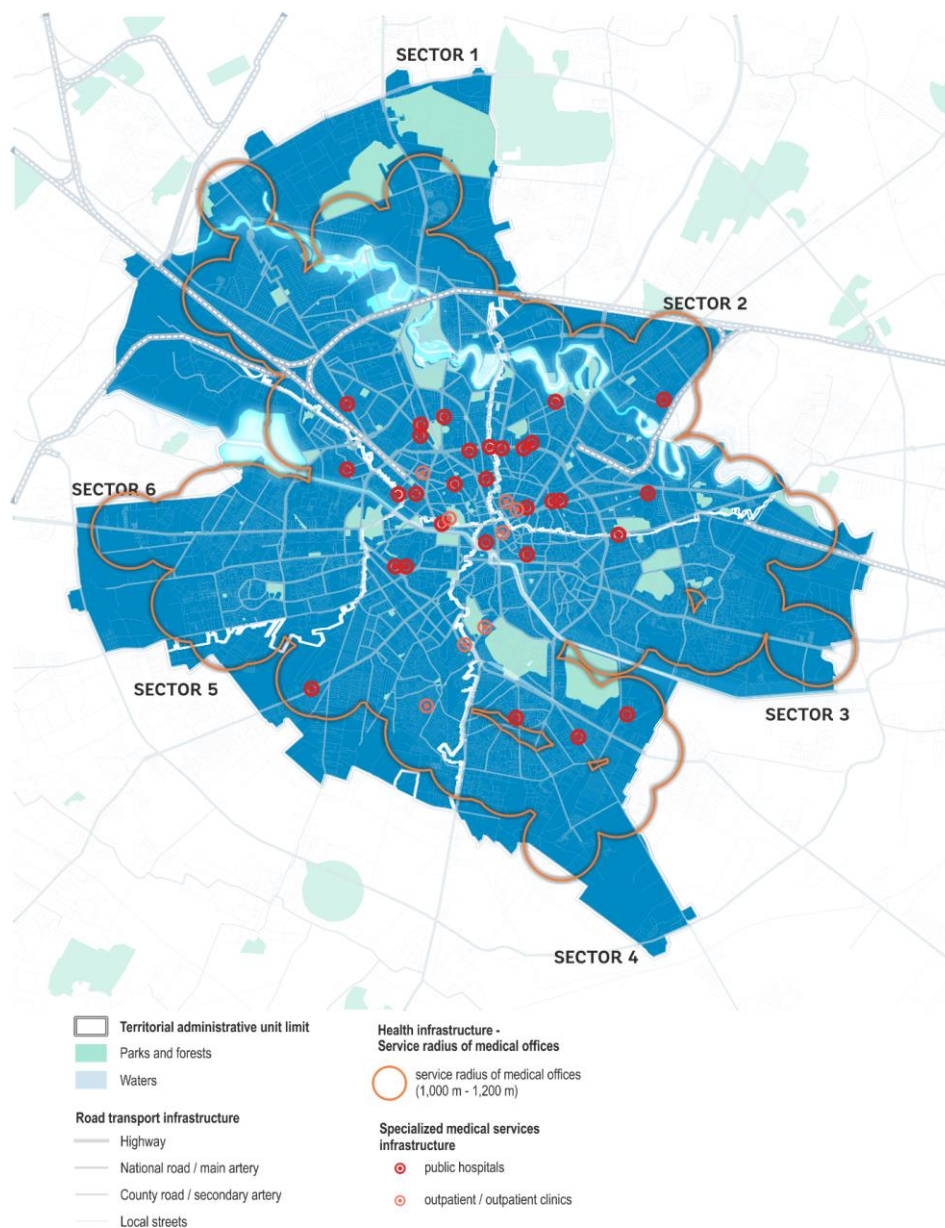
	• The graduation rate in middle school is high, recording 85.12% (4th place nationwide, behind the counties of Brăila, Cluj and Prahova) at the National Evaluation of 2018-2019. As regards the Bacculaureate, out of the Bucharest City high schools, three rank among the top 5 nationwide, one in top 10, six in top 50 and seven in top 100. • Dual education is an attractive option, in 2018, 10 schools in the Capital offering dual education in the technical or services field for 233 students. • Special education is not sufficiently developed in terms of infrastructure and qualified staff for assistive therapies and counseling. • Bullying is still persistent in schools, despite that all the units were equipped with video surveillance. • In terms of human capital, the pre-university educational system is faced with an insufficient number of school counselors, the existence of unqualified teachers, as well as insufficient auxiliary teaching staff. • The number of students in vocational education dropped significantly in 2012 – 2018, most technical high schools have very low graduation rates, from less than 50% to 4%, and therefore are not a viable alternative to theoretical education. • The university physical infrastructure has a series of problems, such as buildings with seismic risk or buildings that need rehabilitation and endowment, insufficient buildings where courses can be properly held, lack of advanced technologies that should be available to students, lack of modern working technics and materials. • The university curriculum is currently based on the labor market requirements and student needs from at least 10 to 20 years ago and, at the level of most study programs in the capital city, the European key-skills set out by the European Union under the New Agenda for Skills in Europe are not developed.
Development trends	• The evolution of the student numbers on all levels of education shows a slightly increasing trend, supported by the movement of children living in Ilfov County. In order to maintain this trend, the education infrastructure and related facilities will have to be diversified to fight against overcrowding. • In order to further develop pre-university education as a means to both address the current problems and ensure the transition to a modern and intelligent educational process, a need arises for collaboration among all actors involved (municipal and local public administrations - such as education departments of sector municipalities, the private sector, parents, children, NGOs) and to enable access to education for the local community. • With Romania's accession to the European Union, the city of Bucharest began to constantly lose students amid the continuing decline in birth rates after 1989, but also since more high school graduates prefer to study at universities abroad. Since Bucharest wants to become a competitive European Capital for business and as

	European regions are in direct competition for well-qualified young human capital, the trend of internationalization of university education arises.
Strategy recommendations	• Draft a unitary plan to develop the educational infrastructure by identifying available spaces for the creation of new school units, identifying areas that need kindergartens/nurseries, identifying new residential areas (or future residential areas), and providing a school infrastructure. • Carry out seismic assessment in all schools and rehabilitate, equip and modernize education units to comply with the legal operating conditions. • Develop special education through direct investments and partnerships with specialized associations and companies that can provide qualified staff. • Broaden the material base for vocational/dual education by equipping education units with state-of-the-art equipment and providing cafeteria or recreational facilities, recreational options or multifunctional spaces with modern technology for student practice. • Make a unique electronic database to monitor relevant indicators for comprehensive analysis of education in the whole city. • Integrated intervention in schools via joint actions of the DSP, DGASPC and the Local Police, and for cooperation with social experts to provide complementary services to students in difficulty and fight against acts of violence. • Ensure minimum conditions of hygiene in all schools and monitor their further implementation. • Harmonize and standardize school counseling activities in schools, enabling this process to become a complex, continuous and sustained one, achieved via coordination between school counselors and class masters. • Rehabilitate and modernize the existing large university campuses, such as the ones in Politehnica or Tei area, or create a new campus based on Smart City principle, in partnership with universities that wish to internationalize their study offer, following the trends of other major university cities. • Strengthen the connection between universities and businesses to create sustainable partnerships and launch a new online platform integrating jobs for students. • Create a unique eLearning platform at city level to boost competitiveness among universities and promote interdisciplinarity among universities and study areas, digitalization of university courses and making them available to more students.
Proposals stemming from the consultation process	• Fight against overcrowding by attaching modular units to the existing facilities, in the medium term, identify public buildings that can be turned into education units, and in the long term, the building of new education units. • More kindergartens, particularly in new residential areas, more nurseries and subordinate them to the Ministry of Education and Research. • Involvement of the municipal and sectoral public administration in addressing issues related to infrastructure, health authorizations and fire prevention authorizations, students' health, their transportation to schools by minibuses, etc. • Improve the quality of education by partnering high performing schools and high-schools with the least performing ones to ensure a transfer of knowledge and best practices, so that all pre-university education units offer an attractive education experience for all the young citizens of Bucharest. • Creation of smart eLearning platforms at city level, which may significantly increase the quality of education via an easy access of all students to consistent educational practices. • Digitize the educational process by means of highly interactive systems allowing a shift in the provision of educational services towards a smart, student-oriented environment.

- 
- Ensure the unhindered access to school for people with disabilities and provide a learning-oriented school environment by providing recreational areas, and agreeable learning spaces.
 - Adapting the educational process to include the emergence of contemporary skills, as set out under the New Agenda for Skills in Europe, published in 2016 by the European Union (e.g.: communication, public speaking, entrepreneurship, participatory democracy, inclusion and equal opportunities, graphic presentation, etc.).
 - Expanding extra-curricular activities and providing facilities for the deployment of after-school programs, dedicated sports facilities — such as swimming pools — where students can spend their leisure time in organized activities.
 - In order to establish Bucharest as a European student city, a collaborative association should be established, responsible for the analysis of the capital's strengths based on international indicators for the attractiveness of university cities and to create a "European student city" brand for Bucharest.
 - Develop the higher education infrastructure (equipment, student dorms, relaxation areas and cafeterias, digital facilities, etc.), digitize and merge the facilities provided to students, so that they become dedicated one-off services at city level (for example, introducing a single access card for all Bucharest libraries, the existence of a single “student card” with discounts, etc.).

2.6.2. HEALTHCARE INFRASTRUCTURE AND SERVICES

Figure 40.
Specialized
medical services
(hospitals and
clinics)



Source: Own processing

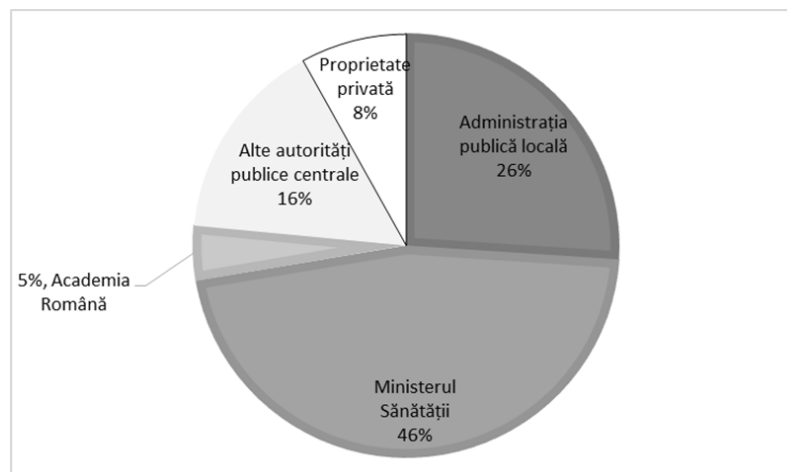
Key-issues

Besides the 168 medical facilities depicted based on ASSMB and DSPMB information, in 2018 the network of specialized medical services of Bucharest also included 518 specialized healthcare centers and 1,789 specialized medical practices, according to NIS data (Tempo online). These two types of medical facilities saw a permanent increase in numbers and privatizations. Thus, between 2003 and 2018, the number of specialized healthcare centers increased almost nine fold, while the number of specialized medical practices increased by more than twice, from 767 (of which 70% private) to 1,789 (100% private).

A review of the specialties available in public medical facilities show that most hospitals have diverse specializations. Medical specialties follow the same trend as hospitals and tend to concentrate in Sectors 1 and 2, although they are available in most sectors.

The number of beds available in private hospitals followed a steadily increasing trend, reaching 1,772 beds in 2018 (NIS data). The hospital beds are supplemented by a total of 64 beds in public facilities and 663 beds in private specialized facilities.

Figure 41. Distribution of bed numbers in Bucharest City hospitals, according to ownership and affiliation, 31 December 2018



Source: Own calculation based on the MoH open data set, data.gov.ro, and NIS data, the Tempo online database.

The total number of doctors increased steadily from less than 8,500 in 2000 to 13,160 in 2018. Therefore, the number of inhabitants per doctor dropped down to 139 in 2018.

Strengths/ Weaknesses

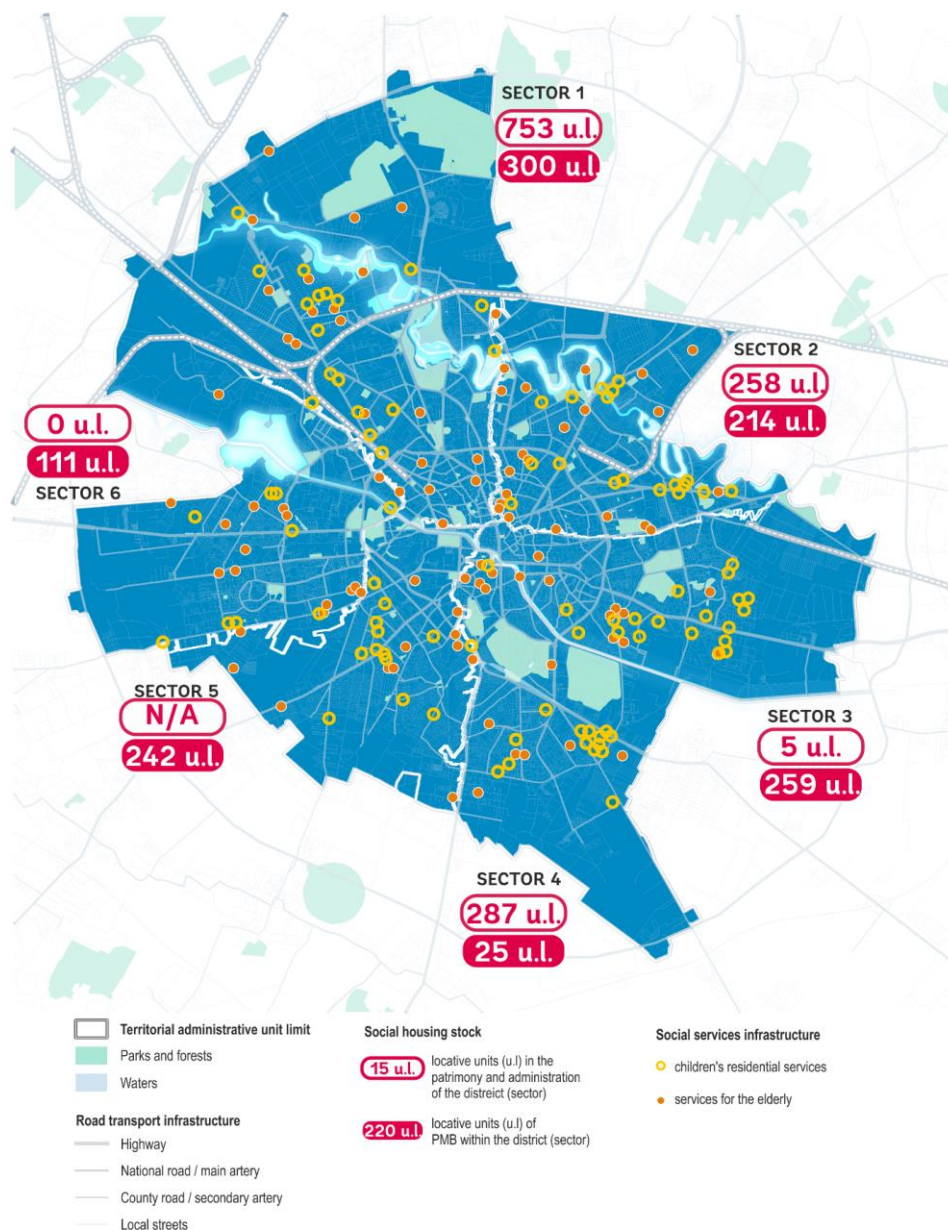
- The development in recent years of the private network of medical units has led to the increase and diversification of the service offer.
- Primary healthcare services (network of general practitioners, pharmacy network, network of dentists) recorded a positive evolution, covering almost the entire territory of the city (Sector 4 and, especially, Sector 5 are faced with deficits).
- The latest NIS data for Bucharest shows an increase in the number of ambulances (190 in 2017 versus 153 in 2005) In 2019, PMB purchased 106 new ambulances and ISU B-IF received 65 new ambulances under the "Viziune 2020" program funded from the 2014-2020 Large Infrastructure Operational Program.
- The healthcare infrastructure is obsolete, with fragmented in-hospital circuits and a part of the buildings don't have seismic examination (according to the information submitted by ASSMB, out of the 19 hospitals owned by PMB, 12 need expansion works and 8 need consolidation works).
- High accessibility for patients in neighboring counties leads to the overcrowding of the existing hospital capacity, especially when it comes to emergency services.
- Insufficient capacity of outpatient facilities (and the significant share of people without a medical insurance) leads to a large number of patients coming to emergency rooms.
- The system is facing a shortage of staff with secondary education in health facilities (especially due to external migration), but also in the emergency system (due to difficult working conditions).
- There is a small number of community health mediators and nurses serving marginalized communities, which generally

		include people who are vulnerable to (public) and uninsured health problems. • The incidence rates are high for certain communicable diseases, especially among vulnerable groups. High incidence of healthcare-associated infections.
Development trends	• For Bucharest-Ilfov Region, the Regional Healthcare Services Plan provides the following strategic investment directions: rehabilitation of intensive care units (with support from the World Bank), strengthening of the regional emergency care network (Ministry of Health in cooperation with the Ministry of the Interior), restructuring and rehabilitation of strategic hospitals (Ministry of Health and local public authorities), and reorganization of the hospital network, i.e. converting a number of hospital beds to acute day care, but also long term care, rehabilitation care and palliative care. • The new context of the global pandemic caused by the COVID-19 crisis substantially alters the needs for healthcare services and infrastructure at global, national and, naturally, at Bucharest's level. During this period, it became very important to supplement the staff of the Bucharest Public Health Directorate tasked with collecting tests and performing epidemiological investigations. At the same time, all the unmet personnel needs, particularly in infectious diseases, emergency care and ATI became even more critical. • The new challenges along with the growing share of elderly people (over 65 years), with various chronic conditions and who frequently resort to medical services, will put an enhanced pressure on the healthcare system, both in terms of demand for infrastructure and clear procedures for admission and testing of patients in hospitals, staff training and use of protective equipment.	
Strategy recommendations	• Correlation of the healthcare infrastructure development lines at ASSMB level, with those planned at regional level (but also at the level of neighboring counties) and with adequate financing (from all funding sources), respecting the principle of efficient and effective financial management • Seismic expertise of all sanitary buildings owned by PMB and consolidate them with priority, based on a cost-effectiveness analysis • Make investments in hospital units in accordance with the provisions of the Health Strategy of Bucharest City for 2018-2020 • Improved endowment of the healthcare infrastructure, which should be correlated at national level and with the reduction of territorial disparities in the development of healthcare services, to reduce the pressure on the healthcare network in Bucharest. • Continuing and multiplying effective programs for screening / early detection of diseases, respectively for promoting a healthy lifestyle (e.g. nutrition in schools). • Development of campaigns to prevent the incidence of communicable diseases, especially within marginalized communities (e.g. through the health and social care network), and communities (e.g. through school medicine practices). • Rigorous monitoring of cases of healthcare-associated infections and substantiation of improvement measures. • Regular monitoring of patient satisfaction (at least in the hospitals managed by the ASSMB network).	

	• Support hospitals in the implementation of healthcare quality management (at least in the hospitals managed by the ASSMB network).
Proposals stemming from the consultation process	• Mitigate the migration of highly skilled workforce through measures related to: transparent employment mechanisms, anti-corruption and anti-crime policies and employee review policies • Introduce public-private partnerships for healthcare infrastructure (there are many best practices in this respect that can be taken as a model). • Public campaign promoting healthy food and a healthy lifestyle (e.g. many countries promote home cooking or the introduction of healthy cooking classes in education institutions). • Promote prevention medicine. • Improve the application of medical protocols and public procurement procedures in hospitals • Better communicate key-information about a hospital activity to the general public, for a patient to understand the protocols and the services he will benefit from when going to a public hospital. • Allow private companies that offer private life insurances to enter the market. • Introduce performance indicators, incentives and tools to measure patient satisfaction. • Introduce private management. • Introduce legislation that allows the construction of Cath Labs. • The private sector can build / set up such spaces (e.g., there is such a lab for every 100,000 people in Israel) • Change the legislation for doctors to be able to choose only one system to work for, i.e public or private. • Improve the infrastructure to attract as many employees as possible. Massively invest in this infrastructure. • Train doctors to use the existing equipment.

2.6.3. INFRASTRUCTURE AND SOCIAL SERVICES

Figure 42. Social services for the elderly and home healthcare services, as well as cultural centers with senior clubs, in Bucharest, in 2019



Source: Own processing

Key-issues

Of the population of over 2.14 million inhabitants, several categories of people face a high risk or forms of social exclusion associated with poverty or with various specific problems for which general policies cannot provide a viable solution: (i) People in poverty, (ii) Children separated or at risk of separation from their family, (iii) Elderly people, (iv) Roma people, (v) People with disabilities, (vi) People in social need that live in marginalized communities, (vii) Other groups - homeless people, victims of domestic violence, immigrants, etc.

Various social services have been developed in Bucharest for all types of vulnerable groups, with a total of 410 services, of which 140 private and 270 public units. In case of the public social services, the responsibilities are shared between the General Directorates of Social Assistance and Child Protection (DGASPC) of all the six sectors and the General Directorate of Social Assistance of Bucharest.

Strengths/ Weaknesses	• The strategic documents in the social field identified at the level of the sector municipalities (or DGASPCs) and of Bucharest (or DGASMB) are a support designed to guide the activity of the main organizational unit with responsibilities in the social field, i.e. the General Directorate of Social Assistance and Child Protection of each sector. • The positive evolution consisting in the decrease in the number of cases of separated children that was noticed in Bucharest is the aggregate result of several factors, from the increase of the living standard of the population, to the existence of a larger number of NGOs, foundations and religious associations operating in the field of social assistance, as well as a relatively large number of diverse community-based services, public and private. • Day care services provided through senior clubs/pensioner clubs are appreciated by the elderly, especially for the opportunities of socializing and spending the free time. • The children day care infrastructure and services (children with families, separated children or at risk of separation from their parents) that have a significant impact on preventing both the separation of the child from the family and school drop-out are inadequate. • The share of children placed in residential services is high, while the share of children placed in alternative family-type services (AMP, placement within a family) is too low. • Concentration of the services for adults with disabilities are residential services (institutions) and neuropsychiatric recovery and rehabilitation centers (NRRC) and less in day care centers. Even though the occupancy rate of people with disabilities is the highest in the country, it is still not sufficient compared to the needs. • The residential care and assistance centers for the elderly or the homes for the elderly do not cover the real need of the population. • The social housing stock available to be leased is totally insufficient to cover the current needs. The distribution of responsibilities between the General Municipality and the sector municipalities is unclear in many ways regarding the stock and management of social housing sector.
Development trends	• The data from the Agency for Payments and Social Inspection of Bucharest signals a decline in people with modest income who can benefit from cash allowances to prevent and fight against poverty and risk of social exclusion due to the relatively low rate of poverty in Bucharest. However, the thresholds set out at national level should be adjusted to the context of Bucharest City, where the expenses and constraints (such as those related to children or housing) are significantly higher than in other cities in the country, leading to an increase of the demand for such benefits. • The aging trend of the population, together with the effects of an economic crisis caused by COVID-19, will lead to an increasing pressure on the social care system and also to a social housing demand. • This trend will impact the institutional environment and the social service market, in which the role of DGASMB in relation to the sector DGASPCs must be redesigned, and the private providers and NGOs could largely take over the provision and development of social services, so that the DGASPCs could play a leading role in planning, monitoring and evaluating the services.

Strategy recommendations

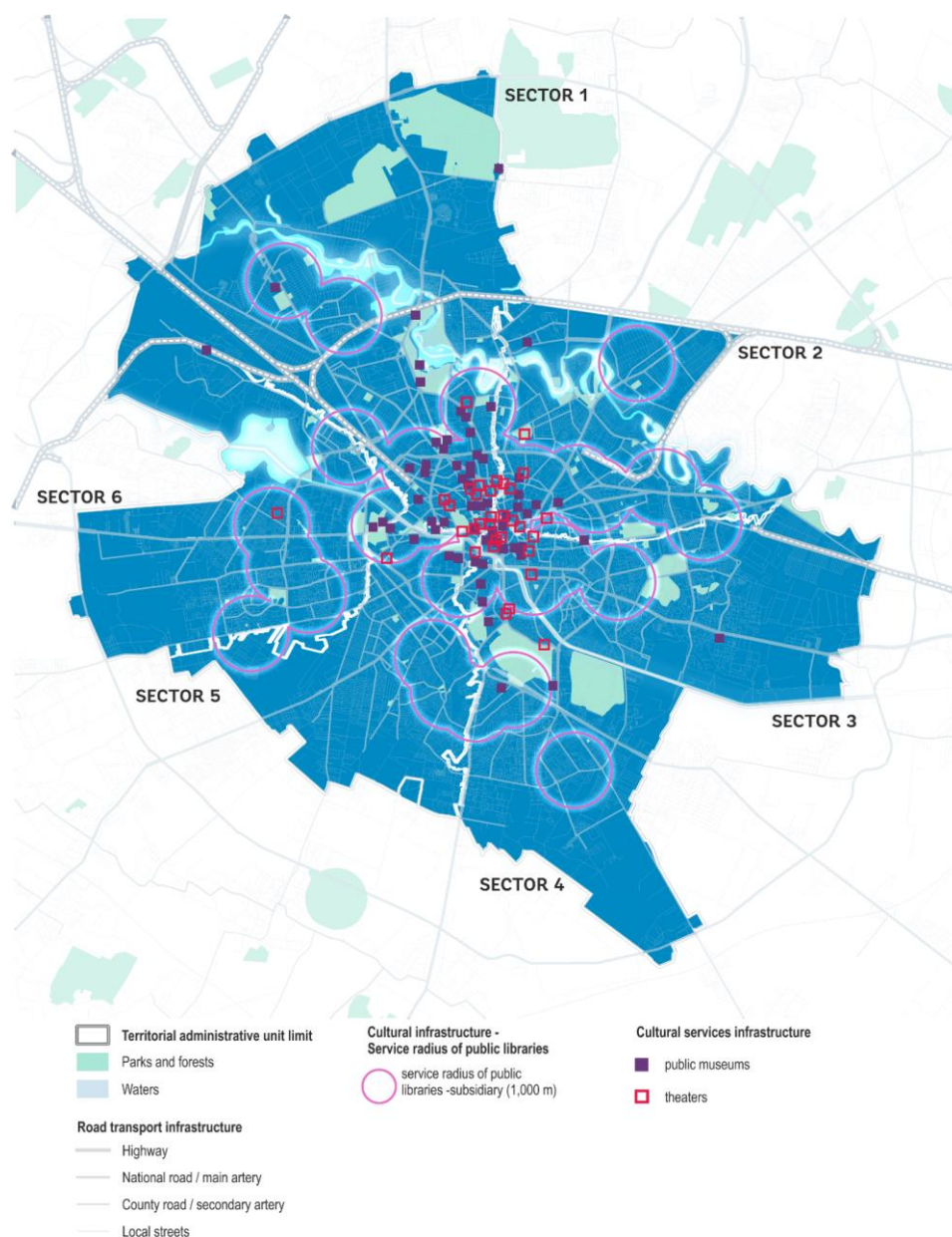
- Establish day services/day care centers and ensure free access for children in difficult situations with a risk of separation from the family
- Develop day recovery/rehabilitation or palliative care services, psychological therapy, speech therapy, psycho-pedagogical therapy, sensory stimulation, physical therapy, adapted sports or parental counseling services.
- Develop home care services through a mobile team for children with disabilities unable to move
- General development of services for children with disabilities and their parents, especially in the area with respiro centers, day care centers, crisis and recovery centers, including programs to ensure the accessibility of regular education units that integrate children with disabilities
- Improve family-type services or conclude partnerships with other counties where these services are developed
- Develop and diversify social services for adults with disabilities for the specific needs of different types and degrees of disability.
- Develop programs to ensure accessibility with ramps at the entrance to the apartment blocks and support programs for people with disabilities to ensure accessibility of the house and of the car, as well as with assistive equipment and technologies
- Encourage sustainable social businesses and provide facilities for people with disabilities to enter the labor market
- Develop residential care and assistance centers for the elderly, regulate and monitor companies that provide accommodation services to the elderly and expand the network of home care services.
- Develop the social housing stock by building, rehabilitating or purchasing buildings to serve as social housing units
- Improve the collaboration between sector DGASPCs and the Housing departments/units within the municipalities on the allocation and monitoring of social housing
- Plan the development of the social services in an integrated approach, especially with the healthcare and educational sector within the city, as well as integrating the provision of social and medical services for various vulnerable groups

Proposals stemming from the consultation process

- Community centers in neighborhoods - access to healthcare services, education, social services etc. (potential collaboration with NGOs)
- Increase the quality of life for vulnerable families
- Collect and centralize information about the elderly, the sick and/or the lonely people (from population records, social services, building superintendents). Single persons must be identified in the population record department within the City Hall and tenants' associations should help by signaling if they do not appear for a few days. The associations should have everyone's contact telephone numbers.
- Support the pensioners with their housing expenses
- Grant financial support for covering the expanses of children going to school

2.6.4. CULTURAL INFRASTRUCTURE, ACTIVITIES, EVENTS AND SERVICES

Figure 43. Spatial distribution of cultural infrastructure



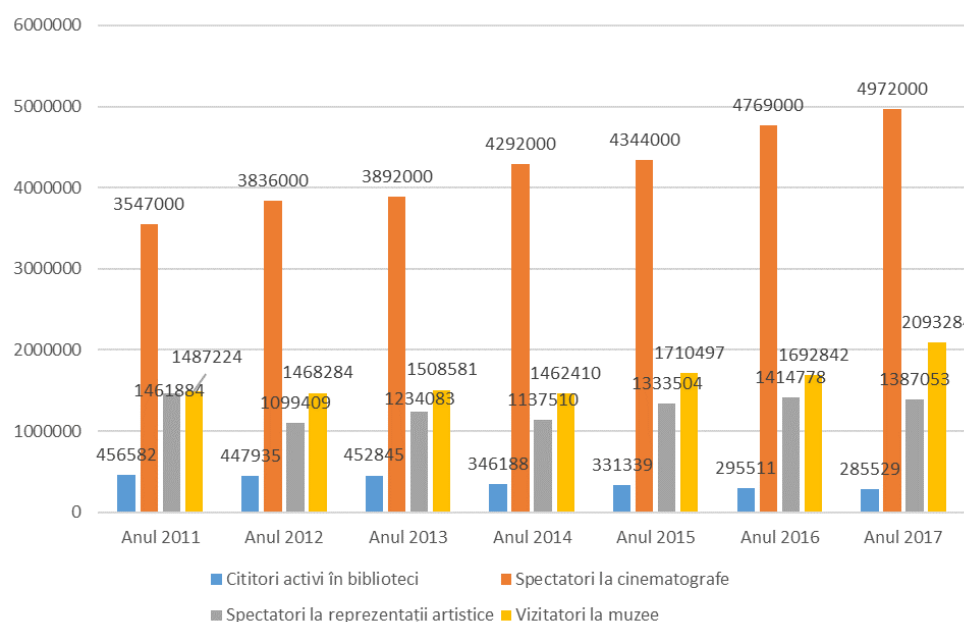
Source: Own processing

Key-issues

The cultural field is of interest for the development of Bucharest, as evidenced by the previous steps taken to plan this sector, such as Bucharest's candidacy for the title of European Cultural Capital for 2021 and the action plan identified on this occasion or the Cultural Strategy of Bucharest 2016-2026.

The cultural consumption motivations can be divided into three main categories: entertainment (watching/listening to movies, TV shows or radio shows), intellectual (reading books, newspapers or magazines) and artistic (dancing, singing, painting, etc.). Among the Bucharest residents, there is a high level of entertainment and intellectual motivations, which indicate rather an inclination towards cultural consumption as a leisure activity.

Figure 44. Evolution of cultural consumption in Bucharest



Source: The NIS TEMPO Online database

Bucharest cultural institutions are subordinated to numerous authorities such as the General Council of Bucharest, the sector municipalities, the national public institutions (for example, the Ministry of Culture, the Ministry of Education, the Ministry of Defense, etc.) or the education and research institutions. Most of the time, they have their own cultural facilities, as well as annual subsidies that cover most of their operational expenses.

The entrepreneurial and the independent/non-profit sectors operating in cultural and creative areas are well represented, the capital cumulating 31.68% of the total number of companies, 30.37% of the total number of employees and 43.66% of the turnover in the creative sectors at the national level in 2017.

Strengths/ Weaknesses

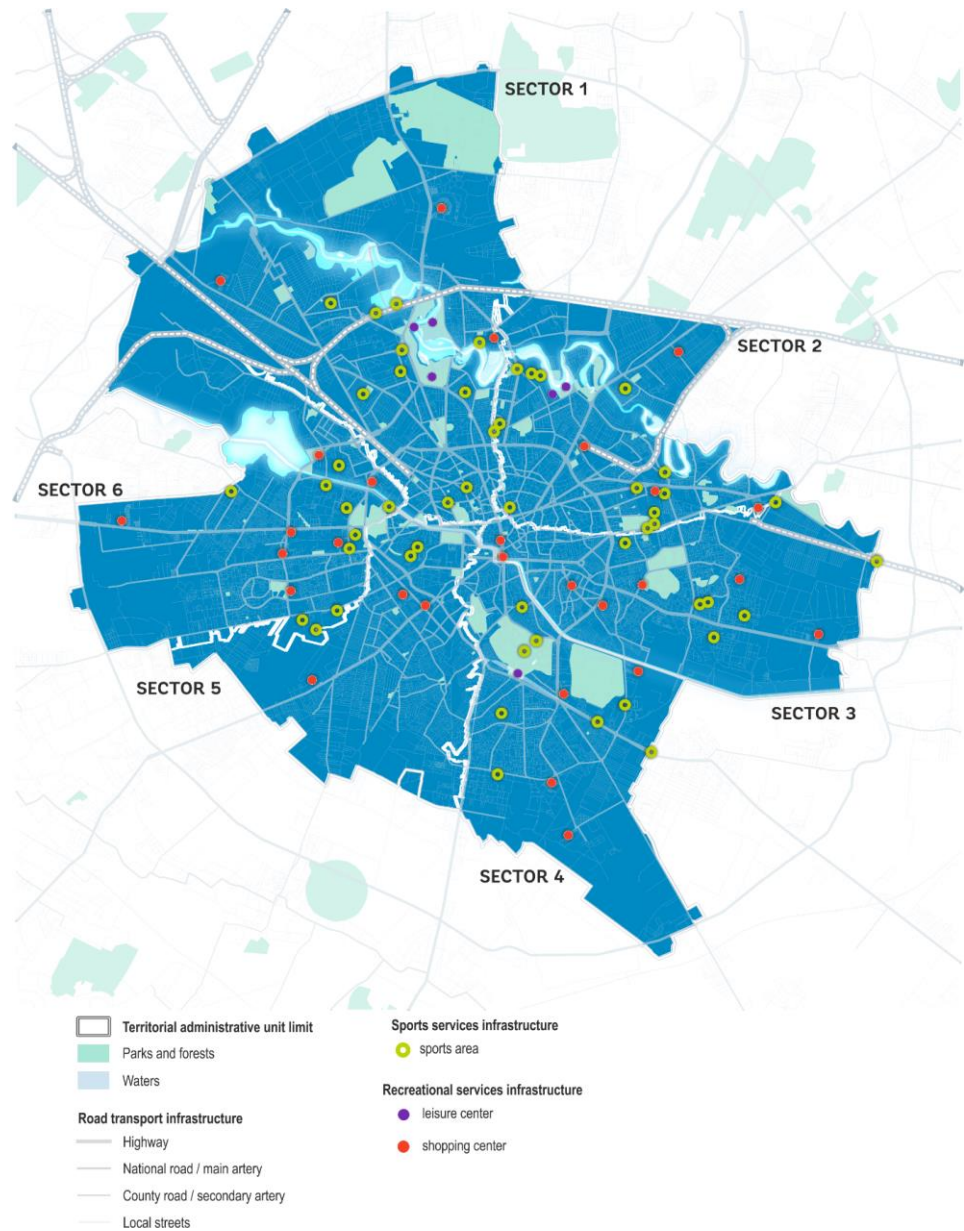
- The diversity of facilities, spaces, styles and activities is a unique factor that has the potential to be exploited by the variety of the cultural offer due to the general eclecticism of Bucharest.
- The cultural infrastructure is characterized by a high variety of the existing offer, from institutions of municipal and national interest to alternative spaces that complement the range of opportunities available in the capital city.
- Many events are being organized, whether they are classic cultural activities such as plays, exhibitions, opera concerts, book launches, etc. or unique initiatives such as festivals, concerts, conferences or
- Many of the city's cultural facilities are facing a number of common challenges such as the spatial distribution and the servicing capacity (the cultural life is concentrated mostly in the city center), the attractiveness and visibility of facilities or their condition and level of equipment, as well as funding challenges.
- All this affects the attractiveness and the overall image of Bucharest, as well as its capacity to stand out as a European cultural capital.
- There is no integrative event agenda that can provide information on exactly the total number of cultural activities available during a year, and the event promotion is insufficient.
- The support available to cultural actors is insufficient and the collaboration between cultural actors in Bucharest

	recurring events such as guided tours or treasure hunts.	to diversify and enhance the added value of the cultural offer is limited.
Development trends	- Although the general trend in the period 2011-2017 was a 26% increase in the total number of users, things happened differently depending on the targeted categories of facilities. Thus, the cinema audience is a constantly growing category, which in 2017 reached a threshold of approximately 500,000 people annually. - The number of museum visitors recorded a significant increase of 41%, which underlines the importance of Bucharest museums and the need to continuously develop them. - At the same time, however, the largest decrease, of about 37%, was recorded among readers in libraries, which proves the declining attractiveness of those facilities.	
Strategy recommendations	- Capitalization of abandoned spaces or spaces in advanced state of degradation in the city to transform them in socio-cultural facilities that serve the central area and especially the housing neighborhoods. - Development of new socio-cultural facilities within the housing neighborhoods functioning as community centers, where activities chosen following a local community consultation can be organized. - Establish major areas of cultural interest and support their identity development - e.g. Cartierul Creativ, ambience room, areas dedicated to hubs and creation areas, as well as new endowments, such as leisure areas or a new cultural quarter of museums in relation to Dâmbovița River and the Colentina river chain of lakes. - Set up cultural routes or streets/routes/squares through which non-motorized transportation is encouraged, that facilitate the connection between areas of interest both within the central area and between the central area and the outskirts. - Permanent development of initiatives such as the cultural consumption barometer to identify trends, motivations and expectations of Bucharest inhabitants on the access to cultural activities in the city. - Draft a guide on the establishment and services provided within libraries so as to allow them to have a community center purpose. - Draft a guide on the establishment and services provided within museums to make them more attractive and in line with the international standards for the display of materials and information. - Implement a program for the modernization of public cultural institutions so as to provide quality and necessary services (e.g. Parking areas, socialization areas etc.). - Development of new financial tools for the support of large-scale / multi-annual actions for the independent sector, based on a multi-annual financing budget of public authorities. - Development of a network of workspaces for actors in the cultural and creative sectors, which can also function as community centers, exhibitions or facilities in the field of research and innovation. - Support and develop acceleration programs and hubs in the cultural and creative sectors that encourage the development of the private sector in the field - Promote collaboration between cultural actors both by organizing advisory councils and matchmaking events and by facilitating fixed-term partnerships in which the private and the independent sectors can get involved in projects, in collaboration with cultural public institutions. - Develop an online platform to bring together and promote all the activities in the cultural agenda of the capital during a year.	

	• Develop a signaling system at city level through which cultural activities in the city to be promoted in an attractive and unitary way. • Develop marketing strategies for cultural areas to identify the target audience for the cultural offer in the capital city and the adequate ways to address it.
Proposals stemming from the consultation process	• Set up 6 theater clubs in the six sectors to host theaters for interns / projects for beginners, and artistic residences. • Organize itinerant shows and educational activities (e.g. workshops) in performances / sports halls in schools to decentralize the cultural offer in the residential areas. • Organize new events in the public space - e.g. performance events in subway stations. • Provide support for the private and/or independent environment for the preparation of projects to secure financing. • Direct involvement of artists and cultural managers in a body responsible for cultural infrastructure development to direct funds according to the preferences of the cultural consumers • Update the financing mechanisms to evaluate projects based on criteria such as feasibility, implementing capacity, sustainability, history etc. • Grant financing for the private and/or independent environment • Implement a new policy for art procurement and distribution in galleries • Linking the work of institutions such as Creart, Arcub and Expo Arte, and even bringing them together under the same umbrella institution

2.6.5. SPORTS AND LEISURE INFRASTRUCTURE, ACTIVITIES, EVENTS AND SERVICES

Figure 45.
Territorial
distribution of
main sports
facilities



Source: Own processing

Key-issues

The sports infrastructure is made up of sports facilities and complexes, fields, stadiums and swimming pools, mainly owned by some public institutions such as Bucharest Municipality, Ministry of Youth and Sports, Ministry of National Education, Municipal Sports Associations, but also owned or managed by private sports clubs or entities. They are complemented by the main facilities for mass sports, i.e. private fitness centers/gyms, or facilities related to the education units, in 2018 Bucharest having 374 gyms, 430 sports fields and 17 swimming pools in schools, high schools and universities

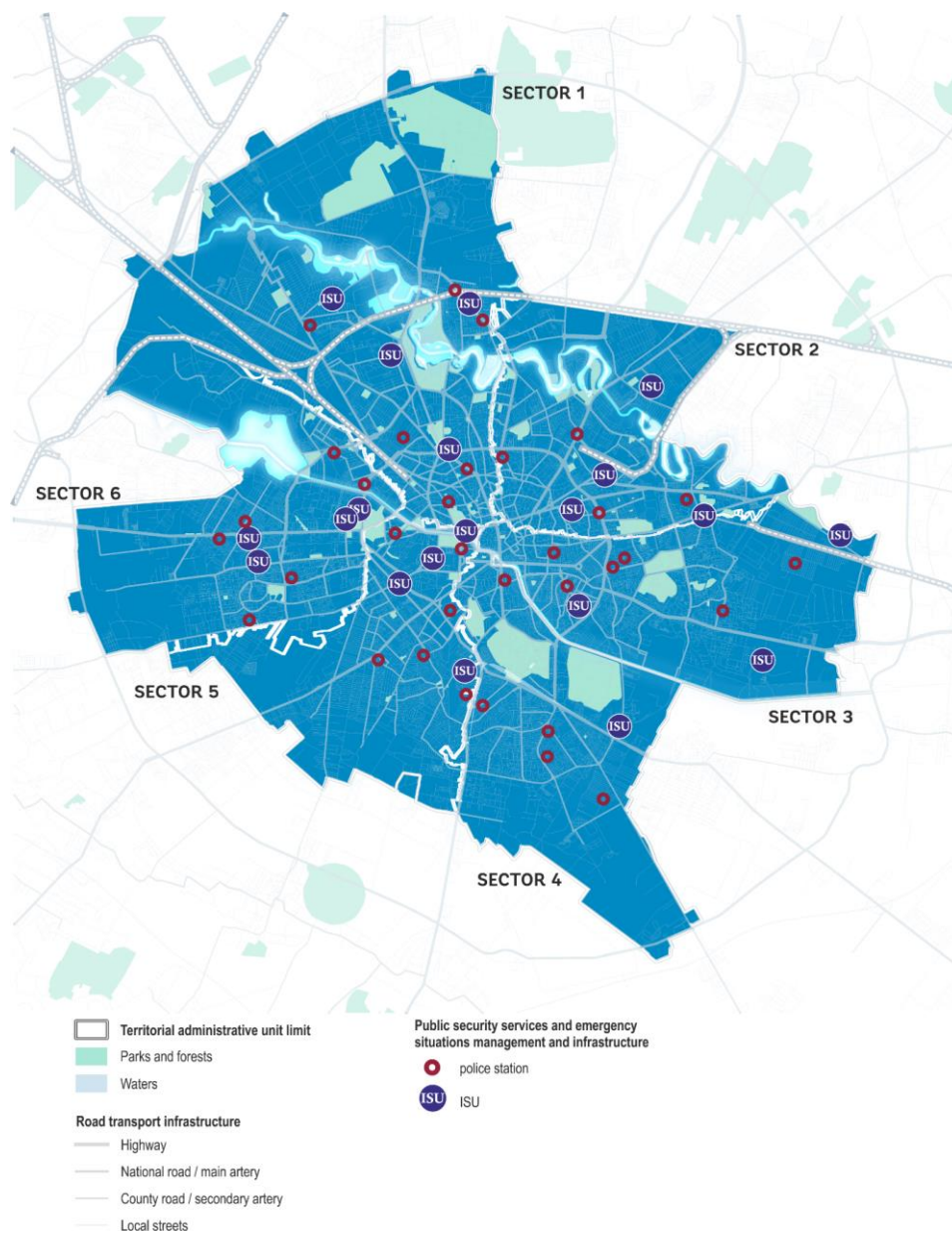
As regards the current leisure facilities in Bucharest, these are grouped into main categories depending on the user interest, and the most widespread are the catering facilities (restaurants, bars and cafes), which based on their specificity and location can be attended both by inhabitants and visitors.

	The location of the catering facilities help shaping certain main leisure areas, which are concentrated especially in the central and central-northern area of the city, the historic center being the most notorious leisure area in the capital, attractive both for inhabitants and visitors from the country and abroad. This is complemented by a series of other areas in constant development, such as Grădina Icoanei - Piața Romană - Șos. Ștefan cel Mare, Calea Victoriei area, Calea Moșilor – Bdul Pache Protopopescu – Calea Călărași area or Floreasca – Dorobanți – Piața Victoriei – Bdul Ion Mihalache area.	
Strengths/ Weaknesses	- Numerous investments or initiatives have been made in recent years to develop the sports infrastructure in the capital, as is the case of the 66 completed or ongoing projects from 2002 to the present, financed by the National Investment Company, which mainly aimed at sports facilities related to education units, but also a series of major projects such as the construction of the polo pool at the Steaua Bucharest Army Sports Club, the construction of the Olympic swimming pool at the Dinamo Sports Club, the rehabilitation of the competition and training pool at the Rapid Sports Club, the construction of Steaua Stadium Bucharest, the construction of the arena of the Arcul de Triumf National Rugby Stadium, as well as the consolidation and modernization of the “Valentin Stănescu” Giulești Stadium. - The Capital City is known for its nightlife offer, the main area with 24/24h economy being represented by the historic center, to which are added the other main leisure areas, and punctually the Bucharest clubs located in peripheral areas of the city.	- In addition to the lack of a clear record of the city sports infrastructure, Bucharest also faces the lack of major facilities such as a major sports facility to organize indoor and outdoor events, dedicated to several sports, a multipurpose hall with a capacity of at least 10,000 people, a stadium with an athletics track or an Olympic swimming pool, a sports facility dedicated to performance table tennis. - In terms of spatial distribution, there are several areas in the city that are poorly served by the major sports facilities, especially in Sector 5 and 6, but also in the outskirts. - Areas with high potential in Bucharest, such as the lakes and the Dâmbovița River corridor, are insufficiently capitalized for sports activities. - Shopping avenues and public spaces for pedestrians that encourage recreational and socializing activities are lacking.
Development trends	- Part of the recent investments targeted the stadiums prepared for the training of national teams that will play in Bucharest during Euro 2020. This event is expected to help increase the interest for sports activities and profile Bucharest as an attractive location for such events. - The works already in progress for the construction of the "Mihai Flamaropol" Skating Rink (a complex that will provide a capacity of 3,100 seats), as well as the existing initiative to build a new multi-purpose hall with a capacity of 20,000 seats will act in the same direction, by increasing the offer of sports facilities.	
Strategy recommendations	Develop major sports facilities to ensure the necessary space to practice performance sports, but also to organize events and competitions of municipal, national and international interest (e.g. multi-purpose hall, stadium with an athletics track, etc.). These facilities must be located both in central and residential areas.	

	• Develop marketing strategies for various sports areas/types of sports activities to identify the target audience for the sports offer in the capital city and the adequate ways to address it. • Develop an online platform to bring together and promote all the activities in the sports agenda of the capital during a year. • Capitalization of abandoned spaces or spaces in advanced state of degradation in the city to transform them in community facilities to serve as neighborhood centers with sports facilities in residential areas. • Develop major leisure facilities in relation to the favorable natural elements (lakes, Dâmbovița River). • Develop the recreational activity sector in secondary leisure areas at the city level and elaborate a different functioning regulation for the historic center and the secondary leisure areas, that would encourage the development of entertainment activities or functional mix between leisure, housing and working areas. • Elaborate and implement a tourism marketing and development strategy that promotes the leisure offer within an integrated identity of Bucharest, including in relation to Ilfov County.
Proposals stemming from the consultation process	• Implement a program for the constant modernization of sports infrastructure that needs rehabilitation/expansion/equipping works - e.g. by developing new facilities around the 6 School Sports Clubs. • Open the sports halls and fields within education units to be rented outside school hours • Implementing a park zoning update program to differentiate leisure areas from sports/movement areas — relevant actors such as event organizers, sport federations, etc. must be involved in the organization of public spaces • Introduce additional sources of lighting in parks for increased user safety • Supplement sports medical clinics and modernize and equip the existing clinics • Organize outdoor sports and leisure activities, e.g. by blocking car access on certain streets in residential areas weekly/monthly. • Diversify sports infrastructure in line with the interests by age groups, e.g. playgrounds for 0-3 age group, climbing walls and virtual rooms for movement etc. for older age groups • Set up metal structures around the sports fields in education institutions, that would allow their closure depending on the weather. • Organize major sports events - e.g. world semi-marathon championship or international football tournaments for children • Establish a research institute in sports area • Implement tax facilities to support sports activities - e.g. ensure free public transport for those who attend major sports events • Promote sports activities to the community through activation campaigns, such as sports simulators or events in shopping centers or in the public space • Provide support to sports clubs in preparing projects for external funds

2.6.6. EMERGENCY RESPONSE AND PUBLIC SAFETY SERVICES

Figure 46.
Territorial
distribution of
the structures of
the ISU, Police
and Police Riot in
Bucharest



Source: Own drawing

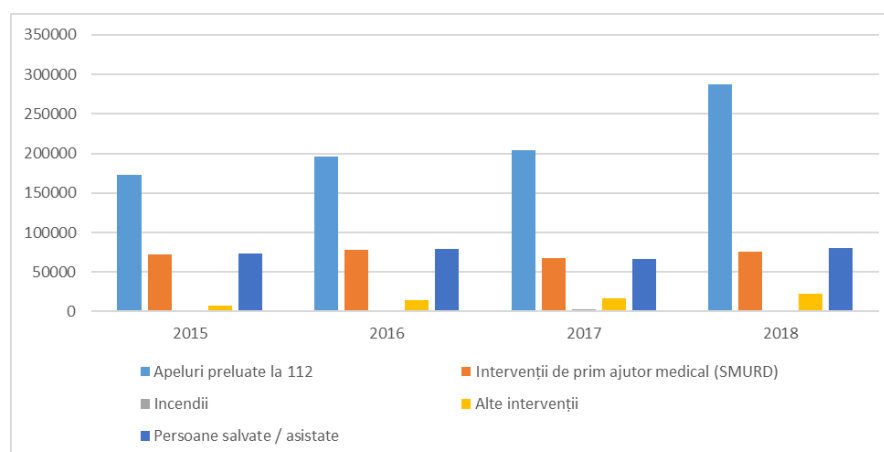
Key-issues

According to the Risk assessment and coverage plan for 2019 adopted by the Bucharest Committee for Emergency Situations, the following risk types were identified at the capital city level: flooding, forest fires, earthquakes, industrial hazard, dangerous product transport and storage, road transport, air transport, underground transport, radiological hazard, water pollution, collapse of buildings, installations and facilities, public utility failure, objects falling from atmosphere and cosmos, unexploded ammunition, epidemics, fires, public events etc.

Areas with a high risk of emergencies are, according to the same document, the areas of activity developed along the modes of transport, the areas of technological installations (both for technological risks especially), the floodable areas (for the risk of floods) and the Historic Center (especially for seismic risk).

Bucharest-Ilfov ISU was involved in solving 100,685 emergency cases (23% of the total number reported nationally), of which 83% were in Bucharest and 17% in Ilfov in 2018. Around 75% of them were qualified first aid interventions (an average of over 200/day), 2% were fires and the remaining 23% were related to other types of incidents/accidents. At the same time, 283,963 emergency calls (112) were managed by ISU dispatchers, a 38% increase compared to 2017. The figures show a daily average of 788 calls, an average of 120 calls/dispatcher/shift respectively.

Figure 47. Main indicators of the ISU “Dealul Spirii” activity 2015-2018



Source: ISU “Dealul Spirii” annual activity reports

Strengths/ Weaknesses

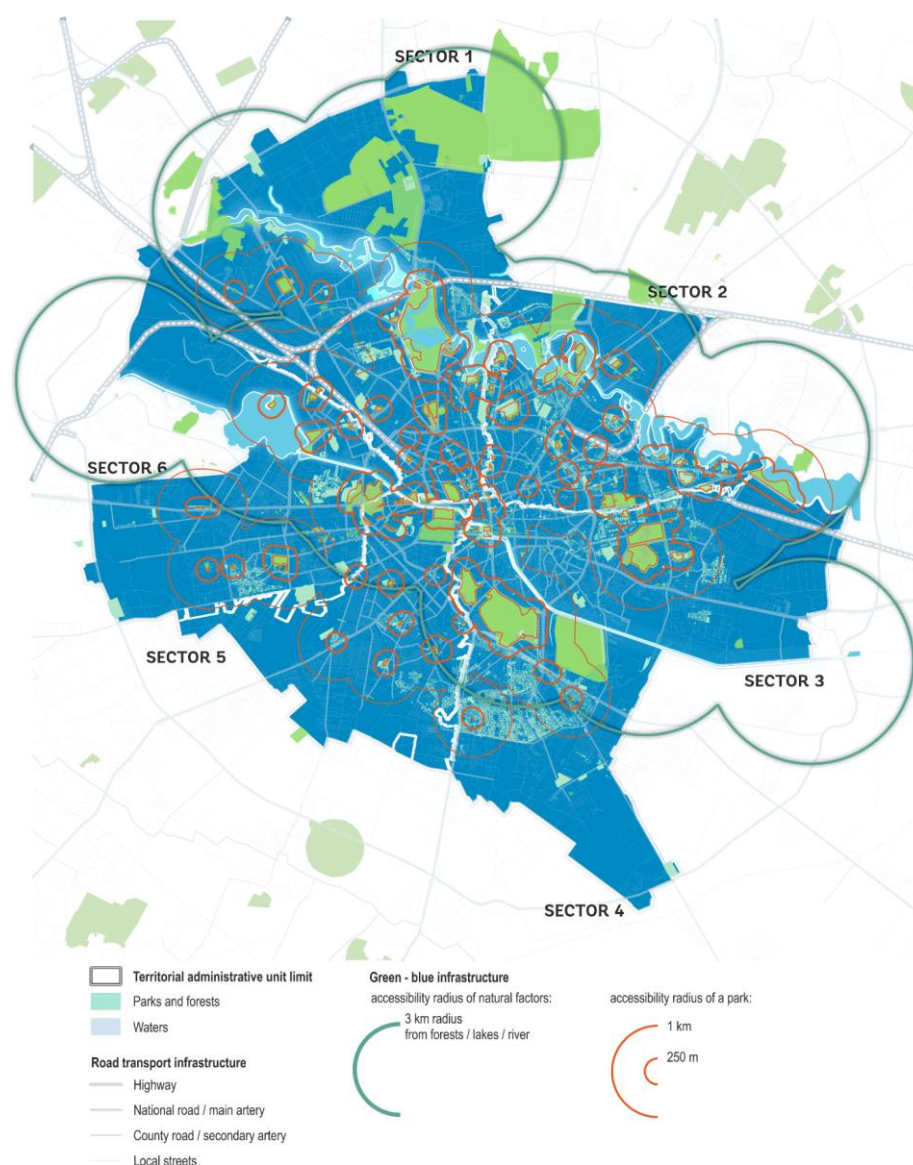
- In the capital city and Bucharest-Ilfov region there is a stable system for risk assessment and coverage, based on the legislation in force, annually updated plans and intervention procedures, organizational structures (committees and operational centers for emergency situations at municipal and sector level, operational center), respectively clear responsibilities for each entity involved and for each risk category.
- Major investments were made in 2019 at the Bucharest-Ilfov ISU “Dealul Spirii” level through the “Viziune 2020” project, financed from European funds within LIOP 2014-2020, investments that included 55 new type B ambulances and 10 type C ambulances and expanding the number of intervention crews to 40.
- Also in 2019, the heliport for the SMURD helicopter located on the top of Bucharest University Emergency Hospital was
- The assessment of some risks (flooding, earthquakes, extreme weather phenomena, pandemics etc.) and investment resources in case they occur (e.g. accommodation or catering facilities for the distressed) seem incomplete, not accurately territorialized and unsystematically performed at the city level.
- The development process for risk assessment and coverage plans, at the city and sector level, does not involve an efficient participatory process that brings together other entities (e.g. NGOs, tenants’ associations, civic initiative groups etc.)
- There are deficiencies in the infrastructure that notifies, warns and alarms the population in case of emergencies, especially in terms of number, type, state of operation and geographical distribution.
- The main entities involved in the management of emergencies (ISU B-ILF, SABIF) struggle with poor endowment and equipment/intervention tools in an advanced state of wear.
- The journey times in case of some neighborhoods in the outskirts are high due to the long distance from the

	inaugurated, and in 2020 ISU also purchased intervention equipment in case of earthquake, such as thermal imaging cameras and heartbeat sensors for the victims under rubble.	existing ambulance substations and firefighter detachments, but also to the fact that intervention cars get stuck in traffic. There is an acute shortage of medical and support staff at the level of ISU and the Bucharest-Ilfov Ambulance Service, but also of the emergency hospitals.
Development trends	The loan agreement concluded by the World Bank with Romania in 2018, called "Improving Disaster Risk Management" will allow, among other things, that by 2024 the consolidation (or even reconstruction) and rehabilitation of several buildings managed by ISU Bucharest-Ilfov (the firefighter detachment in Obor, the police and gendarme buildings).	
Strategy recommendations	- Elaborate more detailed analyzes of some risks, of the vulnerability of the capital, of the probability of their occurrence and of the potential impact of the risks at territorial level (examination of the buildings with seismic risk, updating the analysis of the flood lines for the two watercourses - Dâmbovița and Colentina, introduction in PAAR of the areas most affected by climate risks, etc. - Develop a GIS database with all the most exposed / vulnerable areas in case of risks and with the resources available at community level for emergency management - Turn the risk assessment and coverage plan into a process of participatory planning and submit the document for public debate - Develop the infrastructure that notifies, warns and alarms the population in case of emergencies (e.g. modernize the sirens and increase their coverage) - Continue the investments made by IGSU and the Ministry of Health to fully equip ISU "Dealul Spirii", SMURD and the Bucharest-Ilfov Ambulance Service with means, technique and full endowments, according to the list of needs prepared by these institutions, - Establish new firefighter detachments / SMURD working units and rescue substations in the areas with high intervention times, together with ISU / SABIF / PMB and sector municipalities - Establish and manage evacuation routes – these designated routes must be cleared before storms or major weather events to allow emergency response (and after snow are the first to be cleared), but also are checked to make sure that they are resistant to earthquakes (i.e. bridges, and ensuring buildings can't collapse and block routes). - Attract specialized staff in the emergency system (Ambulance Service and SMURD) and purchase protection equipment for the operational staff	
Proposals stemming from the consultation process	- Continue and promote public donation campaigns to collect the funds necessary for SMURD equipping - Implement the concept of social ambulance, also through a donation campaign and with NGO support, that would ensure the free travel to hospital of socially marginalized people. - Involve NGOs, education units and other entities in raising awareness of how current risks and climate change occur and impact our lives. - Support from local authorities to increase the number of volunteers in "Societatea de Salvare București" (Bucharest Ambulance Society) and "Există un erou în fiecare dintre voi" (There is a hero in each of you) program. - Complete the implementation of the traffic management system to prioritize emergency response vehicles. - Urgent measures to strengthen the management capacity of emergencies in hospitals, SMURD/112 etc.	

2.7. ENVIRONMENT, CLIMATE CHANGE AND RISKS

2.7.1. NATURAL CAPITAL AND GREEN/BLUE INFRASTRUCTURE

Figure 48. Areas served by natural and green areas in Bucharest



Source: Own processing

Key-issues

The green and blue infrastructure in Bucharest is a network of natural, semi-natural, restored and man-made areas, including all categories of green areas, agricultural lands and urban aquatic surfaces with the aim of providing a wide range of ecosystem services for the improvement of urban living, safety, resilience and city sustainability. It includes key-areas, main areas, connectors and areas of emerging importance.

The approach to the green and blue infrastructure of Bucharest City should be linked to the regional ecological infrastructure, of which the resources quality and ecosystem services provided within the city depend. The regional green infrastructure consists of forest areas, wet areas, agricultural lands with the related guard rails, as well as re-naturalized areas (abandoned lands, brownfields). Part of these (12,317 ha, i.e. 6,8% of the Ilfov County surface) are integrated in the protected natural areas.

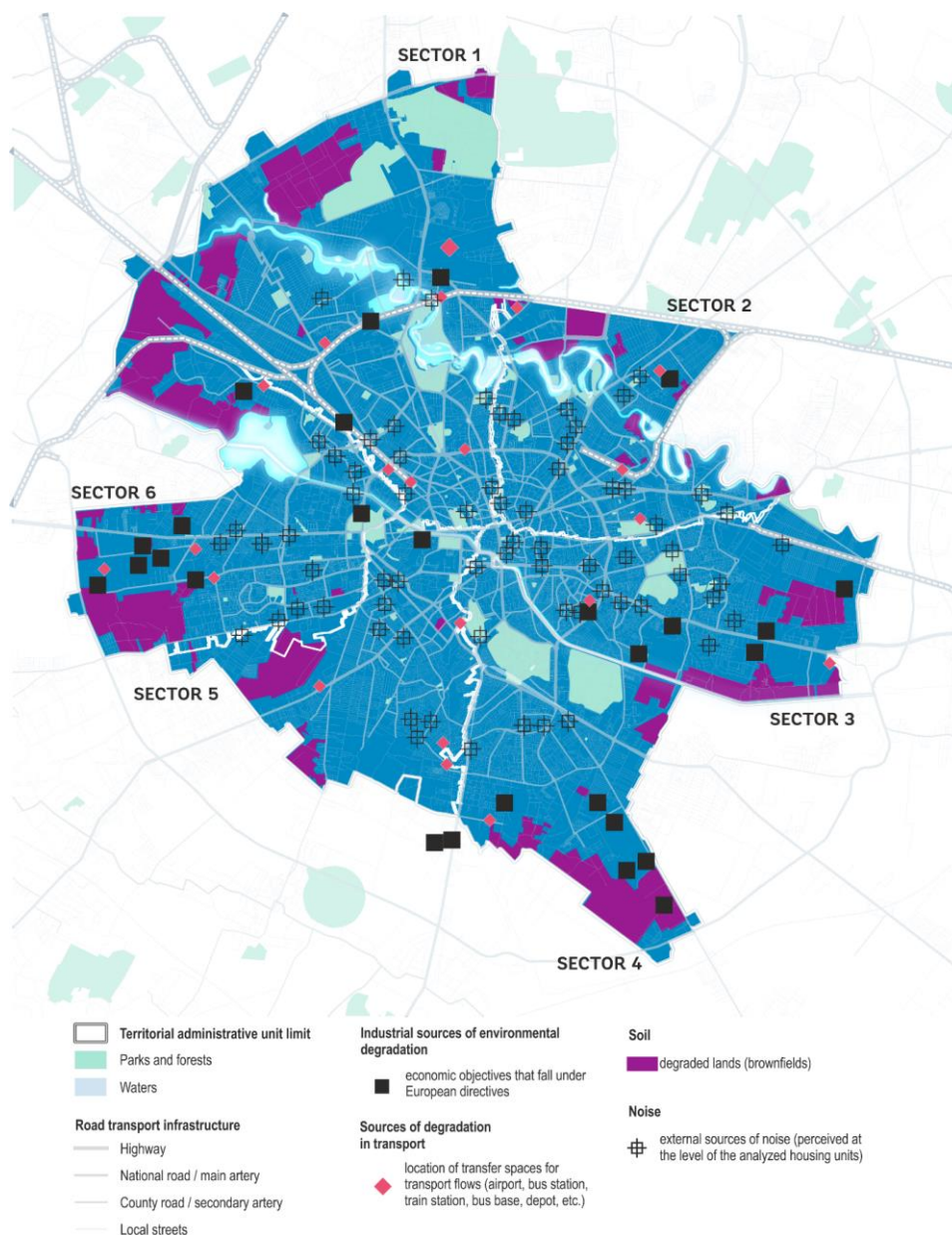
	The green component of the green-blue infrastructure has a surface of 4508 ha (2017), i.e. 19% of the Bucharest surface and includes Băneasa Forest, Văcărești Natural Park, Bucharest City parks, residential compound gardens, street alignments, squares, etc. The urban aquatic areas in Bucharest City include rivers (Dâmbovița, Colentina), lakes and their shores (lakes along Colentina Valley, Morii Lake and lakes within the green areas), marshy areas and artificial hydraulic works (e.g., canals). In 2017, the urban aquatic areas in Bucharest City covered an area of about 1,208.8 ha (5.1% of the administrative territory), of which 111 ha are within green areas. The dynamics of the green-blue infrastructure elements is especially influenced by the city expansion. It is obvious that the available park area available per inhabitant has decreased after 1990, especially due to restitutions and to an expansion of the residential built-up surfaces. The green area decrease is observed at the parks of metropolitan interest, the neighborhood ones and apartment block gardens. .
Strengths/ Weaknesses	• The share of green and aquatic areas is high (around 24% of the Bucharest surface). • There is a diversified offer of ecosystem services provided by the green-blue infrastructure, and the share of native species in green areas is high. • Băneasa Forest and Văcărești Natural Park have a high potential to combine nature conservation and sustainable social capitalization activities. • Park attractiveness for the inhabitants have led to a series of investments from sector local authorities: in 2019, a park of 20,000 sqm was completed in Sector 6, on Bd. Timișoara, by reconverting a former industrial land, and the Municipality of Sector 3 already works to set up a new park of about 5 ha, including a lake, on Brățării Street. • The results following the EMERSA project (2016-2017), <i>Metode experimentale pentru evaluarea serviciilor ecosistemice ale lacurilor urbane in contextul schimbărilor climatice globale</i>, have shown a clear influence of the blue infrastructure on air quality, temperature and humidity dynamics (humidity increase and temperature decrease during summer) and the role of pollutants storage in lakes. • The cultural ecosystem services appreciated the most by visitors and residents are those related to aesthetic aspects and escaping from the daily routine, as well as those related to walking and socializing. • The abandoned lands from within and outside Bucharest City and the lands along the modes of transport (mainly railways) are areas where species that mostly generate disservice are very likely to grow (including invasive species). • The connectivity and multifunctionality level of green and aquatic areas in Bucharest is low, both within the city and with the components outside. • Despite the attractiveness of green areas for residents, their ability to generate ecosystem services adapted to human communities is still undervalued. • Although it has an interesting dynamics and a declared status of urban protected area by the Romania Government, Văcărești area is less attractive for Bucharest inhabitants, and its management is still discussed. • Poor planning of Băneasa Forest results into a disorderly capitalization by different categories of visitors. • Accumulation of pollutants in the sediments of the lakes along Colentina and in parks favors the degradation of water quality and accentuates the eutrophication problems. • The increased impact of high temperatures on the water quality of lakes and Dâmbovița River leads to the degradation of aquatic ecosystems and the

		decrease of the ecosystem services they provide.
Development trends	• It can be observed a degradation tendency for the vegetation and related infrastructure, in the case of parks, gardens, street alignments, a tendency of excessive homogenization of tree species used in street alignments, a decrease of native tree species, an increased impact of some invasive species with a tendency to spread and enhanced sanitation problems caused by abandoned lands in the capital city. • A growing interest of inhabitants for outdoor activities is noticeable in all public consultations and even more so recently, in the context of the restrictions induced by the COVID-19 pandemics. • There are several public investments initiated or planned at the level of the capital city and sectors in this respect: - The Municipality of Sector 4 wants to build a park of 2.7 ha in Metalurgiei area, the works are foreseen to start in 2020. and - Bucharest Municipality is also working to design a 1.5 ha park in Eroilor area. - Sector 6 has budgeted for 2020 funds for the expropriation of about 2 lands in Ghencea area (former Militari greenhouses), where it intends to set up a new park. - The Municipality of Sector 5 also has in view the development of new green areas in Antiaeriană area once the urban regeneration project starts. - Sticlăriei Park, managed by the Municipality of Sector 2, will be redeveloped and upgraded with European funds, while similar initiatives exist for Cișmigiu Park where the technical solution has not yet been agreed upon. - Unirii Park, managed by the Bucharest Municipality (ALPAB), and Pantelimon Park, managed by the Municipality of Sector 3 are also to be upgraded.	
Strategy recommendations	• Promote the green-blue infrastructure concept and align the public investments in the components of the green-blue infrastructure with the expectations of their users • Determine the structural and functional relationship between the components of the green-blue infrastructure in Bucharest and those of the Bucharest-Ilfov Development Region, prioritizing the Văcărești Natural Park (shaping ecological corridors towards the exit from Bucharest) and Băneasa Forest; • Create facilities for the management of visitors, but also of biodiversity in the area of the Văcărești Natural Park, in order to increase its attractiveness and to ensure a better focus on social capitalization jointly with nature conservation; • Maintain the structural and functional integrity of Băneasa Forest and develop minimal infrastructures for visitors (sports infrastructures, bicycle tracks, alleys, spaces for creative activities) • Ensure functional connectivity along Colentina River, by creating pedestrian paths and bicycle tracks, as well as by ensuring the continuity of publicly accessible green areas; • Declog the lakes along Colentina River and those in some of the Bucharest parks (for example, Tineretului, Național, and Sticlăriei parks); • Increase water dynamics in the area of the lakes and of Dâmbovița River, to reduce water heating problems during summer; • Introduce fish fauna in the lakes for controlled use for sports fishing (especially in park lakes, whose water is replaced annually);	

	• Promote projects to improve ecosystem services provided by Morii Lake and Dâmbovița canal, restore dams and shore areas, implicitly considering an increase of security for the different categories of user; • Create areas that can be used for various water sports; • Rehabilitate the parks of Bucharest City, both by gradually replacing the vegetation that is old or has been affected by different infrastructures (gradual replacement of the vegetation), as well as the insufficient or outdated infrastructures (Cișmigiu, Herăstrau, Tineretului, Carol parks etc.) • Promote programs aimed at restoring the delimitation, the herbaceous vegetation and the trees in the gardens of residential buildings • Preserve the diversity of the tree stock in Bucharest City by introducing mainly native species, especially in parks (e.g. ash, linden, oak, elm) and non-native species that have proven viable over time (e.g. American red oak, American maple). • Ensure a minimal management of abandoned spaces, including the removal of invasive species (varnish tree, ragweed etc.) and of species that pose a risk to the health of the population (rats, ticks). • Update the Register of Green Spaces in Bucharest.
Proposals stemming from the consultation process	• Develop public green areas in residential areas with low accessibility to green areas; • Develop new residential areas provided that adequate access to green area is granted, including by taking into account green areas such as parks and gardens within residential compounds; • Develop water resources in Bucharest (e.g. develop Dâmbovița River in the area of the National Library, including a boat bridge or set up a bicycle route on the shores of Colentina River). • Create green corridors that connect the green-blue infrastructure components of Bucharest and Ilfov • Rehabilitate the parks by gradually replacing degraded vegetation and infrastructure, ensuring optimal conditions for relaxation, recreation, sports and creative activities, to the detriment of leisure. • Maintain the current limits of Băneasa Forest and develop infrastructures for visitors (sports infrastructures, bicycle tracks, alleys, spaces for creative activities) • Improve regulatory and cultural ecosystem services promoted by Morii Lake and Dâmbovița canal • Ensure functional connectivity along Colentina River, by creating pedestrian paths and bicycle tracks, as well as by ensuring the continuity of publicly accessible green areas • Increase the attractiveness of Văcărești Natural Park by making improvements for visitors and biodiversity management • Increase the integration level of aquatic surfaces in the urban environment • Declog the lakes along Colentina River and those in some of the Bucharest parks • Enhance the identity of Bucharest as a “garden” (brand) – integrated landscape approach, encourage Urban garden-type green terraces (urban policy for sustainability and fighting against climate change)

2.7.2. ENVIRONMENTAL QUALITY FACTORS AND (WATER, AIR, SOIL, NOISE) POLLUTION

Figure 49.
Sources of degradation of the quality of environmental factors and the quality of life in Bucharest



Source: Own processing

Key-issues

Depending on the nature of the source of degradation, in Bucharest City we can delimit industrial sources, household and household-like sources (offices, schools etc.), sources related to transports (road, rail, air, special), to hospitals, and other categories (building sites, retail premises etc.).

In Bucharest City there are 7 SEVESO industrial agents. Five of them are active in the field of energy production: Power Plant Branch Bucharest SA - ELCEN (CTE București VEST, CTE București Sud, CTE București Progresu, CTE București Grozăvești and CTE București Titan), and 2 are active in the chemical industry (SC INDUSTRIAL CHIM SRL, SC ISOVOLTA SA). Considering the proximity to Bucharest, the 11 SEVESO agents in Ilfov County must also be taken into account. In Bucharest City there are 39 economic operators subjected to the integrated environmental permit.

The air quality in Bucharest City is influenced by the industrial activities concentrated in the urban agglomeration and by mobile sources (especially by road traffic). They are complemented by residential sources (mainly by burning fuels), controlled and uncontrolled landfills (landfills ignitions, waste decomposition), construction activities (sites), the quality of the sanitation activities in public spaces.

The monitoring of the ambient air quality at the level of the Capital is done through 6 fixed measuring stations located in Bucharest and 2 in Ilfov, which are part of the National Air Quality Monitoring Network, subordinated to the central administration. On air quality indicators, according to the Integrated Air Quality Plan of Bucharest 2018-2022 (subchapter 4.3.): For nitrogen oxides NO_x exceed the critical level of 40 µg / m³ in all locations, the main contribution being car traffic; for NO₂ the limit values at 3 of the stations for the annual averages and the hourly maximums are exceeded; for PM₁₀ the daily maximums are exceeded at two stations, and the annual averages are around the limit value at two of the stations; for PM_{2.5} particles the limit values at two stations are exceeded, and at other two they are located around it. The Air Quality Maintenance Plan for Bucharest 2018-2022 (in subchapter 3.5.) Indicated that the levels of concentrations of carbon dioxide, sulfur dioxide and heavy metals do not exceed the limit values at the stations where they could be determined, but also the fact that car traffic, followed by industry and residential heating are responsible for their main generators. In this context, the European Commission has initiated an infringement procedure for the Municipality of Bucharest for non-compliance with the daily limit values, respectively the annual limit values for PM₁₀ concentrations provided by Directive 2008/50 / EC, an action that already has a verdict from the Court European Court of Justice and which refers to the period prior to the elaboration and approval of the Integrated Air Quality Plan. Another infringement procedure initiated is the one aimed at exceeding NO₂ concentrations.

Bucharest City Hall has an urban noise monitoring system consisting of 15 fixed stations located in each of the 6 sectors, at relevant points. According to the Action Plan for reducing the noise level in Bucharest (update proposal from 2019), in Bucharest the main sources of noise are road traffic (especially on high arteries, where there are public transport routes), traffic railway (especially trams) and industrial activity. During 2018, at the level of the municipality, the strategic noise maps of the municipality for each of these sources were elaborated in stages. According to them, on a number of 57 streets the noise level during the day exceeded the allowed threshold of 70 dB, and 59 on the one during the night (60 dB). Compared to 2011, there was a decrease in the number of people affected by high noise values, but not the achievement of their reduction forecasts at that time, the reasons being related to the increase in motorization and traffic volumes, but also by only partially implementing measures to synchronize traffic lights and reduce the visit limit.

The water quality in Bucharest City is directly influenced by: the intake of water with a moderate ecological status from upstream the city, both from the Dâmbovița and Colentina rivers; large number of pollution sources, many of them discharging insufficiently treated domestic and technological wastewater; large number of inhabitants who have a consumption pattern specific to a big city; the high diversity of sources of pollution and the diffuse character of the small and medium ones; the very large urban surface, a large part of it being impermeable. As regards the quality of surface waters, no water body has a good and very good ecological status. All underground waters in Bucharest require a qualitative management taking into account that, in terms of quality, the water table in Bucharest City does not meet the drinking water criteria.

The soil is an important carbon storage medium, but also the environmental component which support very diverse anthropic improvements and activities (built-up surfaces, agricultural activities, landfills etc.). Among the recent phenomena stand out the

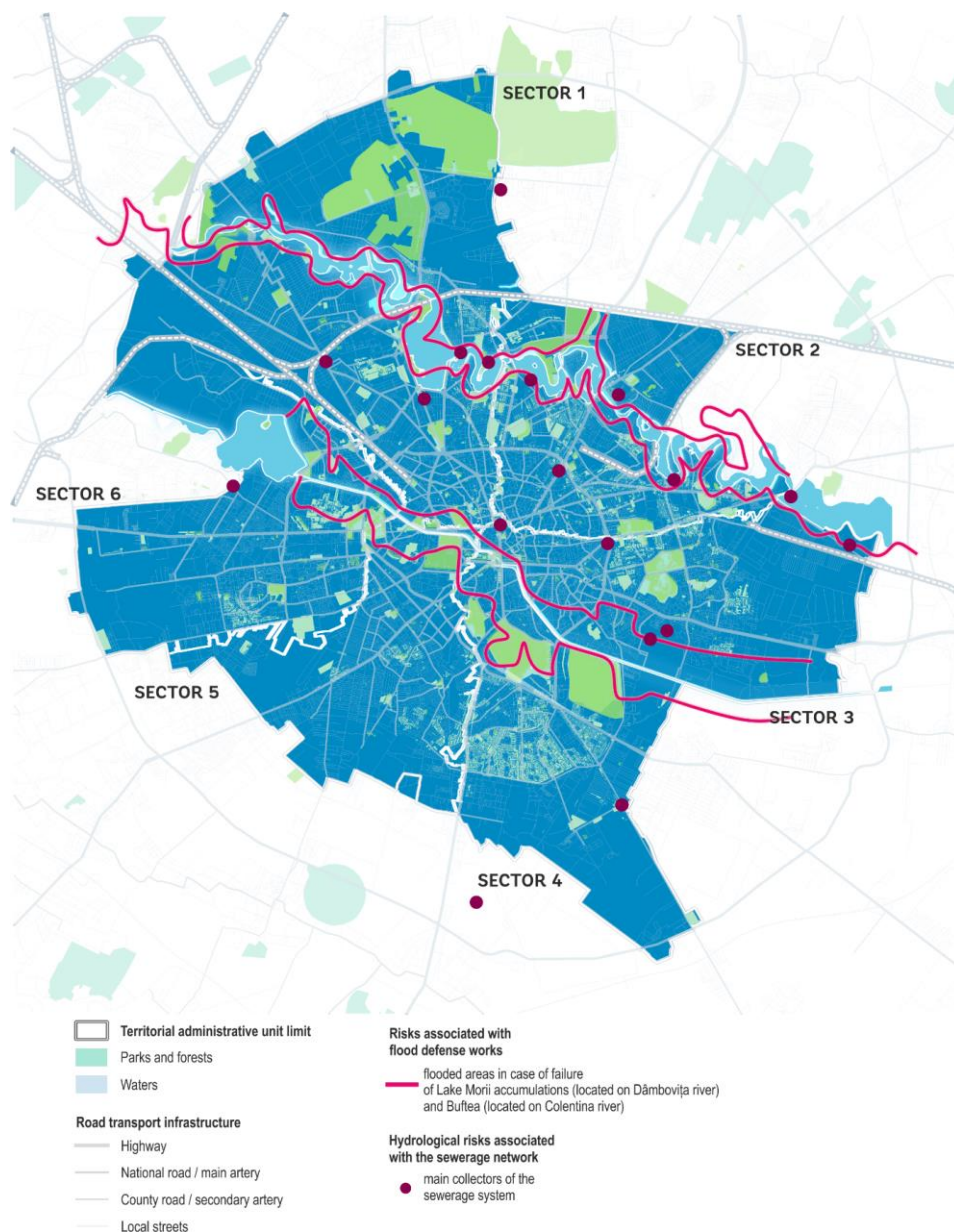
	processes of covering with built-up surfaces and infrastructures, very active in Bucharest City, but also the loading with very diverse pollutants. Besides, in Bucharest City are registered 115.6 ha of degraded areas. According to Bucharest Municipality Geo-Atlas, exceedances of lead concentrations in soil are recorded on the major part of Bucharest City surface, and local exceedances for vanadium (in the area of the former industrial facilities of the machine-tools industry), chromium (in the area of the former industrial facilities of the machine-tools, metal coatings and chemical industry), titanium (in the area of the former concrete mixing plants), zinc (in the areas of intense road traffic) and copper (in the central area and on the Dudești-Policolor site).		
Strengths/ Weaknesses	<table border="1"> <tr> <td data-bbox="427 526 916 1980"> • The location in a plain area favors active ventilation of the city, especially on the dominant directions of the wind. • The surface water volume transited by rivers near Bucharest is high • From the hydrogeological point of view, Bucharest City is located over the largest drinking water deposit in the country, which extends underground on a surface of over 2,500 km². The water deposit under Bucharest can be seen as a unitary structure. It comprises several aquifers located at different levels, which communicate with each other in certain areas. • The average to high natural fertility of the soils specific to Bucharest and the average-high permeability of the rock deposits, which allow the supply of groundwaters, can be seen. • Decrease in the number of people affected by noise pollution generated by rail / rail transport and industrial activity, • Elaboration of plans to reduce the noise level, the air pollution. • Existence of the municipality's own campaigns to monitor air quality and noise levels. • Initiation by central authorities of investments for the expansion and modernization of the RNMCA, as well as for real-time information to the general public on the level of air pollution </td><td data-bbox="916 526 1394 1980"> • Reporting of exceedances of limit values for air pollution, in particular in the case of suspended dust and nitrogen oxides, mainly caused by car traffic and leading to the opening of infringement proceedings • Historical deficiencies (especially for the period 2013-2016) in collecting data on the concentrations of air pollutants at fixed stations part of the RNMCA. • Exceeding the maximum permissible noise thresholds on the main arteries, against the background of high traffic values • There is an <i>import</i> of pollutants from outside the city, some of them being generated naturally and other from anthropic activities carried out in the vicinity. • The environmental monitoring network, especially for air and water components, does not provide data on relevant substances, many of them emerging (for example. benzene, pesticide, biocide, pesticide, medicine). • The issue of the photochemical smog phenomenon, because of exceeding the ozone indicator at some of the stations. • Relatively large areas of degraded land, affected by acidification, and even polluted with heavy metals. • Existence of water pollution sources, in the conditions in which no surface body has a good / very good ecological status, and the groundwater does not meet the potability criteria. • Insufficient involvement of civil society and the NGO sector in environmental protection decision-making process. </td></tr> </table>	• The location in a plain area favors active ventilation of the city, especially on the dominant directions of the wind. • The surface water volume transited by rivers near Bucharest is high • From the hydrogeological point of view, Bucharest City is located over the largest drinking water deposit in the country, which extends underground on a surface of over 2,500 km². The water deposit under Bucharest can be seen as a unitary structure. It comprises several aquifers located at different levels, which communicate with each other in certain areas. • The average to high natural fertility of the soils specific to Bucharest and the average-high permeability of the rock deposits, which allow the supply of groundwaters, can be seen. • Decrease in the number of people affected by noise pollution generated by rail / rail transport and industrial activity, • Elaboration of plans to reduce the noise level, the air pollution. • Existence of the municipality's own campaigns to monitor air quality and noise levels. • Initiation by central authorities of investments for the expansion and modernization of the RNMCA, as well as for real-time information to the general public on the level of air pollution	• Reporting of exceedances of limit values for air pollution, in particular in the case of suspended dust and nitrogen oxides, mainly caused by car traffic and leading to the opening of infringement proceedings • Historical deficiencies (especially for the period 2013-2016) in collecting data on the concentrations of air pollutants at fixed stations part of the RNMCA. • Exceeding the maximum permissible noise thresholds on the main arteries, against the background of high traffic values • There is an <i>import</i> of pollutants from outside the city, some of them being generated naturally and other from anthropic activities carried out in the vicinity. • The environmental monitoring network, especially for air and water components, does not provide data on relevant substances, many of them emerging (for example. benzene, pesticide, biocide, pesticide, medicine). • The issue of the photochemical smog phenomenon, because of exceeding the ozone indicator at some of the stations. • Relatively large areas of degraded land, affected by acidification, and even polluted with heavy metals. • Existence of water pollution sources, in the conditions in which no surface body has a good / very good ecological status, and the groundwater does not meet the potability criteria. • Insufficient involvement of civil society and the NGO sector in environmental protection decision-making process.
• The location in a plain area favors active ventilation of the city, especially on the dominant directions of the wind. • The surface water volume transited by rivers near Bucharest is high • From the hydrogeological point of view, Bucharest City is located over the largest drinking water deposit in the country, which extends underground on a surface of over 2,500 km². The water deposit under Bucharest can be seen as a unitary structure. It comprises several aquifers located at different levels, which communicate with each other in certain areas. • The average to high natural fertility of the soils specific to Bucharest and the average-high permeability of the rock deposits, which allow the supply of groundwaters, can be seen. • Decrease in the number of people affected by noise pollution generated by rail / rail transport and industrial activity, • Elaboration of plans to reduce the noise level, the air pollution. • Existence of the municipality's own campaigns to monitor air quality and noise levels. • Initiation by central authorities of investments for the expansion and modernization of the RNMCA, as well as for real-time information to the general public on the level of air pollution	• Reporting of exceedances of limit values for air pollution, in particular in the case of suspended dust and nitrogen oxides, mainly caused by car traffic and leading to the opening of infringement proceedings • Historical deficiencies (especially for the period 2013-2016) in collecting data on the concentrations of air pollutants at fixed stations part of the RNMCA. • Exceeding the maximum permissible noise thresholds on the main arteries, against the background of high traffic values • There is an <i>import</i> of pollutants from outside the city, some of them being generated naturally and other from anthropic activities carried out in the vicinity. • The environmental monitoring network, especially for air and water components, does not provide data on relevant substances, many of them emerging (for example. benzene, pesticide, biocide, pesticide, medicine). • The issue of the photochemical smog phenomenon, because of exceeding the ozone indicator at some of the stations. • Relatively large areas of degraded land, affected by acidification, and even polluted with heavy metals. • Existence of water pollution sources, in the conditions in which no surface body has a good / very good ecological status, and the groundwater does not meet the potability criteria. • Insufficient involvement of civil society and the NGO sector in environmental protection decision-making process.		

Development trends	After the changes determined by the transitional period, the industrial sources in Bucharest City show a tendency of revitalization and diversification, mainly at the level of SME. Therefore, a special attention should be granted to these small size activities (production capacity, surface and used resources etc.), but with a cumulative impact equally important as of large sources. The Ministry of Environment, Waters and Forests has started a project to expand the National Air Quality Monitoring Network, which will also include 50 sensors, 30 analyzers and a self-laboratory for the Bucharest-Ilfov agglomeration. In 2020, analyzers were installed for online monitoring of PM10 suspended particles, as well as a real-time information panel for the population in the Bucur-Obor area. To these will be added in 2021 three new monitoring stations and two information panels. The Capital City Hall organizes annual monitoring campaigns, by performing indicative measurements of air pollutants, air quality in areas with traffic, with the self-employed. At the Capital level there are also private initiatives such as AerLive.ro – a platform for air quality measurement launched in December 2019 by several NGOs. This consists in over 100 devices located all over the Capital, which provide the citizens with real time information on some of the pollutants in the air. The Action Plan for reducing the noise level in Bucharest (updated proposal from 2019) includes measures to reduce noise at the source, mitigate the propagation path, as well as measures around the receiver. These include from technical measures for cars and tires, urban planning regulations, calming traffic on secondary roads, diverting it to less sensitive areas, maintaining good road surface condition, traffic management, sound insulation of buildings, construction of sound barriers, up to to encourage pedestrian travel, public transport and cycling.
Strategy recommendations	• Control road traffic in areas where the maximum permitted concentrations are exceeded (consider also traffic-free areas), ensure smooth road traffic to limit the volume of pollutants emitted into the atmosphere and decrease the number of non-Euro, Euro 1 and Euro 2 vehicles in the car fleet by introducing adequate legislative and tax provisions. • Transition to the public transport to highly environmentally friendly vehicles • Discourage the use of asphalt/bitumen-based materials to reduce the occurrence of heat islands and of volatile organic compounds • Improve the quality of green areas by reconsidering the introduction of grass and shrub layers, including in the area of street alignments and gardens of residential buildings. • Control the use of fuels in residential areas that are not connected to the central heating supply network, especially in winter. • Control the decomposition gas discharges from the box culverts of Bucharest City. • Limit the abusive use of noise systems in traffic areas (horns, sirens) • Continuously improving the quality of the transport infrastructure to reduce air pollution and noise • Reconfigure and extend the environmental quality monitoring network of Bucharest City by considering new measurement points and new relevant substances (benzene for urban air, pesticides, biocides and medicines for wastewater). • Introduce an alert system that allows for promoting real-time measures in the event of problems related to ozone concentrations. • Develop operational collaboration protocols with research institutions in the field of environmental protection / urban ecology. • Organize a quality monitoring system for the indoor environment of the housing.

	• Improve the administrative capacity of responsible environmental institutions in Bucharest
Proposals stemming from the consultation process	• Improve public participation in decision-making in the field of environmental protection • Increase the taxes for all vehicles driving in Bucharest; encourage the use of public transport; • Introduce a tax for all vehicles transiting Bucharest/city tax; • Ban heavy traffic in the entire city area (trucks, lorries that transit/supply industrial and shopping centers); • Promote green solutions for green areas (e.g., water storage areas, floodplains), buildings (green walls, green roofs) and transport infrastructure (green corridors); • More permeable surfaces and green areas required for existing hypermarkets • Launch an extensive media campaign to prevent behaviors that violate hygiene standards in public spaces (on the street, in buses, etc.); establish video surveillance systems to identify people who do not behave appropriately in terms of maintaining public hygiene; advertise materials that are widely broadcast in public space to generate a sort of social pressure that stimulates prosocial behaviors in public space; establish a system for sanctioning persons who do not comply with the basic rules of maintaining cleanliness in public space; public communication to raise awareness, for all public groups, on the importance of maintaining cleanliness in public space, the significant effects of pollution on many aspects of daily life; • Establish more waste recycling centers, increasing at the same time the waste recycling rate; • Strengthen the capacity of the waste management system to integrate all sorts of waste, including bulky waste, construction waste, end-of-life vehicles; • Promote sustainable solutions waste disposal in Bucharest. • Increase the waste recycling rate

2.7.3. HYDROLOGICAL HAZARDS AND RISKS. FLOODING

Figure 50. Flood areas in case of failure of Morii Lake (located on Dâmbovița River) and Buftea (located on Colentina River) storages.



Source: Own processing

Key-issues

From the hydrological point of view, Bucharest is located where Dâmbovița meets Colentina, belonging to Argeș catchment area. The territory of Bucharest City has a predominantly surface water supply, the underground supply representing between 10 and 30% of the total flow.

The main water management works in the hydrographic area, which contribute to the Capital flood defense consist of:

- On Dâmbovița River - The Ist line of defense of the Capital achieved by the lake with complex use Văcărești; the IInd line of defense of the Capital consists of regulation and embankment works on the left bank of Dâmbovița River, between the localities of Podu Rizii and Conțești and the high waters diversion Dâmbovița–Sabar–Argeș (Brezoale); the IIIrd line is marked out by the railway fill on the Capital's belt line and the embankment of Dragomirești–Chitila canal,

	regulation and embankment works of the main course up to the area of the bridge in the locality Roșu and the Morii Lake reservoir for complex use. On Ilfov River - The 1st line of defense of the Capital consists of six existing reservoirs: Udrești, Bungetu I, Bungetu II and Brătești, intended mainly for irrigation, and Adunați and Ilfoveni, intended mainly as buffer lakes for the water supply of the Capital; The 2nd line of defense consists of diversions Ilfov–Colentina (Bolovani), Ilfov – Dâmbovița – Ciorogârla (Arcuda), as well as the diversion Ilfov – Dâmbovița (Răcari). Currently, the sewage system also has the capacity to collect and discharge rainwater for an event with a frequency of up to 1 in 5 years. However, the design rules currently in force require the sizing of the sewage networks for a frequency of 1 in 10 years for localities with a population of over 100,000 inhabitants, as is the case of Bucharest City.
Strengths/ Weaknesses	- As regards the risk of hydrological hazards related to Dâmbovița River, Morii Lake accumulation was built at the entrance in Bucharest, the largest lake within the city perimeter. - The succession of lakes on Colentina River. - Several scenarios of flood occurrence are identified for Bucharest City: (a) Morii Lake dam break, failures at the hydrotechnical constructions on the course of Dâmbovița River; (b) Buftea dam break and failure of cascaded facilities located on the course of Colentina River; (c) heavy rainfall that cause the flooding of certain streets and buildings in the area. - The sewerage is undersized considering the technical regulations in force, leading to a risk of hydrological hazards related to the sewerage system of the Capital. - Sediment deposits/blockages are formed at the level of sewage collectors due to the low flow rate. - The sewerage and wastewater treatment system does not fully comply with the requirements of the European directives on the quality of wastewater discharged into receiving collectors - There are also problems related to the transport of sediments, namely the risk of clogging and eutrophication of the main watercourses in the Capital area (Dâmbovița, Colentina)
Development trends	The historic pluvial events recorded during the last 2 decades (2005, 2007, 2013, 2017 etc.) validate the climate change scenarios drawn by the Intergovernmental Commission on Climate Change (IPCC), which support an increase of extreme weather phenomena occurrence (heavy rainfalls/drought) on the background of global warming and of increasing amount of greenhouse gas emissions on the surface of the Earth. In this respect, it is necessary to identify those solutions/measures that can help increase the existing sewerage capacity in view to meet both the technical rules currently in force and the expected weather/climate conditions. Their construction will be done exclusively in a separate system, and the rainwater system discharge will be done in the closest natural receivers in compliance with the regulations on environment protection.

Strategy recommendations

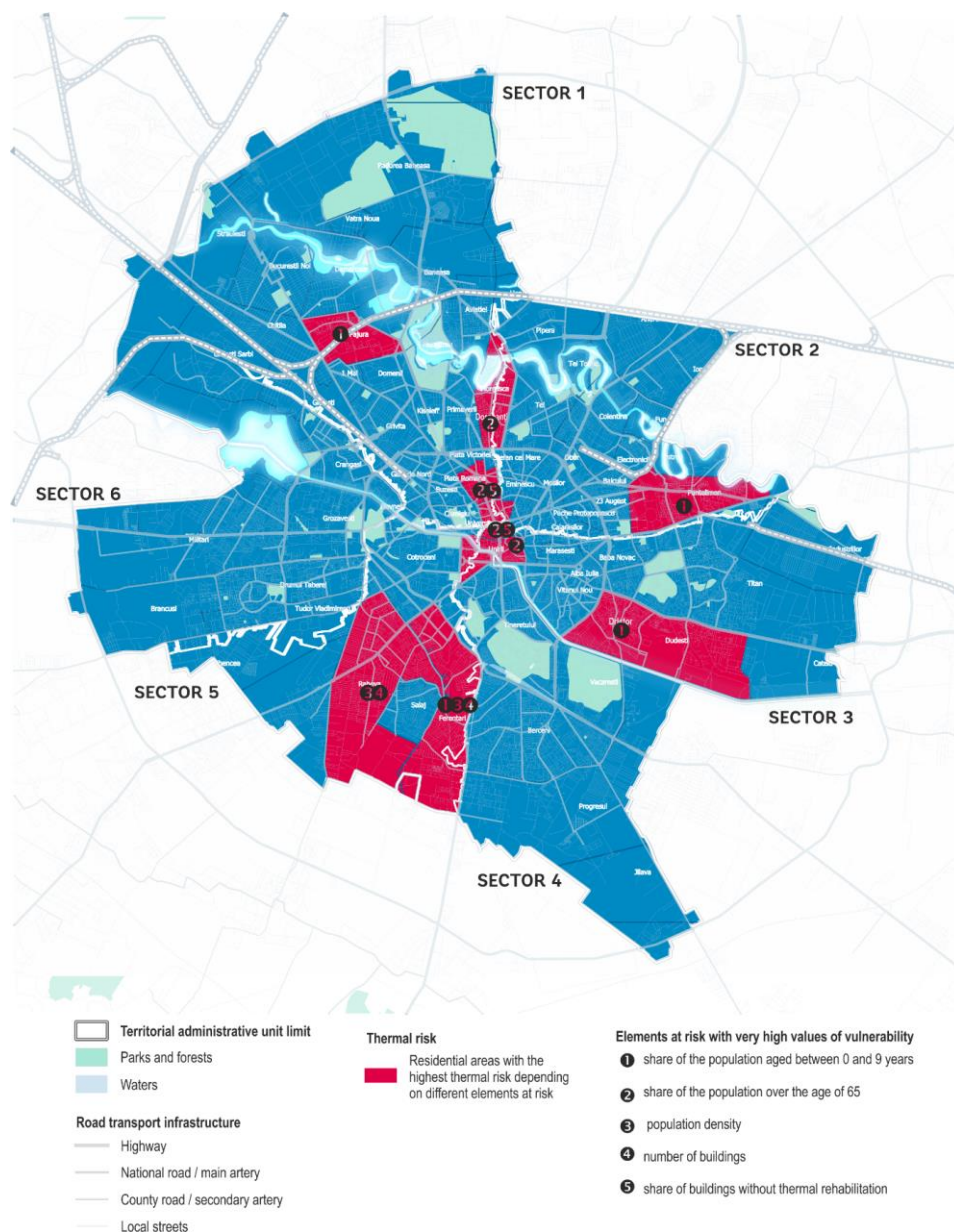
- Develop the drainage systems administrated by ANIF to discharge water by pumping it from the Giulești polder and carry out works to discharge excess natural water naturally/gravitationally;
- Develop the General Urban Plan and the coordinating Zonal Urban Plans at sector level in relation to the flood areas related to the Giulești Sârbi Polder; approvals should be issued based on the General Urban Plan adopted.
- Evaluate the operation and safety of the Morii Lake drain and rehabilitate it so as to ensure proper drainage of the waters infiltrated in the lateral dams;
- Use Dâmbovița River as a receiver for rainwater in a separate system and of water coming from the sewerage network, the latter being diluted to such a degree as to fall within the limits provided in the regulations in force;
- Redevelop the riverbed in order to adapt it to the dynamic process which includes low flow rates for renewal and the occurrence of eutrophication, by creating community recreation areas that would also be used as floodplains during periods of high water.
- Use the valley of Colentina River and the related chain of lakes as a receiver for rainwater in a separate system and of water coming from the sewerage network, the latter being diluted to such a degree as to fall within the limits provided in the regulations in force.
- Carry out works that increase the capacity of the evacuators for the dams downstream of the Buftea development according to the norms in force, complying with the technical assessments for safe operation and with the operating rules.
- Carry out an updated basin study (for the Argeș, Dambovița, and Colentina rivers) to identify the actions necessary for flood protection, including a detailed institutional analysis of the land and assets, necessary expropriations, rehabilitation etc.
- Correlate the rainwater flows for frequencies of 1/10 with the take-up capacity of the receivers.
- Change the dry weather flow section of the main collectors;
- Deviate flows in dry weather so as to increase flow rates and prevent deposit formation.
- Construct of a high performance treatment plant;
- Rehabilitate the sewerage network in order to reduce infiltrated flows;
- Limit the negative effects on water quality in the collector by creating a side accumulation (polder) downstream SEAU Glina, in the Bălăceana area, to take over flood peaks and retain the sediments (controlled process of natural treatment/settling).
- Use Văcărești Lake to take up exclusively rainwater from the southern area of Bucharest and discharge it by complying with the legislation in force;
- Develop the Dâmbovița, Mangu, Cănic, and Ciorogârla rivers, the Pasărea valley and the Mogoșoaia and Cernica lakes, also rehabilitating the ANIF canals in order to take over the rainwater from the metropolitan area.
- Operationalize the Ogrezeni accumulation in order to ensure a water reserve for Bucharest City from the Argeș River
- Address the problem of eutrophication at the level of both river basins, Colentina and Dâmbovița, and ensure the renewal and/or eutrophication combating flows.

Proposals stemming from the consultation process

- Increase data collection and transparency on flooding risk

2.7.4. CLIMATIC HAZARDS AND RISKS

Figure 51.
Residential areas
most exposed to
temperature risk
depending on
various
vulnerabilities



Source: Own processing

Key-issues

The likelihood of extreme temperatures and rainfalls defines the climate hazard and is used to analyze the risk to society and the environment.

In the vast majority of cases, between the city (Filaret) and the peri-urban area (Afumați and Băneasa) there are clear differentiations of the average and maximum values of the (ClimPACT) extreme temperature and rainfall indices, showing the significant influence of the city in changing the regional climate and, in some cases, amplifying climate hazards.

Air temperature is considerably changed by the city, being usually higher than in the surrounding area, thus influencing the local atmospheric dynamics and causing changes in all-weather parameters. Compared to the area in the immediate vicinity, the city has a 0.9-1.2°C higher average multi-year temperature, but the instantaneous differences

	often amount to 4-6°C. The absolute maximum temperatures in the analyzed period exceeded 42°C, and the minimum values dropped below -22°C in the city and below -26°C at the periphery. Within the city there are important differences in the LST values, determined by land cover and by the different use of space; this shapes different values of the urban temperature-related hazard, and the analysis based on MODIS and in particular Landsat images should also address the intra-urban scale; the hottest census districts are those in the central area and the continuous urban built areas across the city. Bucharest City is affected by a series of complex weather hazards (glaze, fog, blizzards) which are due to the combined action, in different degrees, of air temperature, atmospheric precipitation and wind. The effect of the city on complex weather hazards can be noticed in the case of phenomena such as hail, rain and rain showers, snow and snow showers, snow cover and fog, but other phenomena are not noticeably influenced by the built environment, such as glaze, hoar-frost or blizzard. During the hot season, the urban heat island can cause an intensification of liquid precipitation in the central areas, while in the cold season the city has the effect of reducing convection, and snow showers are more frequent at the periphery. A similar situation occurs in the case of hail. Between 1981 and 2018 there was a decreasing trend in the frequency of days with hoar-frost, rain, snow, snow cover and fog. The lower frequency of these phenomena does not automatically lead to a decrease in their potential to cause damages and casualties, as it can increase the intensity of the occurrence.	
Strengths/ Weaknesses	- Given the protection equipment and the city topography, the thunderstorm phenomena-related hazard (thunder, lighting) is very low. - For the area around Bucharest, hail phenomenon is specific for the hot season and has a rather low frequency. The hail-related hazard is higher at the periphery than in the central part of the city. - The influence of the city is felt by an increase in the frequency of low speeds and a decrease in the frequency of high speeds, and less in the actual values of wind speed. During the analyzed period, the urbanization process induced changes of the urban surface (building height, surface roughness etc.), which has caused a sharp decrease of the maximum wind speed. The wind speed is likely to intensify along big boulevards and in town squares.	- The influence of the city is significant both in the case of positive temperature extremes, which it amplifies, and in the case of negative temperature extremes, which it often attenuates. - A strong diurnal influence of the city is apparent in case of several temperature-related hazards. For example, heat waves are more frequent, more intense and longer in the city than at the periphery, the differences being better highlighted during the night. - The temperature of the urban surface is generally much higher than in the surrounding area; in summer, the urban surface temperature frequently reaches average values of over 40°C during the day and over 22°C at night.
Development trends	In the coming decades, Bucharest will have higher temperatures both a moderate and extreme climate change scenario. There are very clear trends of increasing average, maximum and minimum daily temperatures.	

	• By 2040, there will be about 7-8 more summer days and 10-12 more tropical days. The number of days with temperatures above 35 degrees Celsius and of tropical nights will increase by 3-10 (depending on the scenario). • The temperature difference between day and night tends to be increasing in the next two decades, due to the more pronounced increase of the maximum temperature compared to the minimum. • There will be fewer and fewer days when the temperature drops below 0°C in Bucharest in the next two decades, the trends being similar in the two scenarios considered. • The higher temperatures in the next two decades will lead to substantial changes in the cooling and heating energy needs of Bucharest, having as a reference the daily average temperatures of 15.5°C for heating, and 22.0°C for cooling. Thus, the energy required for cooling in the hot season will increase, and the need for heating in the cold season will decrease. • The next two decades will see a slow trend for rainfalls to be more limited, while dry periods will extend into both scenarios. Thus, the climate of the capital will present a slight tendency to aridization. • High values of climate risk tend to concentrate in the central part of the city, as a result of the overlap of higher temperature values and some demographic (e.g. concentration of the elderly population) and habitat characteristics (e.g. share of buildings not thermally insulated), which generates a high vulnerability.
Strategy recommendations	• Set a permanent advisory committee/working group on climate change at metropolitan level (Bucharest and Ilfov). The group should help develop, implement and monitor a Regional Action Plan for Climate Change Adaptation. • Reduce the greenhouse gases and urban pollution in order to diminish its contribution to local warming, especially by implementing the measures included in the Bucharest Integrated Air Quality Plan for 2018-2022. Update the Plan when it expires. • Implement warning and alert codes adapted to the temperature and rainfall extremes in the urban environment, with the help of the National Meteorological Administration and other entities in the field of emergency situations. • Upon adopting the new General Urban Plan, include urban regulations stipulating clear requirements for the developers for tackling the urban heat island effect and adapting to climate change. • Implement awareness and education measures for the population regarding the impact of the city on temperature extremes and the need to adapt their lifestyle. • Use satellite images in combination with surface data to perform a detailed analysis, on an intra-urban scale (neighborhood, census district etc.), being able to capture all the complexity of the urban heat island phenomenon (day-night, clear sky - cloudy sky etc.) in order to prioritize public interventions (e.g. green areas, shaded pedestrian areas, drinking water fountains, grass-covered parking lots etc.) • Correlate temperature data with other relevant information to explain the occurrence of extreme temperatures, on the one hand, and to quantify urban temperature-related risk, on the other – information needed by emergency committees, for example. • Make and broadcast weather forecasts that are customized for the characteristics of different blocks, neighborhoods or census districts. • Monitor weather parameters in detail in order to timely capture the local impact of climate evolution, by installing mini-weather stations/sensors

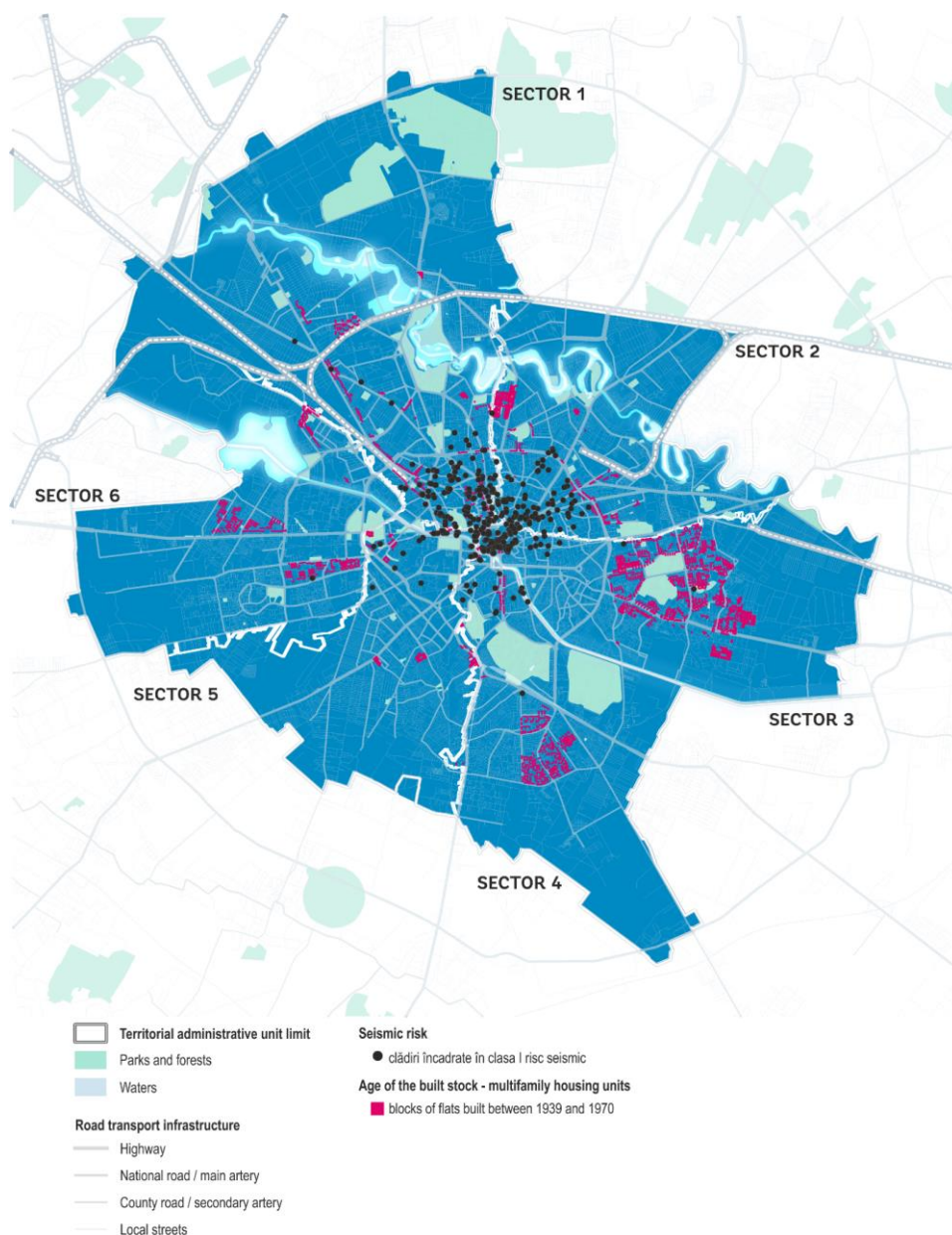
(possibly integrated with those measuring pollution levels) in as many areas of the Capital as possible and connecting them to a monitoring center.

- Inform the population more efficiently on the forecast weather hazards (e.g. by using the Ro-Alert model).
- Develop periodic studies on the characteristics of liquid and solid precipitation in order to properly size the stormwater drainage network.
- Implement technical solutions to limit the clogging of manholes by waste or plant debris.
- Develop a denser weather monitoring network, located in specific microclimatic areas.
- Develop specialized studies to determine the feasibility of using the local wind potential for electricity production.
- Develop a study on tree species that are resilient to the changing local climate in Bucharest and adopt a transparent regulation on the execution of maintenance / regeneration / training works on the crowns of trees and shrubs in public spaces in order to prevent incidents during storms or other phenomena (e.g. freezing rain)
- Permanently monitor (e.g. by the Local Police) the condition of the facades and roofs of public and private buildings that are vulnerable to external weather phenomena and implement measures to coerce/encourage owners to repair them.
- Move as many cables as possible underground (electricity, telecommunications cables etc.) in order to avoid damage and endangering the population during storms.
- Adopt urban plans and regulations favorable to the construction of buildings adapted to higher frequencies, intensity and duration of heat waves.
- Extend the green and aquatic areas, but also of the shaded areas on the main pedestrian routes, through a multi-annual tree planting program.
- Increase the number of street drinking pumps and fountains, especially in areas with the highest surface temperature.
- Equip all public transport and public buildings with functional air conditioning installations.
- Adopt population awareness and education measures to engage people in the measures of adapting the city to the new climate conditions.
- Continue investing in the endowment and upgrade of emergency systems (ambulance, SMURD (Mobile Emergency Service for Resuscitation and Extrication), emergency rooms etc.) in order to cope with the large number of requests during hot periods.
- Collaborate with various local stakeholders (NGOs, social centers of city halls, local police, family medicine practices etc.) to discourage the movement of vulnerable people during hot periods (e.g. by delivering products and medicines at home, medical care at home etc.)
- Extension of the system of buried garbage bins all over the capital in order to avoid olfactory pollution and even the risk of the population getting sick in the hot season.
- Adapt the investment plans of combined heat and power plants in the capital, in order to resize the cogeneration production (decrease in the thermal energy and increase in electricity).
- Resize the thermal energy transmission pipes when replacing them, to align to the current climatic conditions.
- Support the implementation of the investment plans of energy transmission and generation operators, in order to reduce the risk of disruption during peak periods of the hot season, when air conditioners are in operation.
- Implement thermal rehabilitation (including repainting) solutions for apartment buildings that do not accentuate the phenomenon of indoor

	temperature increase in the hot season, and combine them with other integrated solutions: e.g. green roofs and green facades. • Increase the flexibility of contracts with snow removal operators, by adapting them to the declining number of snowy days and limiting fixed costs. • Expand the green and aquatic areas in order to reduce the impact of heat waves. • Set up rainwater retention basins for more frequent irrigation of planted areas, street spraying etc. Implement automated irrigation systems for green areas, based on humidity sensors. • Rehabilitate/upgrade or drill new underground wells to supply the Capital with water during hot periods. • Complete the raw water transport boxes from the Ogrezeni accumulation (Argeş) to the Crivina treatment plant. • Organize emergency shelters, that can be designated as cooling centers (in hot weather) where people without air-conditioning can go and stay cool – especially needed for the elderly and very young
Proposals stemming from the consultation process	• Set up permanent first-aid facilities in all areas of the Capital and support the operation of continuous medical care facilities. • Educate the population on how to behave in the event of a heatwave (e.g. by leaflets, presidents of homeowners' associations/apartment building managers, churches, NGOs, social centers etc.). • Have the Local Police (or other entities designated by city halls) monitor and enforce more drastically the snow removal from sidewalks during the cold season. • Implement a firm parking policy that frees sidewalks and lanes occupied by illegally parked vehicles and prevents the action of snow removal vehicles. • Raise awareness at the level of PMB and other authorities on climate change and their impact on the city • Correlation with Ilfov and neighboring counties with regard to measures to adapt to climate change (eg design of green-blue corridors, management of emergencies caused by natural disasters) • Improving the public information on the phenomena associated with climate change and measures to adapt to them (e.g. more information billboards, public interest messages in public spaces etc.) • Install temperature sensors - PPP (ISU, APM, ANM, PMB, PS) • Make the public space more accessible / Parking areas with permeable concrete • Regulations • Integrate new weather monitoring stations • Vertically weather info (atmosphere survey twice a day) • Competition: the most beautiful garden • Map the shaded routes • Connect blue-green corridors • Create a working / collaboration party supporting the PMB to inform and educate the population

2.7.5. SEISMIC RISK

Figure 52.
Buildings
examined and
classified for
seismic risk I and
collective
residential units
older than 50
years



Source: Own processing

Note: The figure presents residential buildings examined and classified for seismic risk I and collective residential units older than 50 years that would require more attention in the future risk analyses. These are not all the potentially vulnerable buildings - there are many other public and private buildings without seismic risk assessment.

Key-issues

Bucharest presents a high seismic risk, requiring increased attention and actions from decision makers. Bucharest's population is growing. Most of the buildings and infrastructure of the capital were built before the mandatory seismic design regulations and require consolidation works. Even the building stock built between 1963 (the year of the first mandatory seismic design technical regulation) and 1977 (the year in which the seismic design paradigm was completely changed as a result of the lessons learned from the March 4 earthquake) must be assessed seismically and, if necessary, strengthened. This includes both private housing and the critical infrastructure for city functioning, namely: schools, hospitals, transport network, critical emergency response facilities and administrative buildings.

	Although there is a national risk assessment together with several studies for Bucharest, the granularity, robustness and character of the available data are limited. Currently, knowledge about seismic risk focuses on technical assessments performed for multi-story residential buildings. The seismic risk is not fully known for apartment buildings, nor for other types of buildings, as many buildings built before the March 4, 1977 earthquake have not been assessed. The only data currently available in Bucharest on vulnerable buildings are the lists of examined residential buildings, data which is also limited. They do not reflect the true scale of the vulnerability of the building stock in Bucharest. Out of the total number of 132,798 residential buildings in Bucharest, according to the 2011 Census, only 1.9% were examined using public funds and included in one of the risk categories (emergency categories, according to the P100/1992 norm, namely seismic risk classes, according to the P100/1996 and P100-3/2008 norms), totaling 2,495 buildings in 2016, plus the specific examination initiatives carried out using private funds, at the initiative of owners or associations of owners. For example, in addition to the buildings that are older than 50 years, Figure 7.5 outlines only those with a technical examination, but the number of buildings in danger is much higher. Public buildings are not systematically assessed, and the information is split in different departments and agencies, often depending on the specific administrative and property arrangements. Due to limited data on the current critical infrastructure and public assets, as well as on private buildings, there is uncertainty about the true magnitude of the seismic vulnerability, and because of this, policy interventions cannot be effectively targeted. The existing programs and interventions mainly focus on consolidation interventions, responding to specific requests. Most public actions focus on (public and private) building consolidation, following a demand-based approach (i.e. responding to specific requests from government agencies or homeowners' associations/homeowners). There is no strategic approach which would take into account a variety of criteria for prioritizing specific interventions. Efforts to reduce seismic risk through consolidation or reconstruction must focus exclusively on residential buildings that have already been examined, and a strategic approach that takes risk into account comprehensively can help guide resources efficiently and raise public awareness of the seismic risk the city is faced with.
Strengths/ Weaknesses	• In order to accelerate and supplement the measures implemented through the GO 20/1994 program, starting with 2017, two companies aimed to mitigate the seismic risk were established at the level of the Bucharest Municipality: 1) Municipal Administration for the Consolidation of Seismic Risk Buildings (AMCCRS), respectively Compania Municipală Consolidări SA București (CMC). • Starting with 2017, the Bucharest Municipality is implementing, using its own funds, under the coordination of AMCCRS, a new consolidation program dedicated to multi-story residential buildings, which takes over the general • Currently, there is no database on asset management to pool and monitor the total number and type of buildings in Bucharest, respectively the number and type of users of these buildings, including geospatial information, as well as critical information for risk assessment • It is difficult to know and analyze the seismic vulnerability of buildings in Bucharest City at a portfolio level, to substantiate informed strategic decisions, because public buildings are not included in a pooled and updated inventory. • Despite the vital role they can play in day-to-day operation, as well as in emergencies, public buildings in Bucharest have not been systematically assessed in terms of

	regulations required by GO 20, supplementing them with additional facilities. There has been a visible increase in the number of building consolidations in recent years • The efforts of public institutions and civil society aimed at educating people on earthquakes and raising awareness of the seismic risk have intensified in the last decade, as illustrated by the growing number and scale of platforms and campaigns to raise public awareness.	their vulnerability, in order to inform and prioritize dedicated investment programs, with the aim to improve their resilience and functionality. • The current approach to determining seismic risk by building-by-building technical assessment is not feasible, given the resource and time limitations. A phased approach can be adopted, in line with the international best practices to help understand the risk at a portfolio level and identify the buildings that require technical examination and, consequently, consolidation or reconstruction investments. • A significant percentage of Bucharest residents are not aware of the seismic risk, and the awareness of the seismic risk of a part of the population is not systematically associated with the mobilization to reduce this risk. • The lack of a clear coordination role with a strategic approach to seismic resilience, as well as the limited coordination and communication between the different authorities and departments at different levels have led to a poor seismic risk management. • There are also difficulties in mobilizing the owners (and/or tenants' associations) of buildings at seismic risk due to the insufficient number of necessity housing units, to the limited capacity for collective action, etc.) • In addition to reducing risks, there are many opportunities to strengthen emergency preparedness and response to large-scale disasters, including improved evacuation planning and emergency shelters, and better public awareness of safety in emergency situations. Improved seismic risk information can also help improve emergency planning and response.
Development trends	• The amendments to the program for the consolidation of multi-story residential buildings, as well as works financing from own funds, regardless of the annual allocations made by GO 20, are estimated to accelerate its implementation.	
Strategy recommendations	• Adopt a holistic strategic approach at the level of Bucharest Municipality regarding disaster risk management, that includes three key-aspects: (1) elements at risk (including public and residential infrastructure, critical infrastructure etc.); (2) the ability to assess risk, mitigate it and manage risk	

	impact through emergency preparedness and response; and (3) the social and financial dimensions of disaster risk management. • Develop a database with elements at risk (residential and public buildings, transport infrastructure, utility networks) containing important metadata for seismic risk analysis (e.g. for buildings: the position, year of construction, construction material, load bearing structure, height, intended use). • Prioritize and sequence data collection: develop a methodology that allows the gradual filtering of the analysis in order to determine the vulnerability of the building stock. Thus, the technical assessments and projects should be developed and the intervention works should be prioritized so as to mitigate the seismic risk of buildings depending on the consequences of their collapse on human life, their role for public safety and the post-hazard response actions, as well as the socio-economic consequences of their collapse or damage. • Carry out a seismic risk analysis for the Bucharest City at the level of the entire building portfolio, in order to inform the intervention decisions and to prioritize consolidation works according to the available resources. The seismic risk analyzes (indicating the expected seismic losses), followed by an economic (cost-benefit) analysis can also be used to inform investment decisions. • Determine the expected seismic response of the lands in Bucharest City in order to achieve seismic microzoning, elaborate a comprehensive assessment of the land to better understand the potential amplifications of building vibrations during major earthquakes generated by the Vrancea seismic source, in order to define in detail and precisely the seismic requirements for design and consolidation. • Create a dedicated prioritized program to mitigate the seismic risk for public buildings and continue the steps already taken to examine, design and execute consolidation works for public buildings owned/managed by the Municipality of Bucharest. • Develop a technical and legal framework that introduces and operationalizes the concept of seismic resilience of the building stock, including the establishment of a resilience or risk office / officer in Bucharest Municipality. • Prioritize the risk mitigation interventions (consolidation, reconstruction/demolition): Based on improved risk information and following a prioritized approach, the institutional capacity and financial resources allocated can effectively help mitigate seismic risk, save lives and avoid material losses. • The different institutions and departments that manage public buildings or, respectively, initiate interventions for seismic risk analysis and mitigation in Bucharest City need to be coordinated. Improve the exchange of information on hazard, exposure, vulnerability and risk between the institutional actors and develop a data system that allows for data storage, collection, analysis and dissemination for both public and private assets. • Improve the residential building consolidation program by providing additional measures, in parallel/complementary to the consolidation programs, in order to accelerate progress on this topic.
Proposals stemming from the consultation process	• Improve cross-sectoral coordination on public awareness, regularly run awareness campaigns and simulation exercises.

2.8. ADMINISTRATIVE CAPACITY

2.8.1. LOCAL PUBLIC ADMINISTRATION, ASSOCIATIVE STRUCTURES AND COOPERATION

Figure 53.
Organizational
chart of the
Municipality of
Bucharest

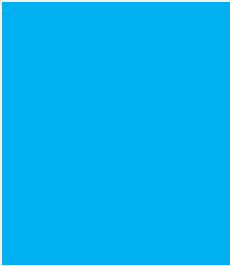
Administrator public	Primar general	Corpul de control al Primarului General
Viceprimar 1		Secretar General
Cabinet viceprimar 1		Cabinet secretar general
Viceprimar 2		
Cabinet viceprimar 2		Cabinet primar general
		
Direcția generală economică		
- Direcția financiar contabilitate, buget - Direcția venituri		
Direcția generală infrastructură		
- Serviciul planificare lucrări mari infrastructură - Direcția urmărire lucrări mari infrastructură - Serviciul mari proiecte		
Direcția generală investiții		
- Direcția planificare investiții - Direcția urmărire proiecte		
Direcția generală management proiecte cu finanțare externă		
- Direcția fonduri nerambursabile - Biroul accesare fonduri rambursabile - Biroul derulare și raportare fonduri rambursabile - Serviciul UIP faza 2 Glina		
Direcția generală urbanism și amenajarea teritoriului		
- Direcția urbanism - Serviciul proiecte urbane - Serviciul publicitate stradală		
Direcția generală administrație și relația cu CGMB		
- Direcția administrație publică - Direcția asistență tehnică și juridică - Direcția relații cu publicul și registratură		
Direcția generală servicii publice		
- Direcția utilități publice - Direcția servicii integrate		
Direcția generală achiziții publice		
- Direcția planificare achiziții - Direcția proceduri - Serviciul monitorizare derulare contracte		
Direcția generală situații de urgență, statistici și strategii		
- Serviciul integrare multiculturală - Direcția înzestrare materială și situații de urgență - Direcția statistici și strategii - Serviciul administrare centrul municipal integrat pentru situații de urgență		
Direcția generală logistică		
- Direcția informatică - Direcția administrativă		
Direcția patrimoniu		
Direcția de mediu		
Direcția juridic		
Direcția managementul resurselor umane		
Direcția auditul și managementul calității		
Direcția de integritate		
Direcția transporturi		
Direcția auditul public intern		
Direcția guvernanta corporativă		
Direcția de presă		
Direcția relații cu ONG, sindicate și patronate		
Direcția relații externe și protocol		
Direcția cultură, învățământ, turism		
Serviciul Euro 2020		
Serviciul sănătate și securitate în muncă		
Biroul documente secrete		
Direcția spațiu locativ și cu altă destinație		

Source: Own processing

Key-issues	In terms of the operation method, General Municipality of Bucharest is organized and operates in accordance with the decisions made the General Council of Bucharest in respect of the approval of the organizational chart, the number of posts and the list of posts of the own specialized apparatus. The legal powers of CGMB are fulfilled through four categories of administrative resources: - The General Municipality of Bucharest, through the General Mayor's apparatus consisting of 5 top management positions (general mayor and general mayor's cabinet, Deputy Mayor 1 and 2, with separate cabinets, General Secretary Cabinet, General Mayor's Control Body) and 27 directorates, of which ten are General Directorates. 43 bodies which render public services and local interest services, a Municipal Authority Regulating Public Services, two regies autonomes and companies in which the General Council of Bucharest is a shareholder. - A Municipal Holding consisting of 22 companies set up by the municipality under GCBD in 2017 - Six sector municipalities that make up Bucharest. The relations between the Municipality of Bucharest and the sector municipalities are not of subordination, but of collaboration, and there are no special rules in place governing the way of cooperation. Each municipality has an elected mayor and an elected local council. Each municipality is free to draft development strategies or local development plans, or urban plans (ZUP for the sector), without correlating them with the strategic documents, urban plans in place at the city level. Most companies in the municipal holding incurred losses in the first 2 years of operation. The only companies which had a profit in their first 2 and a half years following their incorporation are Compania Municipală Parcuri și Grădini București (Parks and Gardens Municipal Company Bucharest), Compania Municipală Întrețineri Arbori și Spații Verzi SA (Trees and Green Area Maintenance Municipal Company SA), Compania Municipală Energetica București SA (Energetica Municipal Company Bucharest SA), Compania Municipală Agrement SA (Entertainment Municipal Company SA), Compania Municipală Managementul Trafic SA (Traffic Management Municipal Company SA) and Compania Dezvoltare Durabilă București SA (Sustainable Development Municipal Company Bucharest SA). PMB is a member of the Romanian Association of Municipalities and of the Mayor Convention on climate and energy as a signatory party The Bucharest – Ilfov Intercommunity Development Association (ADIBI), the Association for Inter-Community Development for Public Transport Bucharest - Ilfov (TPBI) and the Thermal Energy Development Association (the latter is based on the association between Bucharest City, Popești-Leordeni town and Chiajna commune) were established through CGMB decisions. Internationally, the municipality has entered into collaboration protocols with 16 cities.
Strengths/ Weaknesses	- PMB functions on the basis of a complex operational structure, guided by the Rules governing the organization and operation and processes of the General Municipality directorates. - The way the General Municipality and the sector municipalities collaborate and share powers lead to (1). the implementation of certain ad-hoc initiatives, both in terms of topics and space, which are not coordinated and where the powers for the delivery of some public service (e.g. public domain) overlap, and (2). the inefficient allocation and use of resources.

	• The PMB obtained, in 2004, the ISO 9001:2015 quality management system certification (for the management of local public administration services) and, in 2005, the ISO 14001:2015 certificate (for on-site environmental management activities, including activities related to management services for local public administration), this system being focused on internal factors / functional factors, calibrated in order to carry out tasks based on procedures, codes, human resource development training. • In the absence of an updated General Urban Plan, the private developments tend to take the lead in the spatial development of the city, generating negative externalities, by: (1). creating functional and demographic densities which are not coordinated in terms of spatial distribution, (2). generating traffic congestion, (3). putting pressure on the current capacities of public services and utilities and (4). reducing both the quality and the safety of the community life. • Bucharest Municipality does not function proactively, based on performance criteria/indicators, but only reactively depending on the situation that occurs. • There is no collaboration/communication interface across the directorates, which could be used to make common decisions and no performance indicators that evaluate the activities of directorates/departments/companies/institutions that deliver public services. • The integration of the PGMB activities/initiatives with the activities/initiatives of the existing municipal companies is problematic and cannot be monitored and evaluated via the municipality's apparatus • Bucharest Functional Urban Area cannot be managed in a sustainable way and cannot contribute to achieving a territorial cohesion considering the current organization of Bucharest. The distribution of public funds, particularly European funds, does not contribute to the achievement of the development objectives. • The municipality's international cooperation agenda is not proactive in creating contacts that can materialize via projects to benefit Bucharest. The municipality's international cooperation is mostly conventional.
Development trends	• There have been and still are initiatives for advisory service projects which provides an inventory of the European and international experiences on the status of capital cities and then creates, in accordance with the decentralization law, a regulatory framework that is adequate for the transfer of powers and financial resources, in order to ensure the operation of the local council and the municipality of Bucharest, and of the public services provided by the municipality, via its own apparatus and the subordinated institutions. • These endeavors aim at establishing: (1). a new territorial configuration for the municipality's sectors (calibrating their surface area based on indicators such as the characteristics of the public and private built assets, the spatial types, the public equipping, the income generated etc.) and (2). the powers, along with the financial resources of PMB and sector municipalities. • The development of IUDS will help creating and providing the conditions required for the implementation of a project portfolio, via a Directorate in charge with the integration of sectoral strategies and support data and with

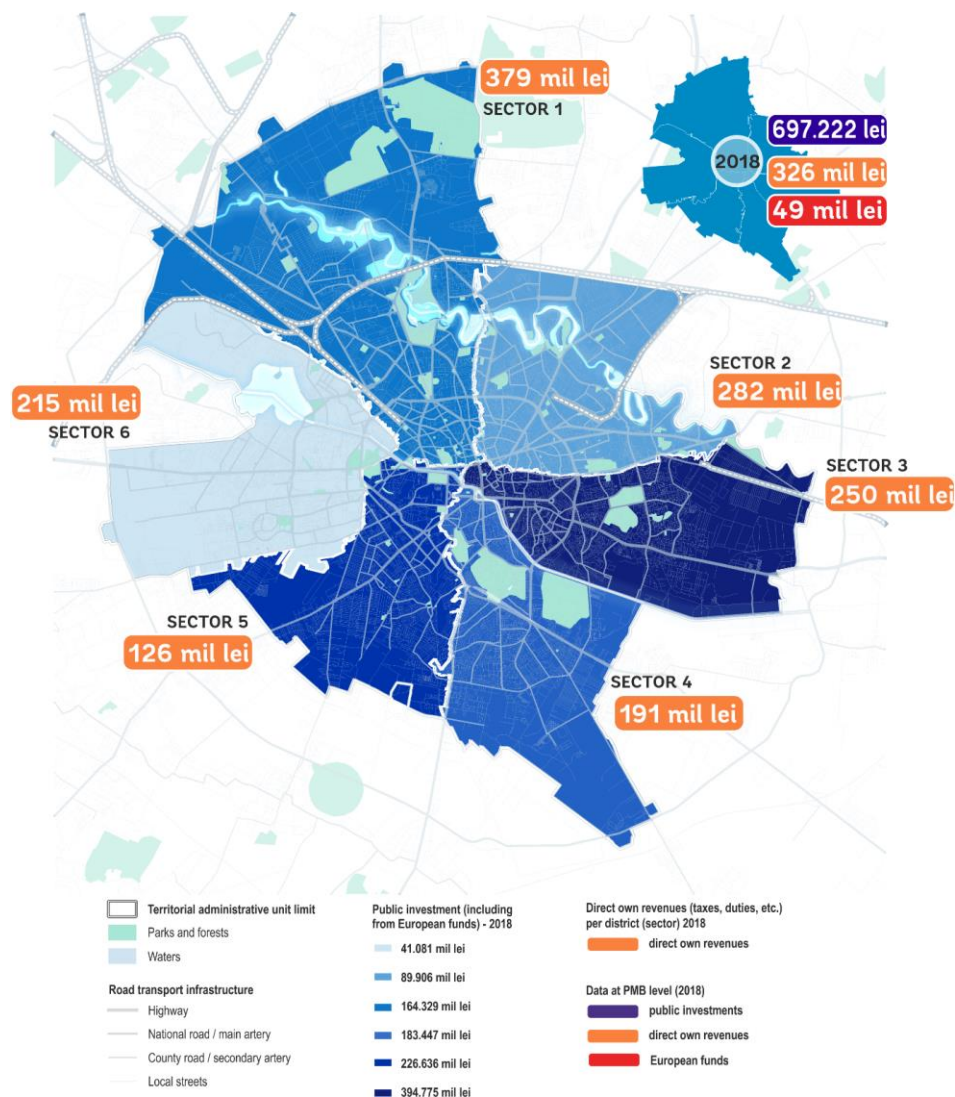
	powers to monitor and evaluate the strategy action plan (project implementation process management) .
Strategy recommendations	• Establishing the capital city status, with increased powers and the resources necessary for the Capital functioning / Drafting the Capital law • Develop the Bucharest Metropolitan Area and plan an integrated development of the territory; operationalize Bucharest Metropolitan Area IDA • Coordinate the powers of the directorates involved in the municipality economic development (coordinate the territory planning activity carried out through the urban planning directorate that should be integrated into a new organizational format where the directorates with powers in the field of the city's development could coordinate themselves in order to ensure the achievement of the goals regarding Bucharest sustainable growth.) • Use a capital investment plan for a 3-years period, made up of priority projects within IUDS Bucharest, to ensure the design of the multiannual budget, preparation of funding sources and the powers of each component of the operational mechanism of the municipality, from procurement services to the acceptance of the works. • Reposition the organizational pyramid of the municipality, with their services and result to the citizens, requesting the placement of the community at the top of the pyramid: citizen - local council - mayor - executive, reflecting this reorientation at the directorate level as well, to provide quality, efficiency and ensure the citizen satisfaction. • Implement a performance code for the process of fulfilling the powers given by the normative framework, within which the organizational components will be identified, designed and transferred in a dashboard, thus substantiating decisions on calibration on the one hand (human resources, budget, intervention / resolution time) but also the monitoring and evaluation of the performances of the municipality directorates in relation to the results obtained. • Rolling out projects from the member of international bodies position (1. achieving and submitting the action plan within the Covenant of Mayors for Climate and Energy, 2. carrying out a project on the city's accessibility, taking into consideration the fields included in the UN Convention on the Rights of Persons with Disabilities etc.).
Proposals stemming from the consultation process	• Grant building permits only if the environment standards and practices are complied with (e.g., electric charging stations in parking areas) • Import international best practices • Encourage social initiatives (smarter approach) (e.g., promote social entrepreneurship) • Improve the dialogue with public authorities to prevent possible challenges. Built a partnership based on trust (e.g., public consultations) • Exchanges and best practices between local administrations of the big cities • Increase some local taxes and duties, in relation to the transparency of the way the local budgets are spent • Create taskforce units for large projects • The Municipality should establish infopoints where companies, NGOs can access information about available funding • Develop a mechanism that allows Bucharest companies to run certain projects of public interest with their own funds, within CSR campaigns • Increase the transparency in the decision-making process addressed to Bucharest citizens (larger access for citizens/members of civil society/NGOs in Municipality board meetings; record and post the recordings on the internet to be accessed by everyone interested).



- Introduce more rigorous regulations on the compliance with the deadlines of completing public works in the city.
- Increase transparency in public decisions (greater accessibility to decision-making processes at the level of local public authorities);
- Reform the administrative services in order to reduce the number of employees at the level of local public authorities

2.8.2. LOCAL BUDGET AND HUMAN RESOURCES, COMPUTERIZATION AND LOGISTICS

Figure 54. - Own revenues and public investments



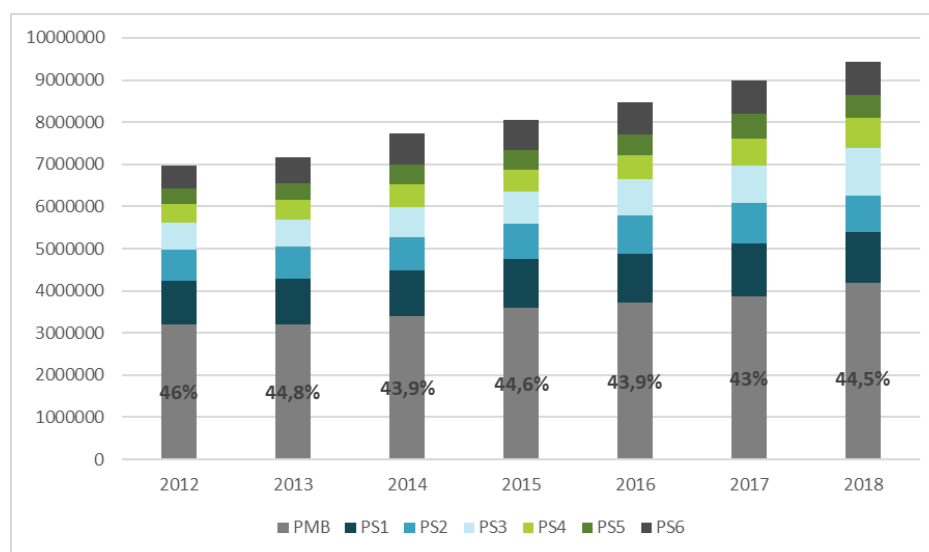
Source: Own processing

Key-issues

The General Council of Bucharest approved a budget of EUR 1.4 billion for 2019. The budget implementation on 31.12.2019 indicated total revenues of around EUR 950 mil. and expenses of less than EUR 750 mil., with a surplus of almost EUR 200 mil. For 2020, the General Council approved a budget which relies on revenues of over EUR 1.5 billion and expenses of around EUR 2.1 billion.

Between 2012 and 2018, the city's budget increased by 35.3% in RON and by 29.6% in EUR, which highlights the positive economic dynamics in the capital city. In 2018, around 44.5% of the total amounts collected were allocated to the PMB, and 55.5% to the 6 sectors, and these percentages remained relatively the same during the period subject to analysis. In turn, the performances of each sector varied, Sector 1 constantly having the highest revenue.

Figure 55. Evolution of revenue to Bucharest local budgets 2012-2018



Source: MRDPA. DLFPB

Years 2017 and 2018 marked a significant increase in the expenses allocated to the cultural, recreational and religious activities of Bucharest. Thus, in 2018, the expenditure for cultural, entertainment and religious activities doubled as compared to 2015. The expenditure for social care services over the past financial years (2017 and 2018) also increased dramatically as compared to the previous years. For example, the annual increase was 646% in 2018 versus 2017.

The staff expenses doubled in 2018 versus 2016, after the Framework – Law no. 153/2017 on the remuneration of the staff paid from public funds was enforced. Thus, per years, in 2016, such expenses increased by 23 % versus 2015, and in 2017 and 2018, the increase was 63 %, respectively 50% versus the previous years.

The share of the amounts received to implement the projects financed from non-reimbursable funds was insignificant. Therefore, at national level, Bucharest municipality ranks 25 in terms of the amounts attracted from EU funds, as compared to other counties in Romania, over the past 3 years for which data were made available, with a total amount of RON 167,400,233, which includes both the funds related to 2007-2013 budgetary programming period, and the funds related to 2014-2020 cycle. However, it is worth noting that starting with 2014 – 2020 programming period, Bucharest became one of the developed regions of the European Union. Therefore, the co-funding rate for the projects submitted is low relative to other territorial-administrative units in the country.

The 2019 organizational chart of the PMB includes 1,269 posts both for civil servants (980 posts – 77%), and for contract staff (285 posts – 22%). Most of the civil servants holding execution positions within the PMB (52%) have a seniority of more than 20 years, being followed by those with a seniority between 15 and 20 years (22%), and those with a seniority between 10 and 15 years (14%). The percentage of the junior civil servants and of the civil servants with a seniority of up to 5 years who are part of the technical specialized apparatus of the PMB is around 6%. There are 195 vacancies in the Specialized Technical Apparatus of the PMB.

Bucharest Municipality or its subordinated institutions use smartphones and web platforms as direct communication tools with the public: Parking București, Trafic alert, InfoSTB, Social Alert, Map2web Bucharest, as well as a functional web page which

	includes information regarding both the institution's activity and the activity of the subordinated organizations that deliver services and of the municipal companies.
Strengths/ Weaknesses	• The economic growth ensures an increased budget above the average of some European capitals, making possible the realization of prestigious projects with a positive impact on the local economic development and the image of the city. • Career growth and motivation of civil servants is supported by a number of development factors, such as: monthly income, technology, access to information, training courses, experience exchange, etc. • The amounts allocated to investments fluctuated in the years subject to analysis and marked a decrease by almost 50% in 2018 versus 2017, most probably as a result of the capitalization of the 22 municipal companies. Subsidies (public transport, utilities) have the highest share in Bucharest Municipality budget, being followed by transfers across the public administration units. • Almost all the departments of the PMB have vacancies. The situation is critical for the General Directorate for Public Procurement (65% vacancies), Environment Directorate (53% vacancies), General Directorate for Infrastructure (46% vacancies), General Directorate for Investments (29% vacancies) and General Directorate for Externally Funded Projects (27% vacancies). • The Municipality does not currently have a website that can help the community identify and explore Bucharest, and the existing website is unattractive in terms of design and query systems, mostly acting as a depositary of activities and documents. • There is a lack of elements that give a common visual identity for the web pages of the institutions subordinated to PMB. • The condition of the support equipment (printers, copiers, scanners) is problematic, most of them (65%) being between 5 and 10 year old, 33% more than 10 year old, and only 2% less than 5 year old. • The document management electronic system is only partially operating within the PMB and is not being used by organizational structures to its full potential, whereas documents are mostly circulated in a printed format. The ERP system currently installed is partially used.

Development trends

- The PMB is already working on some projects meant to upgrade the online public communication interface in two stages:
 - Developing a new web site of the institution that provides a more accessible structure and content and that will be completed within a very short time period. In terms of communication, the Municipality website should be redesigned in order to capture the dynamics of the citizen – private sector – tourist – Municipality dialogue, without overlooking the possibility of disabled people to access information.
 - Developing a portal of the PMB that enrolls all the 49 subordinated institutions, as well as all the companies and structures. This will also fulfil a key function in the relation with the public, by rendering operational an open-data platform – where, besides the supply of all the information regarding the activity of PMB and the subordinated organizations, a mechanism will also be put in place, collecting data and contributions/suggestions from users and the public.
- The irregular and generalized use of the activity management electronic systems prompted the Municipality of Bucharest to launch public procurement procedures for a new document flow and workflow management system, and such procurement will be carried out in the medium term. It provides, inter alia, a better traceability of documents and resolution deadlines within the institutional circuit and will be connected to the electronic systems which enable the relation with the public, via the portal of the Municipality of Bucharest, which is also to be developed.

Strategy recommendations

- Draw up a vacancy occupation plan based on a mechanism meant to prioritize the posts which are critical to the activity of the PMB.
- Promote the recruitment processes on social networks and in the digital media, but also through contacts with the relevant university degrees, organize internships for students and shorter traineeship activities.
- Take advantage of the opportunities offered by the sources of non-reimbursable financing for development projects and enhance the development of projects financed from non-reimbursable funds, both in terms of investment objectives and in terms of the development of the PMB public services and institutional capacity.
- Develop and implement a co-financing system for cultural, recreational and religious projects in partnership with private operators or non-governmental organizations
- Develop and implement a system meant to prioritize the resources allocated to social care depending on the scale of the impact generated in the community or on the urgency of interventions
- Develop staff policies and procedures meant to stimulate professional performance in line with the financial motivation level
- Rigorous approach to the multi-annual strategic planning and budgetary planning process, prioritize critical investment projects with high projected impact.
- Assess the financial performance of municipal companies and their activity growth perspectives or the rate of return of the PMB investments in these companies.
- Conduct performance audits of the public services that use the largest amount of resources in order to identify the weaknesses that affect performance, develop investment plans that cover infrastructure, how it is operated and the related public services, that gradually diminish the level of subsidies.
- Develop a joint visual concept for the overall municipality, regardless of whether public services are delivered in the PMB or in the subordinated institutions.

	• Purchase some more efficient auxiliary electronic equipment that would cut the amount of time allocated to carrying out some tasks and would contribute to the overall work process digitalization. • Develop dedicated systems for digitizing work processes, the use of the current ERP system should be expanded to all of the Municipality departments, with no exceptions, or a more comprehensive system should be purchased, corresponding to the current levels of the directorates.
Proposals stemming from the consultation process	• Develop basic integrated systems in the public administration • Training programs for public authorities (integrate a business approach) • Participatory budgeting • Grant incentives to attract qualified staff in the local administration, pay them based on key performance indicators, bonuses for exceeding targets; clarify working procedures; promote meritocracy in the administration • Accelerate the implementation of e-government solutions, based on best practices in the country and abroad • Publicize the civil servant position to increase society respect and admiration for this role and change the public perception of this sector • Set values, such as respect (for colleagues, citizens), responsibility and ethics (for the work provided), to be shared by all civil servants in an institution and to guide their work. • Acknowledge and celebrate of the best-performing civil servants, both within and outside the institution (e.g. offering medals and communicating their names, offering leadership courses such as those given in the United States). • Increase the retention rate of skilled people in the public system through various incentives and benefits.

3. DESCRIPTION OF THE ADVISORY PROCESS

The identification of the Bucharest issue and the formulation of a territorial diagnosis is made in a participatory process, in which various urban actors - decision makers, businessmen, segments of the population are questioned and debate the problems and challenges the city is facing with, how it responds, or should respond to the request of target groups, possible interventions by local authorities and recommendations for future development projects. The people and urban entities interested in this process got involved by means of the following tools: (1) opinion poll, (2) sectoral advisory and debate meetings, (3) focus groups.

(1) The sociological research carried out in June-July 2019 made use of a questionnaire-based survey as an exclusive method for collecting data. At the level of Bucharest, 7 independent opinion polls were conducted, totaling a volume of 10205 questionnaires applied. Within the 7 opinion polls carried out, 12 data collection tools were applied, respectively 12 types of questionnaires targeting specific issues at the level of target groups. The research results contributed to the identification of the specific needs of each target group and are presented in detail in Annex 9.1.

405 face to face questionnaires were applied at the population level, at the respondent's home. The sampling used for this survey was random, staged, stratified by census precinct, gender and age. In the population survey, dedicated data collection tools were applied for different categories of special social groups, as follows:

- 800 questionnaires for pensioners,
- 800 questionnaires for parents,
- 800 questionnaires for employees,
- 400 questionnaires for vulnerable people,
- 400 questionnaires for students,
- 500 questionnaires for entrepreneurs.

Additionally, questionnaires were applied to the following groups:

- 400 high school students,
- 100 artists and creators,
- 400 commuters using public transport,
- 400 foreign tourists,
- 500 investors.

(b) Sectoral advisory and debate meetings were organized in October 2019 - February 2020, aimed at validating hypotheses resulting from the diagnostic analysis in that area, identifying problems and challenges in that area, and proposing viable solutions. The areas addressed were as follows:

- Culture
- Education
- Energy
- Environment
- Climate Change
- Mobility
- Heritage and housing
- Sports
- Tourism
- Investment/business environment (through meetings with embassy representatives)

(c) The focus groups covered the target groups addressed in the opinion polls - employees (in the state and private sector), entrepreneurs, representatives of tourism employers' associations and

HORECA managers, representatives of organizations working with immigrants, people who live in poverty, people with disabilities, Roma, pensioners, university teachers with management and coordination functions, students, high school students, parents, commuters, artists / creators, researchers - and have targeted several thematic dimensions:

- The evaluative perception of the target group on Bucharest; elements of general identity of the Bucharest urban environment;
- Perception on different aspects / types of problems in Bucharest urban life (e.g. transport, pollution, neighborhood life, leisure, etc.);
- Identifying the main types of solutions to the problems found;
- Identifying expectations and types of urban interventions in Bucharest.

The results of the sectoral advisory and debate meetings and the conclusions of the focus groups are presented in Annex 9.2.

4. INTEGRATED SWOT ANALYSIS

The conclusions of the territorial dialogue are summarized in a SWOT analysis that presents, in an integrated approach, the main strengths and weaknesses of Bucharest, as well as the opportunities and threats that impact its development.

The analysis starts from two important questions of the questionnaire addressed to the population (in general) and investors, related to the advantages and disadvantages of living and investing in this area:

- What do you think the advantages of being a resident of the Capital are?
- At the level of Bucharest, please give a mark from 1 (deeply dissatisfied) to 10 very satisfied, for a number of aspects.
- What is the main reason you chose Bucharest as the main headquarters of the company activity?
- In your opinion, which are the three main disadvantages of Bucharest as a business destination, compared to other cities in the country?

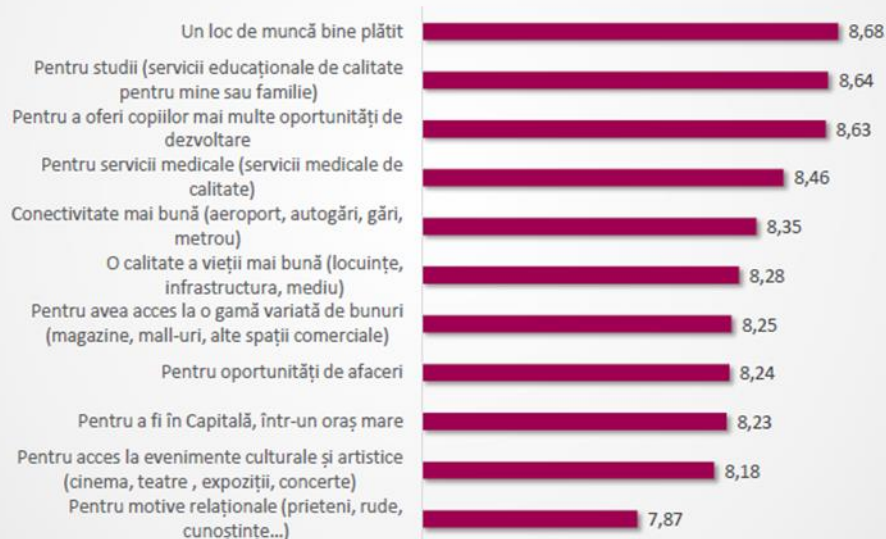
The answers highlight a number of positive and negative aspects, which also emerged from the diagnostic analysis and public consultations. These answers, shown in Figures 7 and 8, together with the strengths and weaknesses identified at the sectoral level (in the boxes in Chapter 9.2) form the basis on which the SWOT analysis is further built (see Figure 9).

Figure 56. Strengths and weaknesses resulting from the questionnaire addressed to the population

Population	
+	Jobs, education services, healthcare services, connectivity, quality of housing, shops, malls, commercial spaces, business opportunities, cultural events
-	road traffic, bike lanes, air quality, road quality, household waste collection, street sanitation, sidewalk quality, drinking water quality

Populație- în general

Care credeți că sunt avantajele de a fi locuitor al Capitalei? (notă de la 1-cel mai puțin important, la 10-cel mai important)



Populație- în general

La nivelul Bucureștiului, vă rugăm să acordați o notă de la 1 (profund nemulțumit/ă) la 10 (foarte mulțumit/ă) pentru următoarele aspecte

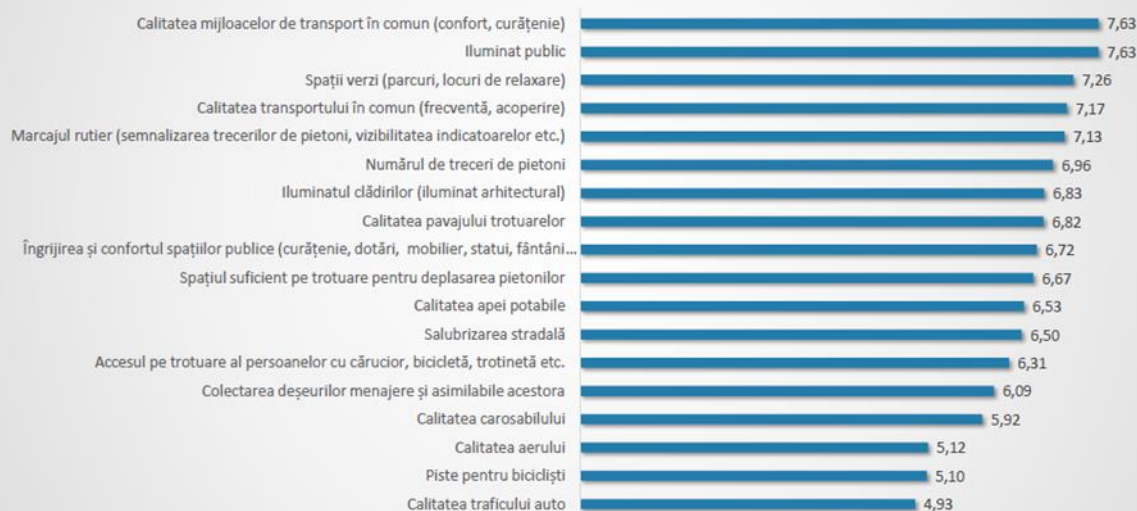


Figure 57. SWOT Analysis

STRENGTHS	WEAKNESSES
• Competitive economy at national and regional level, with opportunities to attract investment and create jobs • Remarkable economic evolution, concentrating an increasing share in the national GDP and placing the Bucharest-Ilfov Region on the 25th place among the regions of the European Union in terms of GDP / capita (PPS) • The most important national competitiveness pole in research, development, innovation (RDI), ranking first on a national level • Important demographic pool and a workforce reservoir with a valuable contribution to the national GDP • Extended Functional Urban Area that provides, through workforce commuting, the necessary supply for carrying out economic activities • High workforce occupancy, especially in high added-value fields – IT&C, R&D, creative industries • Important retail market with good connectivity in the territory, supported by 3 highways, railway infrastructure and Henri Coandă International Airport • Major road infrastructure projects implemented in order to reduce travel times on the main thoroughfares in the city • Public transport network coverage in the city (including the subway), the areas with the highest population density or activities being well served • Dynamic real estate market, with important investments in logistics or commercial functions, but also in residential compounds • Considerable land stocks for development - abandoned or declining industrial areas and vacant land • Reach built heritage, of which around 56% of the architectural monuments are in a very good and good condition • The most developed university center in the country, with 31 public and private universities and a large number of students • Green-blue infrastructure with capitalization potential for recreation and leisure activities • Good telecommunication services provided by the broadband internet speed (fixed connections) and telecommunication network coverage	• Significant number of people at risk of poverty and of slum-type marginalized urban areas, exposed to risks • Insufficient specialized workforce, especially in terms of STEM staff (science, technology, engineering, mathematics) and with business / entrepreneurship and product management skills • Aged housing stock with acute rehabilitation needs and insufficient social housing stock available for rent • Unattractive public space, poorly capitalized, with sporadic rehabilitation interventions • Advanced state of deterioration of the built heritage, amid the abandonment of historical buildings, the erroneous interventions to rehabilitate historical monument buildings, as well as the failure to respect the character of high historical value areas • Urban sprawl manifested by uncontrolled expansions, both on the outskirts and in peri-urban areas • Incomplete road network, the busiest city in the European Union • Underdeveloped ecological transport infrastructure (bicycle lanes and pedestrian traffic, electric charging stations for vehicles) • Pedestrian routes and public transport stations that do not provide access for people with disabilities or strollers • Undersized and aged water supply and sewerage network, with frequent failures • District heating system in an accelerated degradation, with failures of increasing duration, with arrears that led to the bankruptcy of RADET and the insolvency of the main producer, ELCEN • Low connectivity and multifunctionality level of green and aquatic areas in Bucharest, both within the city and with the components outside • Low quality of environmental factors (water, air, soil, noise, electromagnetic radiation) in Bucharest City that does not ensure a clean and healthy environment for the inhabitants, increased frequency of the photochemical smog

OPPORTUNITIES	THREATS
• Availability of 2021-2027 funding for regional development, as well as for a number of sectoral priorities of national interest • Increased interest of foreign companies to establish in Romania, as a result of structural changes at European level (Brexit) • Increased labor migration to Romania, outside the European area • EU priorities related to sustainable development, fighting against climate change and the use of renewable energies • Successful experiences at European level and tools already tested in the field of metropolitan cooperation (especially at the level of capital cities) as models of best practice	• Competitiveness with other areas of interest for investors, both at regional / European level and globally • Declining investment and tourism interest caused by global structural changes as a result of the COVID-19 crisis • Depopulation of communities in the Functional Urban Area through population aging and migration to other countries • Increased likelihood of climate hazards and risks, degradation of the environment quality in general, due to climate change reasons