Research Article

Mitigating the Impact of Urban Densification on Citizens: A Comprehensive Approach for Sustainable Urban Development

George Rotaru*, Ion Alexandru Constantin and Oana Luca

Faculty of Civil, Industrial and Agricultural Engineering, Technical University of Civil Engineering, Romania

*Corresponding Author
George Rotaru, Faculty of Civil, Industrial and Agricultural Engineering, Technical University of Civil Engineering, Romania.

Abstract
Urban densification, driven by population growth and the demand for efficient land use, is an inevitable trend in contemporary cities. While densification offers significant advantages, such as minimizing urban sprawl and enhancing access to infrastructure, it also brings forth challenges that impact the quality of life, environmental health, and social cohesion. This paper presents a strategic framework for mitigating the adverse effects of urban densification, focusing on key areas such as mixed-use zones, green infrastructure, public spaces, public transport, and affordable housing. The strategies discussed are contextualized through the case of Bucharest, Romania's capital, offering practical solutions to ensure balanced, sustainable urban development.

1. Introduction

As urban populations increase globally, densification has emerged as a key strategy for efficient city planning. It promotes the reduction of suburban sprawl and fosters economic vitality by creating dense urban cores where infrastructure and public services can be optimized [1,2]. Cities such as Bucharest are experiencing the pressures of population growth, forcing planners to rethink how cities evolve. However, densification also poses challenges, including environmental strain, inadequate infrastructure, and increased social disparities. The rapid urbanization of Bucharest exemplifies both the benefits and challenges of densification. While it promises a reduction in land consumption and urban sprawl, it also demands careful planning to avoid traffic congestion, pollution, and social inequalities. In this context, it is crucial to establish comprehensive strategies for sustainable urban growth [3].

1.1 The Impact of Urban Densification on Citizens
1.1.1 Environmental Impact

Densification increases the demand for resources such as water, energy, and waste management systems. Without sufficient green infrastructure, urban areas are prone to the urban heat island effect, leading to increased energy consumption and deteriorating air quality [4]. In Bucharest, residential areas experience high levels of air pollution due to vehicle emissions and the lack of adequate

public transport options. According to the European Environment Agency (EEA), air pollution in Bucharest is a significant concern, with levels of particulate matter (PM10) often exceeding the EU's air quality standards. The city's car dependency exacerbates the problem, with about 1.27 million registered vehicles in a city of just over 2 million residents [5]. Parks and green spaces are limited, and where they do exist, they are often underutilized due to a lack of accessibility, poor urban planning, and insufficient maintenance [3,6]. The lack of green spaces in dense residential areas and poorly planned urban developments, further compounds the issue, making it difficult for residents to access parks for recreational or health purposes.

1.1.2 Social Impact

Urban densification can enhance social cohesion through mixed-use developments and compact neighborhoods, which promote interaction among residents. However, in Bucharest, high-density developments have often led to the overuse of public services, such as education and healthcare facilities. Residents in high-density neighborhoods also face increased noise levels, reduced privacy, and a lack of recreational spaces [7,8].

The issue of affordable housing is also significant. The rapid urban expansion in Bucharest has not kept pace with the demand for affordable housing, forcing many residents to relocate to peri-

urban areas, where infrastructure and services are insufficient. This phenomenon has exacerbated social inequality and contributed to traffic congestion, as residents commute long distances to the city center [3]. The lack of affordable housing in central areas has led to the gentrification of neighborhoods in Bucharest. As higher-income groups have moved into formerly affordable areas, rents and property prices have increased, further displacing lower-income residents.

Improving infrastructure to support high-density populations in Bucharest requires both an increase in public service capacity and an enhancement of existing facilities. For instance, establishing a network of satellite public service centers—like smaller schools, clinics, and administrative offices—can help spread demand across the city. Investment in these facilities, especially in high-density zones, is essential to reduce overcrowding and improve quality of services. Moreover, creating partnerships with private entities to co-fund essential services, particularly in education and healthcare, can expedite infrastructure improvements.

Additionally, housing is becoming increasingly unaffordable within city centers, pushing residents to less-served outskirts of the city.

This map (Figure 1) provides a comprehensive view of average prices for new housing units and rents for one-bedroom apartments throughout Bucharest. In our case study area, we see notably high values, with new housing units averaging around €3,000 per square meter and rents reaching approximately €450 per month. These prices are significantly above the city's overall average, highlighting the area's exclusivity and the growing demand for housing in prime urban zones. This disparity reflects the pressures of urban densification in highly sought-after locations, where demand is driving up both purchase and rental costs.

Average price for new units (euro/sq.m.)
Average rent for a one-bedroom apartment (euro/month)
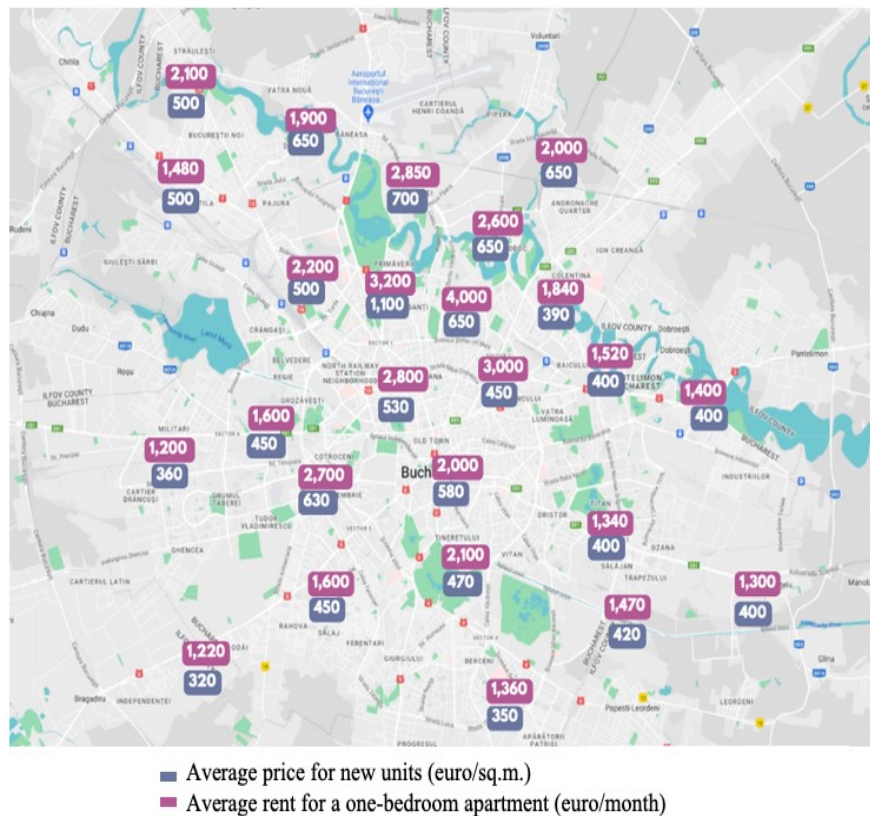
Figure 1: Residential Real Estate Market Analysis 2023 (Source: Romanian Real Estate Market H1 2023 - Crosspoint)

2. Key Strategies for Mitigating the Effects of Urban Densification
2.1 Mixed-Use Zoning
Mixed-use zoning is one of the most effective ways to mitigate the negative impacts of urban densification. By integrating residential, commercial, and recreational spaces within close proximity, cities can reduce the reliance on private vehicles and create vibrant, walkable neighborhoods [6]. In Bucharest, there has been some success with transforming former industrial areas into mixed-use developments, but the process has been slow and inconsistent [9].

To fully realize the potential of mixed-use zoning, Bucharest's urban planning authorities must incentivize the development of multifunctional neighborhoods. This can be achieved by offering tax breaks to developers who invest in mixed-use projects and by revising zoning laws to allow for more flexible land use. [10] To fully realize the potential of mixed-use zoning, it's important to establish clear Key Performance Indicators (KPIs) to guide and measure progress.

Increase in MixedUse Developments	Measured by the number of new projects that integrate residential, commercial, and recreational uses. As the municipality will work through future urban plans to encourage developers to integrate residential, commercial and recreational spaces, this KPI will provide a clear picture of the scale and growth of these projects. The success of mixed-use zoning depends on the large-scale development of these projects, and tracking the number of new mixed-use projects will help authorities ensure that they meet demand and support sustainable growth. Without this KPI, it would be difficult to assess whether Bucharest is making real progress in creating more balanced and less car-dependent urban environments.
Reduction in Commuting Times	An indicator of the success of mixed-use zoning, with a target of reducing average commuting times by 15-20%. This KPI is essential because it directly reflects how well mixed-use zoning is addressing Bucharest's traffic congestion and long commute times. By tracking this indicator, Bucharest can assess whether residents are indeed benefiting from the proximity of various urban functions and whether commuting distances are shortening as a result of the development of multifunctional neighborhoods. This also directly links to improved air quality and reduced carbon emissions, which are key environmental goals for the city. Without tracking commuting times, it would be unclear whether the investments in mixed-use zoning are having a meaningful impact on improving mobility and reducing traffic burdens.

Table 1: KPI Examples for Mixed use Zoning

2.2 Green Infrastructure

Green infrastructure is essential to balance the environmental impact of urban densification. It includes parks, green rooftops, and urban forests, which help to improve air quality, reduce the urban heat island effect, and provide residents with much-needed recreational spaces [11]. While Văcărești Park is a prime example of how green spaces can be revitalized to enhance urban sustainability in Bucharest, currently, the city has 7.1 m² per resident [12]. Moreover, many neighborhoods lack sufficient green spaces. Expanding the city's network of parks and ecological corridors will not only improve environmental quality but also enhance the aesthetic value of urban areas, making them more attractive for residents.

Green Space per Capita	Increase green space availability to meet the World Health Organization's recommendation of 9 m² per resident Increasing green space availability through urban planning, such as developing new parks or revitalizing existing ones, is essential for improving public health and reducing the city's environmental footprint. Tracking this KPI allows urban planners and local administration to measure progress toward this target. The increase in green spaces will contribute to better air quality by reducing pollutants like nitrogen dioxide and particulate matter, improving residents' mental and physical health, and creating more pleasant urban environments. A target for increasing green space per capita can be set over a specified period (e.g., 3–5 years), ensuring a tangible goal for the city's development. For example, Bucharest could aim to increase its green space by an additional 2–3 m² per capita over the next five years, with annual progress evaluations.
Reduction in Urban Heat Island (UHI)	A decrease in the number of urban heat islands, measured by temperature differentials across the city. Bucharest, like many other cities, is affected by the UHI phenomenon, which intensifies the urban heat problem during the summer months. The city has seen increasing temperatures in urbanized areas, contributing to discomfort, health issues, and higher energy costs. Tracking the reduction in the number of UHIs is critical for understanding the impact of urban greening projects, the implementation of reflective materials, and other cooling interventions. This KPI is necessary because it offers a direct measure of the effectiveness of strategies aimed at mitigating the UHI effect. The goal is to reduce UHI intensity by a certain percentage (e.g., 10-15%) within the next 5 years, through the expansion of green spaces, improved urban design, and the use of cooling technologies. For instance, implementing urban greening initiatives like planting trees in high-density areas or encouraging the use of green roofs can directly mitigate UHI effects.

Table 2: KPI Examples for Green Infrastructure

2.3 Public Transport and Sustainable Mobility

Efficient public transport systems are a cornerstone of sustainable urban development [2]. Bucharest's public transport system, while extensive, requires significant improvements to meet the needs of a growing population. According to the TomTom Traffic Index, Bucharest consistently ranks among the most congested cities in Europe, with congestion levels reaching around 50% during peak hours, indicating that more sustainable transport measures must be considered by citizens [13]. The city has taken steps to expand its metro system, but many areas, especially the peri-urban zones, remain underserved by public transport. Promoting active transport modes such as walking and cycling can further reduce traffic congestion and improve air quality. The development of dedicated bike lanes and pedestrian friendly streets is crucial for encouraging sustainable mobility.

Increase in Public Transport	A target to increase the number of public transport users by 20-30% over the next decade. By setting a target to increase public transport ridership, Bucharest can measure its success in reducing the number of private cars on the streets, thus alleviating congestion, cutting down on vehicle emissions, and contributing to a cleaner urban environment. This KPI also incentivizes improvements in the public transport system itself—enhancements in frequency, coverage, reliability, and accessibility will all be necessary to attract more riders and meet this target. By achieving a 20-30% increase in public transport users, Bucharest can also optimize the use of its existing infrastructure, making public funds allocated to transportation more costeffective.
Expansion of Bike Lane Networks:	A goal to increase the length of dedicated bike lanes in the city by 50%. Bucharest has a limited network of dedicated bike lanes, which discourages many people from choosing cycling as a daily commuting option due to safety concerns. Expanding bike lanes aligns with the city's goals of reducing car dependence, alleviating traffic congestion, and lowering emissions. This KPI is essential for making cycling a feasible transportation mode for a larger segment of the population, especially for short-distance commutes within neighborhoods. By increasing bike lane length by 50%, Bucharest can significantly boost the safety, accessibility, and attractiveness of cycling in the city. This KPI also promotes a shift toward low-emission transport options, as bikes produce no emissions and help to relieve streets congestion. Furthermore, cities that have successfully expanded their cycling networks, such as Amsterdam and Copenhagen, have seen substantial increases in bike use and improvements in urban health and air quality

Table 3: KPI Examples for Public Transport and Sustainable Mobility

2.4 Affordable Housing

Affordable housing is a critical issue for cities undergoing rapid densification. In Bucharest, the high cost of housing in central areas has forced many residents to move to the suburbs, where housing is more affordable but infrastructure and services are lacking. The city must prioritize the construction of affordable housing in well-connected urban areas to ensure that all residents have access to quality services and infrastructure.

Increase in Affordable Housing Units	Track the number of new affordable housing units built in central and periurban areas. Housing affordability has become a critical issue in Bucharest, where property prices and rent costs are rising faster than many residents' incomes. By tracking the construction of new affordable housing units, the city can ensure that housing development keeps pace with demand, and that new units are affordable for lower income population. This KPI offers a measurable outcome for assessing the success of policies and initiatives aimed at increasing affordable housing supply, whether through public projects, incentives for developers, or public-private partnerships.
Reduction in Housing Displacement	Aim to reduce the number of residents displaced by gentrification and rising housing costs. Gentrification and rising housing costs can contribute to significant social challenges, including the loss of social cohesion, increased inequality, and longer commute times for those forced to move farther from employment areas. KPI focused on reducing displacement is critical for measuring the effectiveness of strategies such as rent stabilization, community land trusts, or affordable housing programs aimed at preventing the forced relocation of residents. Tracking this KPI allows local elected staff to assess whether development policies are promoting a balanced and inclusive approach. By setting a target to decrease displacement rates, Bucharest can ensure its urban policies do not inadvertently harm long-standing communities. It also helps protect local businesses and schools that depend on neighborhood stability.

Table 4: KPI Examples for Affordable Housing

Bucharest's strategies are addressing unique post-socialist urban challenges, economic limitations, and specific environmental concerns. While other cities may adopt similar objectives, Bucharest's approach - prioritizing community-driven green space development, incentivized affordable housing in central areas, collaborative transport expansion, and a strategic cycling culture shift - is directly aligned with its specific needs. These strategies, therefore, represent an integrated urban development model that could serve as a blueprint for other cities with similar post-industrial legacies.

2.5 Case Study: Urban Densification in Bucharest

Urban densification in Bucharest has led to a wide array of impacts on both the physical environment and the quality of life for its residents. The case study of densification in residential areas of Bucharest, detailed in several recent reports, highlights the city's struggle to balance rapid population growth, housing needs, and infrastructure development while mitigating the negative consequences of densification.

Over the past two decades, the metropolitan area of Bucharest has experienced a deeply fragmented and uncoordinated expansion in its suburban zones, primarily driven by economic and legislative challenges—common issues in many post-communist countries of Central and Eastern Europe. While population density within Bucharest's urban perimeter has been steadily declining since the

1990s, urban density has significantly increased in the last decade, largely due to extensive real estate development projects.

For the Bucharest-Ilfov study area, the following indicators were analyzed using public data provided by the National Institute of Statistics (TEMPO online database) between 2000 and 2020:

- **Density:** population density (inhabitants per hectare) and housing density (number of housing units per hectare).
- **Dynamics:** changes in population and number of housing units.

- **Living Conditions:** living space per person, educational and healthcare facilities. In 2020, most administrative units in Ilfov County had a population density of fewer than 20 inhabitants per hectare, while Bucharest had a density of approximately 90 inhabitants per hectare. Low population density was also reflected in housing density, with most units in Ilfov recording fewer than 10 housing units per hectare. This low density indicates inefficiencies in the provision of infrastructure and public services.

| Cities in Ilfov County	Year 2020				
	Number of people	Number of Housing Units	Hectares	People/Hectar	Housing Units/Hectar
TOTAL ILFOV County	452,027.00	201,443.00	19,939.00	22.67	10.10
BRAGADIRU	25,497.00	15,057.00	1,773.00	14.38	8.49
BUFTEA	22,729.00	7,290.00	3,196.00	7.11	2.28
CHITILA	15,860.00	5,618.00	1,048.00	15.13	5.36
MAGURELE	11,610.00	5,223.00	4,017.00	2.89	1.30
OTOPENI	18,318.00	9,711.00	2,724.00	6.72	3.56
PANTELIMON	29,591.00	11,729.00	2,919.00	10.14	4.02
POPESTI LEORDENI	39,125.00	23,990.00	1,422.00	27.51	16.87
VOLUNTARI	43,904.00	18,065.00	2,840.00	15.46	6.36

Table 5: Residential Real Estate Market Analysis 2023 (Source: Romanian Real Estate Market H1 2023 - Crosspoint)

Ilfov County surpassed Bucharest in housing growth between 2000 and 2020, with an increase of over 115%, amounting to approximately 108,000 additional housing units (from 93,366 in 2000 to 201,443 in 2020). By comparison, Bucharest saw a growth of around 14% over the same period, representing an additional 105,000 units. This growth was most prominent in the first line of suburban localities but, given the persistently low densities, it largely resulted from developments of isolated single-family homes on individual plots.
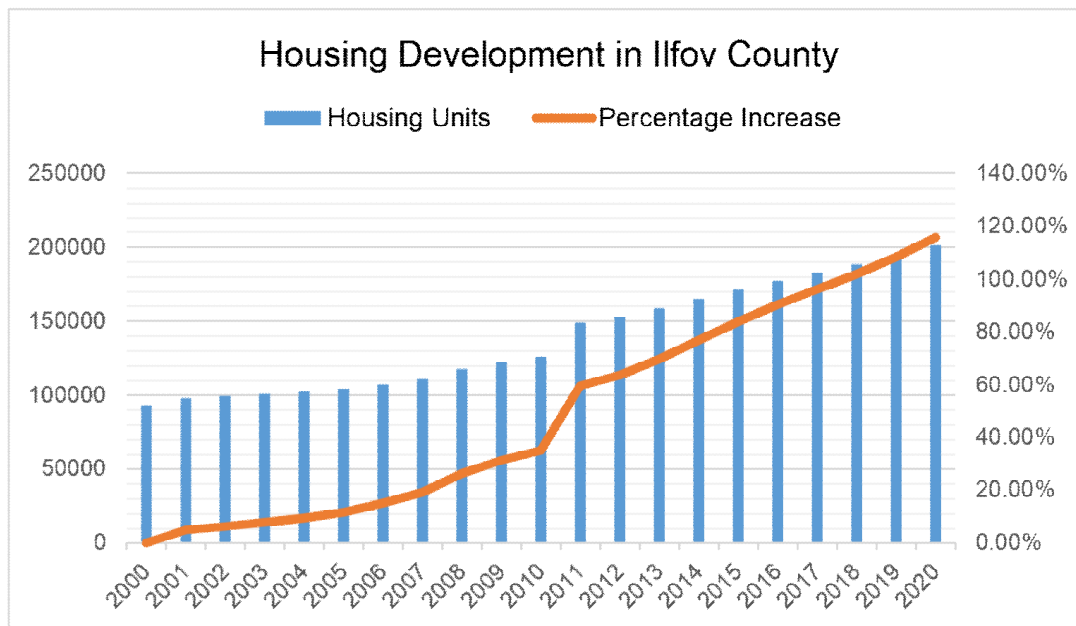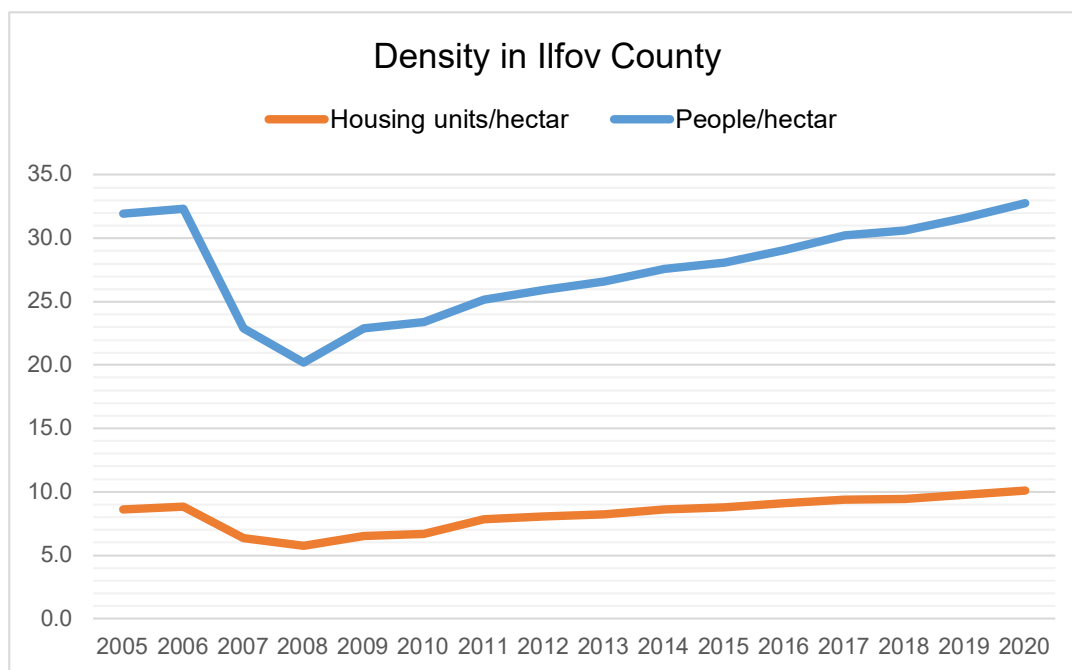

Figure 2: Evolution of the number of housing units between 2000-2020 in Ilfov County. Source of statistical data – INS TEMPO. (Processed by the author)
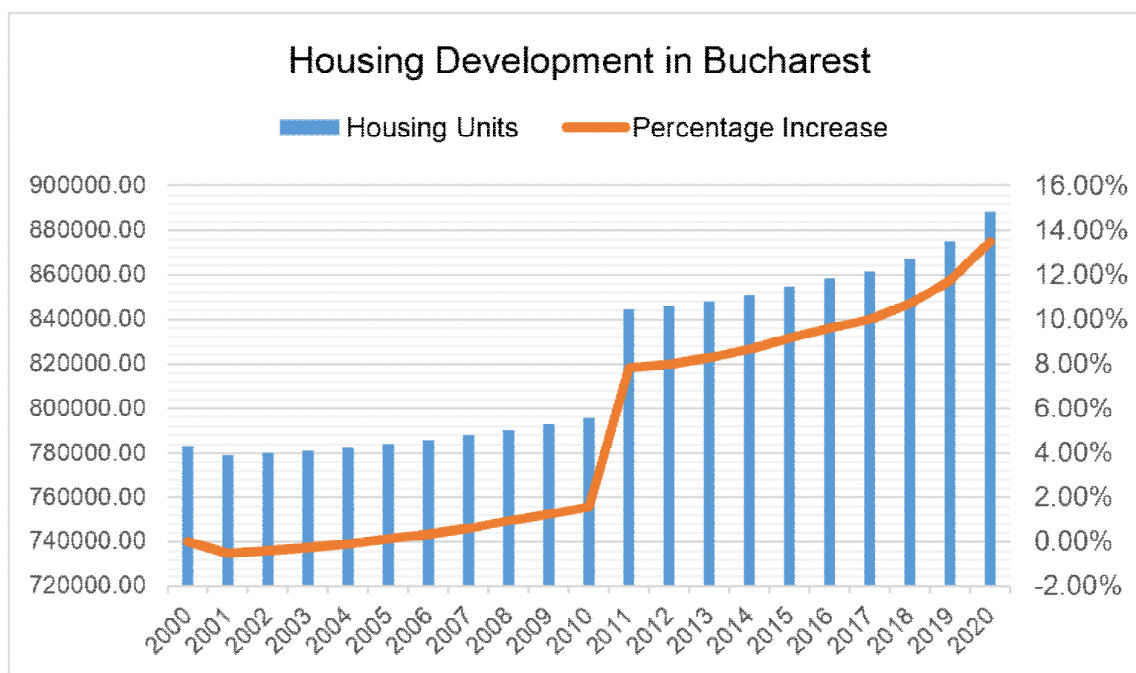
Figure 3: Evolution of the number of housing units between 2000-2020 in Bucharest. Source of statistical data – INS TEMPO. (Processed by the author)

Meanwhile, the population growth rate lagged significantly behind housing growth rates, with a decline of -0.40% in Bucharest and an increase of 59.4% in Ilfov County. Of the approximately 169,000 new residents added to Ilfov between 2005 and 2020, over 60% settled in the closest suburban localities.

Figure 4: Evolution of the density between 2000-2020 in Ilfov County. Source of statistical data – INS TEMPO. (Processed by the author)
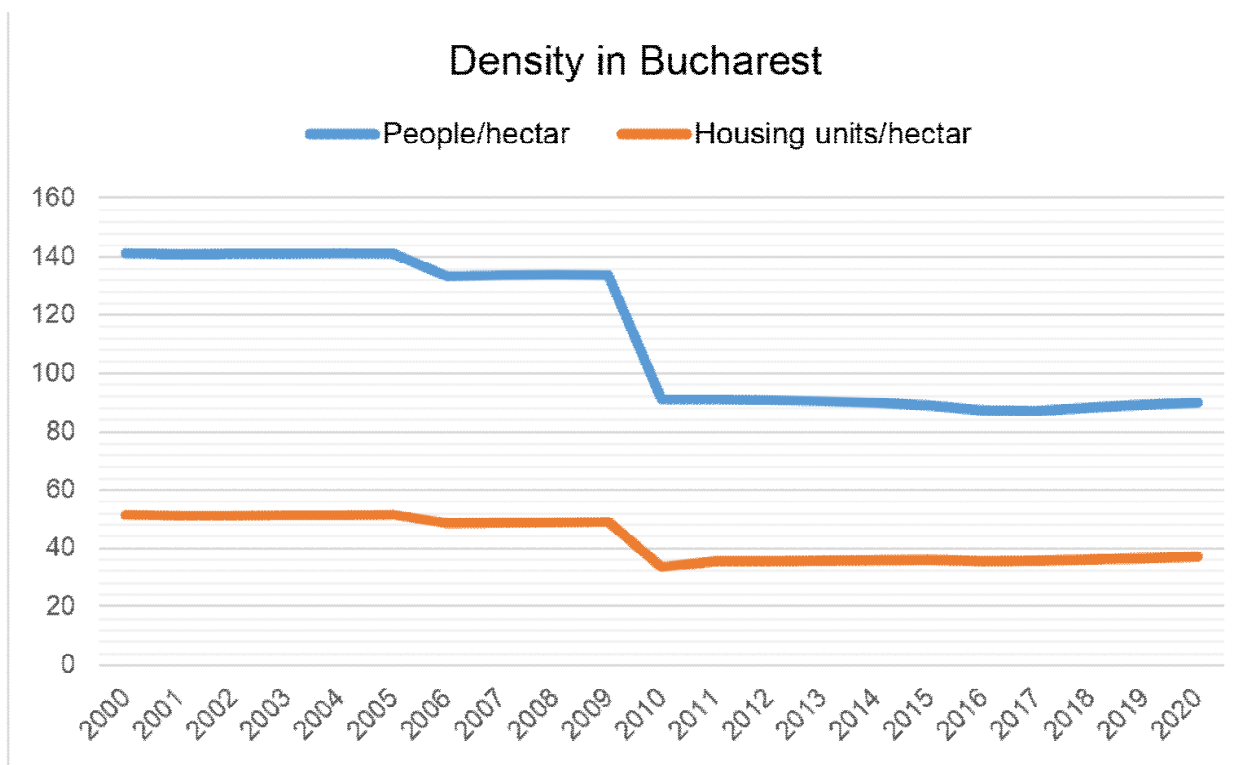
Figure 5: Evolution of the density between 2000-2020 in Ilfov County. Source of statistical data – INS TEMPO. (Processed by the author)

The gap between lower population growth and higher housing growth is evident in the increased living space per person, which rose considerably between 2000 and 2020: from 13.41 to 29.30 square meters per person in Ilfov and from 12.76 to 19.50 square meters in Bucharest.

Despite the ongoing rise in population and housing in Ilfov County, particularly in the first line of administrative units surrounding Bucharest, public services have not expanded at a matching pace. In 2017, Bucharest had 15.69 teachers per 1,000 inhabitants, compared to only 6.33 teachers per 1,000 inhabitants in the first-line localities, where most population growth occurred. In rapidly growing towns like Popești-Leordeni, Bragadiru, and Pantelimon, the number of teachers was below five per 1,000 inhabitants. For healthcare, the data indicates an even greater dependency on Bucharest's services, with only Buftea and Otopeni surpassing one doctor per 1,000 inhabitants.

The data analysis from the National Institute of Statistics underscores that Bucharest's metropolitan area has experienced a disorganized suburban expansion over the past two decades, driven by economic and legislative issues. While urban population density has declined since the early 1990s, urban fabric density has increased in the last decade, largely due to extensive real estate projects. However, this growth has been chaotic, as evidenced by low population and housing densities in most of Ilfov's administrative units, highlighting inefficiencies in the provision of infrastructure and public services.

Additionally, the analysis shows that Ilfov County has outpaced Bucharest in housing growth between 2000 and 2020. Ilfov's housing increased by over 115%, adding around 108,000 housing units, compared to Bucharest's 14% increase, or approximately 105,000 new units. Despite the population and housing increases in Ilfov, public services have not scaled at the same rate. There is a clear discrepancy between the lower rate of population growth and the higher rate of housing growth, with infrastructure and public services—such as educational and healthcare facilities—remaining inadequate, especially in high-growth localities.
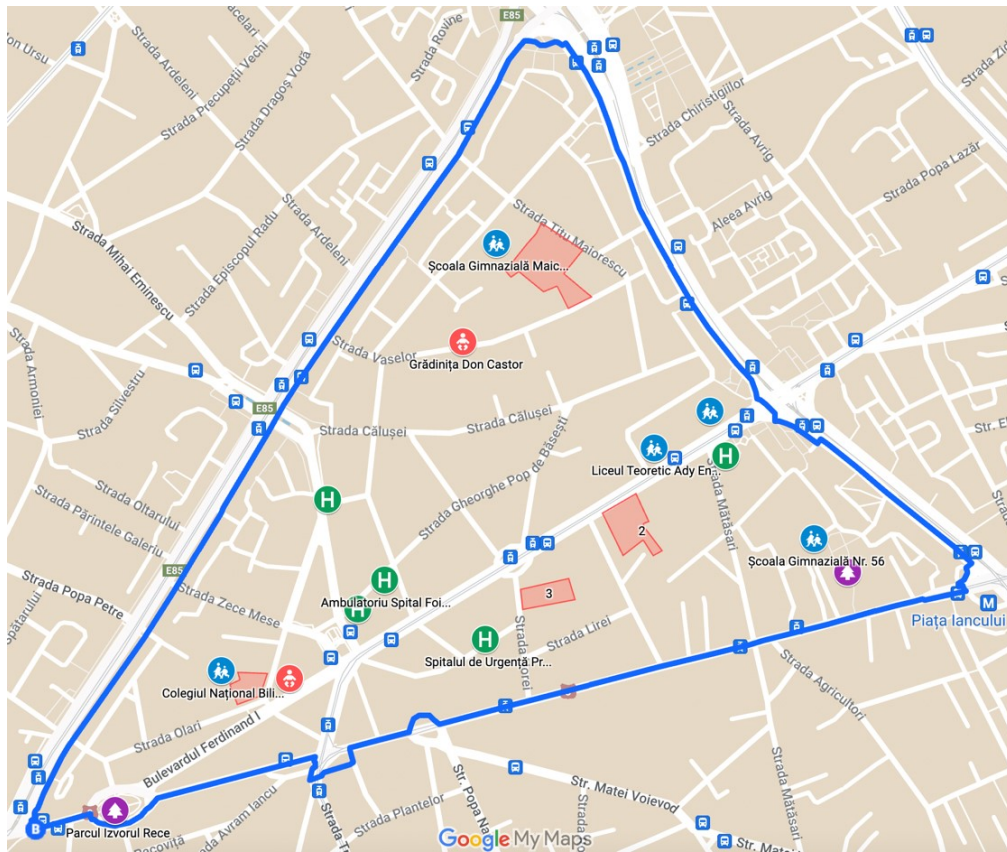
Figure 6: The study area (Source: Processed by the author – Google Maps)

The study area selected for an in-depth examination of urban densification in Bucharest provides a concentrated look at the city's evolving urban fabric and the impact of rapid development on historic neighborhoods. The study area spans 0.72 km² and is triangular, bordered by significant thoroughfares such as Șoseaua Mihai Bravu to the east and Calea Moșilor to the west. The district is traversed by Ferdinand I Boulevard, and its central portion includes protected historical areas such as the Pache Protopopescu area and the Foișorul de Foc Square. Most buildings here date back to the early 20th century and blend collective and individual housing models. Many of these structures were modified or rebuilt during the Communist era, including high-rise residential blocks of 8-10 stories built between 1960 and 1986. These were conceived as rapid solutions to Bucharest's housing shortages, addressing the challenges of urbanization but often at the expense of long-term urban planning quality.

3. Housing and Urban Development
Between 1978 and 1983, large portions of Calea Moșilor were demolished and replaced with high-rise residential buildings, which featured commercial spaces at street level. These developments were rehabilitated in recent years, particularly with thermal efficiency improvements. Despite these updates, the neighborhood still faces a fragmented urban structure, characterized by deteriorated public spaces and neglected green areas.

The urban fabric's density has created both positive and negative outcomes. For example, while housing shortages were alleviated quickly during the Communist era, the rush to develop residential buildings often resulted in poorly designed public spaces. Many green spaces were either unplanned or poorly maintained, leading to a sense of neglect. Trees, shrubs, and urban furniture were placed without consideration for their suitability to the area. Consequently, public spaces are now characterized by neglected green areas, dilapidated pedestrian paths, and subpar street furniture.

3.1 Public Infrastructure and Social Services
The density in Bucharest's residential areas has also had a significant impact on public infrastructure and services. While the study area benefits from some public transport connections, particularly in the northeast (where there are metro, tram, and bus lines), the lack of sufficient educational and healthcare facilities is an ongoing issue. For example, the area is served by several schools and healthcare centers, such as "School Maica Domnului" and the "Clinical Hospital of Orthopaedics," but many facilities are overcrowded, reflecting the imbalance between residential expansion and the development of supporting services.

3.2 Green Spaces and Public Safety
The study highlighted the importance of green spaces for improving residents' quality of life. However, the current state of parks, such as Parcul Izvorul Rece and Parcul Tolbuhin, reveals a need for extensive refurbishment. Poorly maintained, these parks

offer limited recreational opportunities, and traffic congestion near public squares such as Foișorul de Foc creates additional challenges. The report suggests reducing car traffic in these areas and introducing pedestrian-friendly zones as potential solutions.

Public safety also emerges as a concern, particularly at night. Poor lighting and untrimmed vegetation along secondary streets create an environment of insecurity. These areas require better urban planning, including the systematic placement of lighting and trimming of greenery to improve visibility and ensure pedestrian safety.

3.3 Population Density and Housing Quality
Population density in Bucharest has remained relatively high, with approximately 90 residents per hectare in 2020, compared to less than 20 residents per hectare in the surrounding Ilfov County. This sharp contrast highlights the disparity in urbanization between the city and its neighboring areas. The number of housing units in Bucharest increased by 14% between 2000 and 2020, while Ilfov saw a dramatic rise of 115% in the same period, reflecting the growing trend of suburban expansion.

This rapid growth, however, did not resolve all housing issues. Many residents continue to face overcrowding, as housing units built in the Communist era were designed for smaller family sizes. Despite thermal upgrades, many buildings still lack modern amenities. Furthermore, Bucharest's efforts to reduce the urban heat island effect have been slow, with inadequate green space and poor management of existing parks and public spaces.

3.4 Challenges and Opportunities
The SWOT analysis of the study area reveals both strengths and weaknesses. On the positive side, the area benefits from its proximity to central Bucharest and a relatively well-developed public transportation system, especially in the northeast. Additionally, there is significant potential for development, with many plots available for redevelopment.

However, the challenges are substantial. A key threat comes from the degradation of old housing stock, with many buildings at risk from natural disasters like earthquakes. The inconsistent political agenda for urban development complicates long-term planning, and rising real estate prices have made the area less accessible to lower-income residents. Moreover, the scarcity of recreational spaces and inadequate public infrastructure further exacerbates the negative impacts of densification.
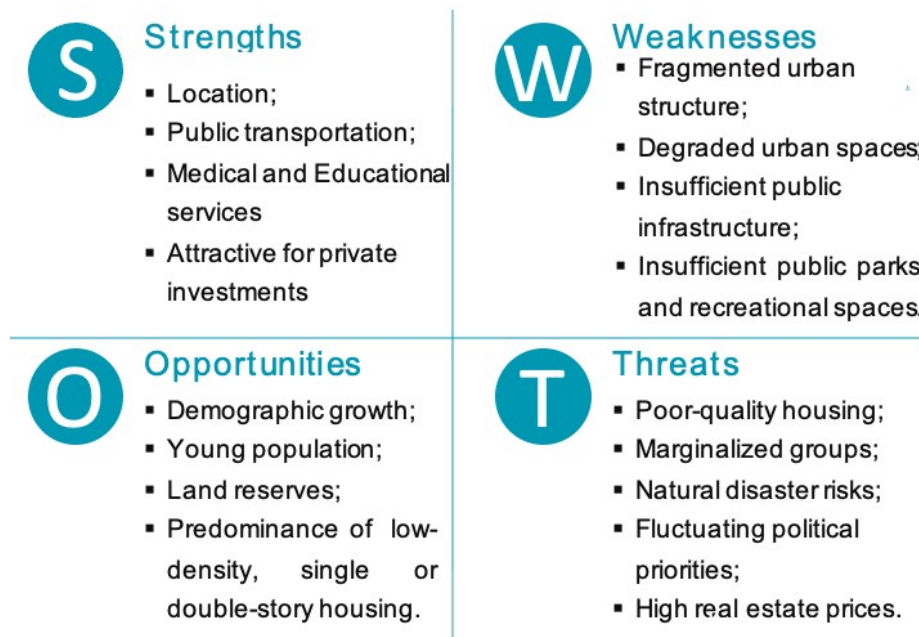

Figure 7: S.W.O.T. Analysis

4. Conclusions
The case study of urban densification in Bucharest illustrates the complexity of managing a rapidly growing urban population in a historically and spatially fragmented environment. Although densification has alleviated housing shortages, it has also led to new challenges in infrastructure, public service provision, and environmental sustainability. Moving forward, urban planners must prioritize the redevelopment of public spaces, improvements in green infrastructure, and the creation of more equitable housing solutions to ensure that Bucharest can meet the needs of its residents in a sustainable manner.

- **Lessons Learned from the Bucharest Case Study**
  Several key lessons can be drawn from the Bucharest experience with urban densification:
- **Integrated Urban Planning is Essential:** One of the central

issues in Bucharest has been the lack of integrated planning across housing, transportation, and public services. Successful densification requires a coordinated approach that ensures infrastructure and services grow in tandem with residential expansion. Policies must be implemented to align housing development with transport networks, green spaces, and social infrastructure such as schools and hospitals.

- **Public Participation in Urban Planning:** The need for greater public participation in urban planning processes is evident. Residents are often the first to feel the negative impacts of rapid densification, from overcrowded public services to noise pollution and traffic congestion. By involving citizens in decision-making, urban planners can ensure that the needs and preferences of residents are reflected in new developments. This can also foster a sense of ownership and responsibility among the public, leading to greater support for sustainable urban growth.

- **Sustainable Development is a Must:** The Bucharest case underscores the importance of sustainability in densification efforts. High-density urban areas must prioritize the development of green infrastructure, sustainable transport options, and energy-efficient buildings. Without these elements, densification can lead to negative environmental outcomes, such as increased pollution, urban heat islands, and biodiversity loss.

- **Affordable Housing Should be a Priority:** To prevent social displacement and promote inclusivity, affordable housing must be a central component of any densification strategy. As the case of Bucharest demonstrates, rising property values in dense urban areas can push lower-income residents to the fringes of the city, where infrastructure is lacking. Ensuring that affordable housing is available in central areas, close to public transport and services, can help to maintain social diversity and reduce the need for long commutes.

- **Future Directions for Bucharest**
  Moving forward, Bucharest must adopt a more proactive and integrated approach to urban planning. Key recommendations include:

- **Improved Public Transport:** The expansion of public transport networks, particularly to underserved suburban areas, is crucial for reducing traffic congestion and improving accessibility. Investments in sustainable transport, such as cycling infrastructure and electric buses, should be prioritized. This could involve a phased 5-to-10-year plan, led by Bucharest Municipality, with potential funding from both national government allocations and EU urban development grants. Such initiatives will need to be carefully coordinated with other urban projects to avoid resource conflicts. A multi-stakeholder approach involving local municipalities, private sector transport companies and residents' associations would ensure the sustainable implementation of infrastructure such as bicycle networks and electric bus systems. Key challenges include integrating these initiatives into existing transport systems, addressing logistical issues like maintenance and coverage, and overcoming resistance from car-dependent commuters.

- **Expansion of Green Spaces:** Increasing the availability and accessibility of public parks and recreational spaces will improve residents' quality of life and reduce the environmental impact of densification. Bucharest should aim to meet the WHO's recommended target of 9 m² of green space per capita by revitalizing existing parks and developing new green corridors throughout the city. This goal should be pursued by identifying underused urban land that could be converted into green spaces, as well as restoring neglected parks and waterfront areas. Nevertheless, issues like the availability of land, potential conflicts with real estate developers, and limited funding for upkeep and maintenance should be anticipated. Additionally, community involvement programs would be essential to ensure that new green spaces respond to local needs and promote community stewardship. Engaging citizens in the planning process and fostering a sense of ownership over these areas can help prevent future neglect and promote long-term sustainability.

- **Balanced Development in Suburban Areas:** To prevent further fragmentation of the urban landscape, suburban development must be carefully planned to include sufficient infrastructure and services. Policies should focus on creating mixed-use suburban communities that combine residential, commercial, and recreational spaces, thus reducing the need for long commutes. This approach could be managed by the Bucharest City Hall in collaboration with the sector mayors and developers, using a combination of public investment and incentivized private financing. Targeted development grants or tax incentives for developers could support sustainable growth over a 10-15-year period.

- **Earthquake-Resilient Buildings:** Given Bucharest's seismic risks, the modernization and reinforcement of old buildings, particularly those built during the Communist era, should be a priority. This will safeguard residents from natural disasters while also extending the life span of existing housing stock. Despite the efforts already undertaken by Bucharest City Hall with support from the Ministry of Development and Public Works, significant progress remains to be achieved. What is needed is a structured modernization program over a 10– 20-year period, with funding from national disaster resilience funds, EU grants and low interest loans to owners. In conclusion, while Bucharest has made significant strides in managing urban densification, many challenges remain. By focusing on sustainable development, public participation, and equitable housing policies, the city can create a more inclusive, resilient, and environmentally friendly urban environment. The lessons from Bucharest can serve as a model for other cities facing similar challenges, demonstrating that careful, integrated planning is the key to successful densification.

References

1. Badland, H. (2014). "*Urban Density and its Impact on Transport and Accessibility*." Springer.

2. Stanilov, K. (2014). "Suburban Development in Post-Socialist Europe: Case Studies in Urban Expansion." *Urbanism and Housing Studies*.

3. Whitehead, C. (2012). "Housing and Density in Urban Areas." *Urban Policy Review*.

4. European Environment Agency. (2020). "The European Environment - State and Outlook 2020." *Publications Office of the European Union*.

5. National Institute of Statistics.

6. Levine, J. (2012). "Mobility and Accessibility in Dense Urban Environments." *Elsevier Publishing*.

7. California Department of Housing & Community Development. (2012). "Efficient Public Services in High-Density Urban Areas," *California Government Publications*.

8. R. A. Irvin, & J. Stansbury. (2004). "Citizen Participation in Decision-Making: Is it Worth the Effort?" *Public Administration Review*.

9. Crosspoint Consulting. (2023). "Romanian Real Estate Market Analysis H1 2023." *Crosspoint Real Estate Market Report*.

10. Bhatnagar, B. (1992). "Public Participation and Urban Planning." *The World Bank*.

11. Clerc, J. (2021). "The 15-Minute City: Conceptual Framework and Application." *Urban Studies Journal*.

12. https://www.statista.com/statistics/1252851/romania-area-of-green-spaces-perinhabitant.

13. Liliana, A., Luca, O. (2021). "Open tools for analysis of elements related to public transport performance. Case study: Tram network in Bucharest." *Applied Sciences* 11.21-10346.