

What shapes a livable city? Subjective and objective determinants of city satisfaction in Romania

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ABSTRACT

This article examines urban quality of life in 41 Romanian cities by combining survey evidence from the 2020 Urban Barometer ($N = 13,380$) with a spatially detailed Quality of Life Index (QOLI) derived from OpenStreetMap and census data. Using hierarchical logistic regression, we assess how individual perceptions and city-level conditions shape city satisfaction. Results show that facilities and services, environmental quality, and governance contribute positively to satisfaction, while perceptions of trust and safety are among the strongest predictors. In contrast, the QOLI measuring the objective availability of amenities is negatively associated with satisfaction, indicating that infrastructure provision alone does not ensure well-being. City size is positively related to satisfaction, whereas economic indicators such as unemployment and aggregate turnover per population have little explanatory power. The study shows that urban well-being depends less on material provision and more on governance, trust, and residents' expectations, with implications for cities in Central and Eastern Europe where historical legacies and uneven development continue to shape urban experiences.

1. Introduction

Across urban landscapes, policymakers and scholars have assumed that expanding infrastructure and services improves satisfaction with city life. As urbanisation intensifies, governments invest in transport, green spaces, and social amenities to create liveable environments (Marans & Stimson, 2024; Wong, 2015). The literature on urban quality has established that satisfaction depends not only on services and infrastructures but also on emotions, expectations, and access to these resources (Dempsey et al., 2011; Jiménez-Caldera et al., 2024; McCreath et al., 2011). Research linking perceptions with objective indicators of urban conditions (Mouratidis, 2018; Stimson & Marans, 2011; Wong, 2015) has examined the role of infrastructure, services, and green spaces in shaping both city satisfaction and well-being (Dobrowolska & Kopczewska, 2024; Kytä et al., 2013; Mouratidis & Poortinga, 2020). Others have focused on transport quality (Vallée et al., 2011; van Wee & Ettema, 2016), variety of amenities (Sapena et al., 2021; Syamili et al., 2023), and access to nature (Seaman et al., 2010) in shaping urban life. If green spaces and recreational facilities support health while fostering social cohesion and belonging (Lee & Maheswaran, 2011; Syamili et al.,

2023), municipal services – such as street maintenance, waste management, or healthcare – also contribute to favourable evaluation of the urban environment (Pacione, 2003; Węziak-Białowolska, 2016). These recurrent findings point toward a recognisable set of dimensions, facilities and services, governance, safety and trust, environmental quality, and overall satisfaction, that structure how residents evaluate urban life.

However, while these elements shape urban life, their presence does not fully account for variations in satisfaction (Okulicz-Kozaryn & Valente, 2019, 2021). Trust in institutions, perceptions of security, and everyday interactions are equally decisive (Bourdin & Torre, 2025; Olsen et al., 2019). Infrastructure perceived as inaccessible or inadequate can generate dissatisfaction, even in well-equipped neighbourhoods (Bonaiuto et al., 2015; Castelli et al., 2023). This challenges the assumption that provision alone guarantees satisfaction with city-life. Earlier studies have hinted at such groupings of dimensions (Counted et al., 2025; Węziak-Białowolska, 2016; Wood et al., 2025), yet the field still lacks a clear typology that integrates them into a coherent framework. We build on Lefebvre's (1992, 2010) concept of figuration, which stresses that urban space is not only a technical arrangement but a staging of social relations and power structures (Petrovici & Poenaru,

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2025). For Lefebvre (1992, 2010) this term emphasises that urban space is not just a physical arrangement but a staging of social relations, a materialisation of power structures and aspirations running through society.

While these patterns appear across contexts, post-socialist cities provide a distinct setting for examining divergence between material provision and experience. In post-socialist landscapes, Romania included, where housing privatisation and decentralisation dismantled logics of service distribution (Bouzarovski et al., 2016), access to urban amenities remains shaped by legacies of central planning still present in contemporary cities (Cotoi, 2021), trans-nationalization via FDI-led development (Ban et al., 2025), and fragmented spatial arrangements (Petrovici & Poenaru, 2025). Examining these conditions offers insight into the Romanian case and how governance and trust shape the relationship between infrastructure and well-being in cities undergoing uneven development.

Using data from the Romanian Urban Barometer 2000, designed in line with the Eurobarometer Flash No. 419 survey on urban quality of life (European Commission, 2015), and a Quality of Life Index (QOLI) based on a census of amenities mapped on a 1 km² grid from OpenStreetMap and subsequently aggregated to the city level, the study applies a hierarchical logistic regression model to examine how individual and city-level factors influence satisfaction across 41 cities. This approach assesses how infrastructure, governance, and trust interact, offering a structured understanding of well-being in post-socialist contexts. Instead of attributing dissatisfaction simply to a lack of services, we test whether alignment between built environments, governance, and expectations explains variation in city satisfaction. Beyond Romania, these findings contribute to broader debates on governance, particularly in cities undergoing restructuring, fragmented capacity, or crises (Bourdin, 2024). The study provides insights relevant to discussions on inequalities, service accessibility, and institutional conditions shaping well-being, with implications beyond post-socialist settings.

We show that presence of public amenities, following methods put forward by Dobrowolska and Kopczewska (2024), does not, in itself, produce satisfaction; the way residents' experience of city is mediated by confidence in authorities, perceived effectiveness of services, and stability of networks (Gonzalez-Torres & Lizana, 2024). Unlike explanations treating infrastructure as an independent variable, this perspective examines how services become accessible, relevant, or exclusionary depending on trust structures. Lefebvre (2010), emphasised through his figuration that both the state and capital do not merely administer space but actively shape it through systems of organization and access. Infrastructure acquires meaning only through its relationship with the institutions that regulate it and the communities that use it. Expanding this discussion, we argue that infrastructure only becomes meaningful when embedded within the social dynamics of everyday life. In spaces where governance is distrusted, even generously provisioned neighbourhoods may fail to inspire a sense of security and belonging. We call this delicate interdependence the *truss of social space* – a structure holding together the threads of trust, belonging, and institutional coherence that define urban experience.

Studies on quality of life (Diener & Suh, 1997; Marans & Stimson, 2024; Stimson & Marans, 2011) indicate that perceptions of environment are shaped by existing amenities. However, empirical data from Romania show significant variation in how residents evaluate their city, even in areas with similar infrastructure. Our results indicate that even two cities with comparable services can produce contrasting reactions: one may be seen as vibrant and accessible, while another is perceived as rigid and unwelcoming. This suggests that built space not only provides resources but also structures experiences through ways residents use and interpret it. Material infrastructures remain fragile or incomplete (Graham & Thrift, 2007), embedded within processes of reproduction (Graham & Marvin, 2022), and reliant on networks supplementing them (Simone, 2019). Our empirical results therefore speak to this typology, showing that facilities, governance, safety, environment, and

satisfaction jointly mediate how similar infrastructures yield divergent perceptions of city life. This pattern is visible in post-socialist cities, where informality and adaptation compensate for limitations of infrastructures (Chelcea & Iancu, 2015). Our analysis shows that infrastructure and the spatial organization of the city orchestrate not only pathways of movement and thresholds of access but also shape deeper resonances, of safety, belonging, and lived potential, an echo we describe as *the reverberation of the built world*. Drawing on Anand (2017), infrastructure is cast not merely as a technical provision but as a political statement, a reflection of who is afforded what, and in what manner. We extend this insight, showing how the presence of infrastructure alone does not directly compose urban routines; its effects reverberate across institutional layers and social structures, tuned by social standing and collective experiences of urban life.

Urban quality of life is often examined in relation to available amenities, but research on subjective well-being (Ng & Diener, 2019) shows that satisfaction depends not only on what city offers but also on what residents expect from it. This is evident in empirical data: cities with similar services can exhibit different levels of satisfaction, and some well-equipped localities may even provoke frustration among residents. We examine this relationship between infrastructure and expectations. Larkin's (2013) concept of 'infrastructural spectrality' refers to way non-functional infrastructures shape imaginaries or how 'infrastructure is fetishized', as discussed by Dalakoglou (2010), where roads were built under socialism despite restrictions on car ownership. These infrastructures carry promises of modernity, often tied to large-scale projects. Cities are woven into the *warp of anticipation*, measured not only by the comforts they deliver but also by the promises residents hold for their unfolding futures. When promises remain suspended or expectations unmet, dissatisfaction may resonate more deeply than in places modestly equipped yet free from such aspirations. Within this *warp of anticipation* lies the space where we measure the distance separating infrastructure from satisfaction, tracing the threads of governance, economic transformation, and cultural labour that define and redefine the horizons of urban hope. We frame these expectations as part of the governance–trust nexus that conditions the translation of provision into experienced satisfaction; the empirical sections test this mechanism.

Following this introduction, the paper is structured into five sections. The next section outlines methodological approach, detailing dataset, variable construction, and modelling used to examine satisfaction. The empirical analysis follows, applying categorical principal component analysis to extract key dimensions of subjective well-being before integrating individual and city-level predictors in a hierarchical regression. The discussion interprets findings in relation to existing literature, while conclusion reflects on implications for urban policy, arguing that improving well-being requires not only infrastructural investment but also reforms that build trust and align services with expectations.

2. Methodological approach

2.1. Data source

The data used in this study comes from the Romanian Urban Barometer, a survey conducted between July 1 and August 15, 2020, across 41 urban areas in Romania. Modelled after the Eurobarometer Flash No. 419 on urban quality of life, the Romanian Urban Barometer measured dimensions of urban quality of life. A total of 13,380 respondents, aged 15 and above, participated. Respondents were drawn from a stratified sample across all 41 cities, ensuring urban representativeness. Allocation was proportional to each city's population (41 city clusters). The sample size was proportional to population, ranging from 250 to 500 respondents per city. Data was collected using a mixed-mode methodology, incorporating telephone and face-to-face interviews. The sample is nationally representative, with a margin of $\pm 1\%$ and a 99% confidence interval. Within this design, it was stratified proportionally

to the population of each city. At the city level, with approximately 250–500 respondents per city, the design ensures approximate representativeness, with margins of error ranging from about $\pm 6\%$ ($n \approx 250$) to $\pm 4\%$ ($n \approx 500$) at the 95 % confidence level.

The 41 cities were selected based on three criteria: size (grouped into strata), development region (NUTS2, eight in Romania), and urban profile (economic, geographic, and administrative) following the Eurobarometer Flash No. 419 strategy. Unlike the Eurobarometer surveys that typically cover only the largest cities in each country, the Urban Barometer was explicitly designed to include the full spectrum of urban settlements, from the capital to small towns. The Romanian urban population has the same demographic distribution by city size classes as the European average (Petrovici et al., 2022). Accordingly, all size classes were included in the sample, with coverage across all NUTS-2 regions of Romania. This heterogeneity is by design, as the aim is to cover the full spectrum of Romanian urban contexts, from the capital to small towns. Analytically, city-level variation is explicitly modelled through hierarchical specifications and stratified sampling to ensure that estimates reflect both large and small urban settings. Quotas ensured demographic characteristics such as age and gender matched estimates from the National Institute of Statistics. To complement survey data, geospatial data from OpenStreetMap mapped urban amenities such as dining, transportation, healthcare, education, sports, shopping, and green space (Dobrowolska & Kopczewska, 2024).

Additionally, the study includes balance sheet data from the governmental portal, reaggregated to calculate turnover and private employees at the city level. From these we compute turnover per employee, that is total firm turnover divided by the number of private employees, as a proxy for local economic activity. Economic indicators accounted for local variations and city size. Data on the unemployment rate in 2020 at city level (SOM101F) was sourced from the National Institute of Statistics.

2.2. Dependent variable

The dependent variable in this analysis is city satisfaction, derived from a binary response to the question: ‘Are you satisfied with life in your city?’ The response was dichotomised, with 1 representing

satisfaction (those who ‘strongly agree’ or ‘somewhat agree’) and 0 representing dissatisfaction (those who ‘somewhat disagree’ or ‘strongly disagree’). We also tested the full four-point scale, following the approach in Okulicz-Kozaryn and Valente (2019), with results reported in Appendix A. A hierarchical logistic regression model was then used to assess aspects influencing city satisfaction. This operationalisation aligns with the conceptual framework of urban satisfaction as a quality-of-life outcome, following Węziak-Białowolska (2016). Robustness checks with alternative specifications, including OLS and ordered logit with clustered SE, are also presented in Appendix A. The findings of these robustness checks are discussed in Section 3.3 and detailed in Appendix A.

2.3. Individual-level factors (subjective measures)

We use 27 questions assessed on a 4-point Likert scale, ranging from ‘strongly disagree’ to ‘strongly agree’. These questions cover aspects such as availability, accessibility, and quality of urban services; personal satisfaction with life, employment, financial stability, and environment; perceived safety in public spaces, neighbourhoods, and the city; trust in others and the city; evaluations of governance; and environmental quality, including noise levels, air quality, cleanliness, and building conditions. Table 1 presents the list of items alongside the mean and standard deviation.

We condensed the 27 questions into several dimensions using Categorical Principal Component Analysis (C-PCA). This technique simplified the dataset by identifying key components reflecting dimensions of urban well-being. Given the ordinal nature of variables, optimal scaling transformed data, making it suitable for PCA. The analysis was conducted using the *princals* function from the *Gifi* package (Mair et al., 2025), with Promax rotation specified to accommodate expected intercorrelations between factors. Promax rotation was selected due to overlaps among dimensions such as safety, trust, and governance. Survey weights were incorporated in PCA, ensuring results reflected demographic distribution. This weighted approach identified interpretable components, capturing key aspects of urban quality of life across Romanian cities.

Sociodemographic characteristics, including age, gender, ethnicity,

Table 1
Categorical Principal Components Analysis: profile variables and constituent items.

Dimension	Variable	Min–Max	Mean (St.Dev)	Loadings	Communality
1. Facilities & Services	Availability of Sports Facilities	1–4	2.574 (0.945)	0.849	0.585
	Access to Cultural Facilities	1–4	2.683 (0.946)	0.895	0.630
	Access to Parks	1–4	2.811 (0.908)	0.608	0.532
	Quality of Retail Stores	1–4	2.987 (0.853)	0.592	0.536
	Availability of Public Transport	1–4	2.577 (0.970)	0.653	0.425
	Quality of Public Spaces	1–4	2.759 (0.882)	0.501	0.574
	Access to Schools	1–4	2.765 (0.894)	0.506	0.441
	Availability of Health Services	1–4	2.486 (0.887)	0.491	0.313
2. Satisfaction	Satisfaction Living Envir.	1–4	3.046 (0.792)	0.716	0.633
	Financial Satisfaction	1–4	2.768 (0.854)	0.820	0.672
	Job Satisfaction	1–4	2.301 (1.158)	0.716	0.490
	Life Satisfaction	1–4	2.968 (0.792)	0.818	0.697
	Perceived Safety in the City	1–4	2.926 (0.880)	0.812	0.672
3. Safety & Trust	Safety in Public Spaces	1–4	2.780 (0.897)	0.500	0.509
	Trust in City People	1–4	2.665 (0.889)	0.611	0.604
	Trust in Neighbours	1–4	2.795 (0.904)	0.721	0.626
	Safety in the Neighbourhood	1–4	3.023 (0.857)	0.885	0.705
	Ease of Finding Housing	1–4	2.428 (0.964)	0.700	0.548
4. Governance	Resilience to Climate Events	1–4	2.504 (0.956)	0.629	0.573
	Efficiency of Local Administration	1–4	2.526 (0.901)	0.631	0.581
	Ease of Finding Jobs	1–4	2.486 (0.955)	0.527	0.464
	Trust in Public Administration	1–4	2.527 (0.918)	0.578	0.571
	Noise Level	1–4	2.568 (0.906)	0.939	0.712
5. Environmental Quality	Air Quality	1–4	2.612 (0.952)	0.903	0.705
	Cleanliness of the City	1–4	2.561 (0.942)	0.756	0.629
	Condition of Buildings	1–4	2.570 (0.886)	0.543	0.548
	Condition of Streets	1–4	2.507 (0.948)	0.472	0.565

and household structure, were control variables to account for differences in satisfaction. Age is particularly important, as older residents have different priorities, especially regarding healthcare and mobility, compared to younger populations. Gender is a key control, given that men and women perceive safety and services differently. Additionally, ethnicity examined whether minority groups experience barriers to service access or lower levels of trust in governance. Years living in the city, categorised as ‘born in the city’, ‘lived in the city more than five years’, and ‘moved within the past five years’, along with household composition, accounted for how residency and living arrangements shape satisfaction. These controls mitigated biases and allowed a refined interpretation of trends captured by the dataset.

2.4. City-level factors (objective measures)

To examine urban dynamics, a Quality-of-Life Index (QOLI) was constructed, adapting the methodology of Dobrowolska and Kopczewska (2024), originally developed for Warsaw. The spatial distribution of population and QOLI across Romanian cities is depicted in Figs. 1 and 2, showing service availability and population density at grid, municipal, and regional levels. The QOLI evaluates urban well-being by assessing accessibility of amenities through a 1 km² grid system. Its adaptation to Romanian contexts relied on OpenStreetMap (OSM) data, where urban services were categorised by essential functions. These categories included dining, transportation, healthcare, education, sports, shopping, and green spaces, with a residual category labelled “other,”

encompassing services not easily classified.

The classification of amenities was adjusted for Romania’s urban and peri-urban conditions. Special attention was given to education and shopping, ensuring rural education centres and informal markets were included. These adjustments captured service diversity in large cities and smaller settlements where alternative systems prevail.

Following the original QOLI framework, amenities were differentiated by perceived importance and frequency of use. Primary amenities, such as pharmacies, were classified as essential. Secondary amenities, like primary care centres, and tertiary amenities, such as hospitals, were considered less frequently accessed but still important. Additional amenities, including retirement homes, were treated as supplementary. In line with Dobrowolska and Kopczewska (2024), the index incorporates not only amenities within each 1 km² grid cell but also spillover effects from neighbouring cells. This is captured through distance-decaying weights, which assign greater relevance to services in the focal cell and progressively lower importance to those in adjacent cells. The weighting scheme follows the mathematical logic of grid contiguity and accessibility, with weights of 0.9, 0.3, 0.2, and 0.1 applied to primary, secondary, tertiary, and additional services, respectively. Robustness checks with alternative weighting schemes confirm that results remain substantively unchanged.

The spatial framework, based on Eurostat’s 2021 census grid for Romania, enabled precise geolocation within 1 km² grid cells. For each cell, per capita availability of amenities was calculated to provide a detailed view of their distribution. To account for spillover effects from

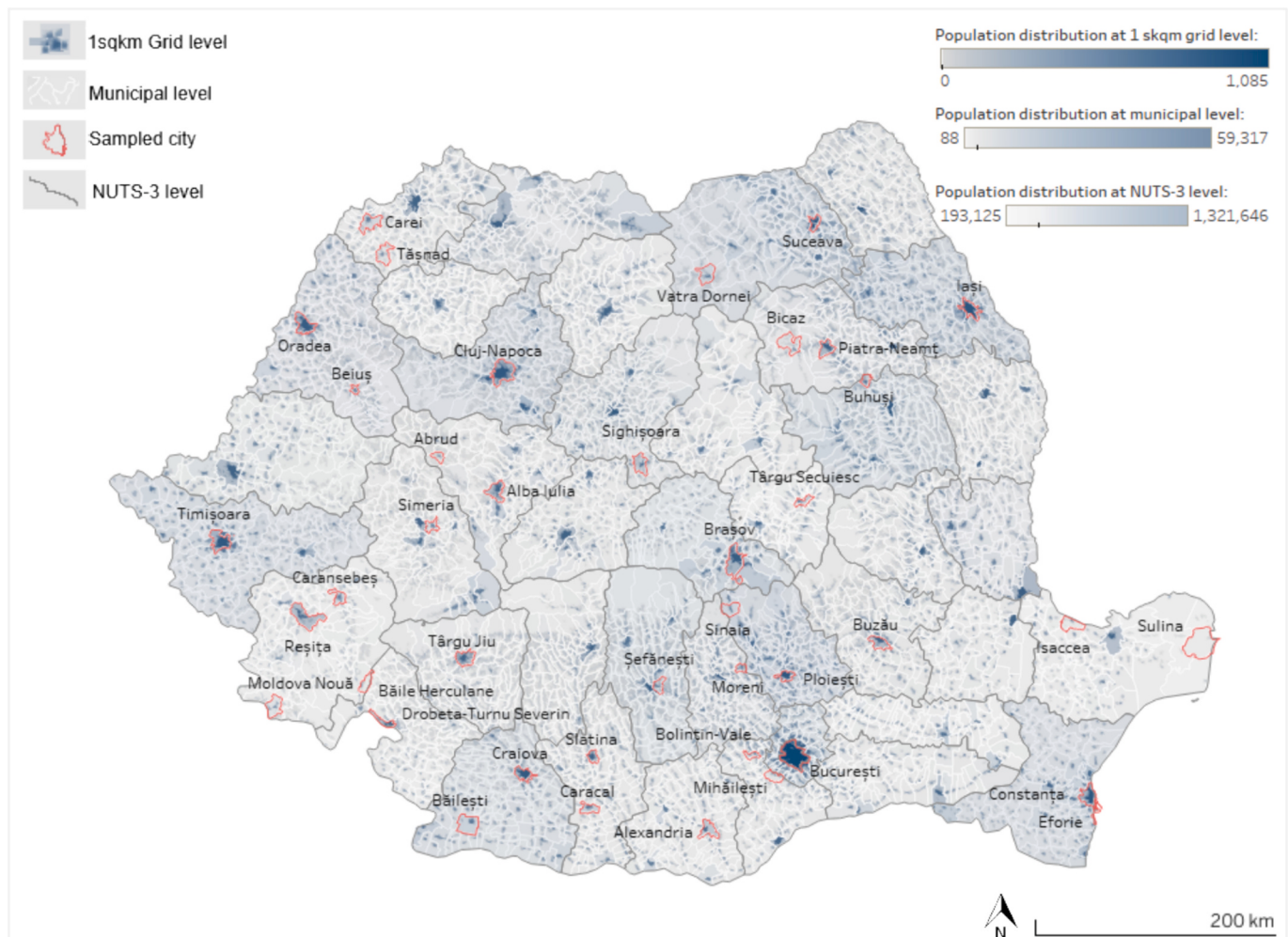


Fig. 1. Selected cities and population distribution at grid, municipality, and regional (NUTS3) scales in Romania, with colours centred on median values and maximums set at the 99th percentile for each level.

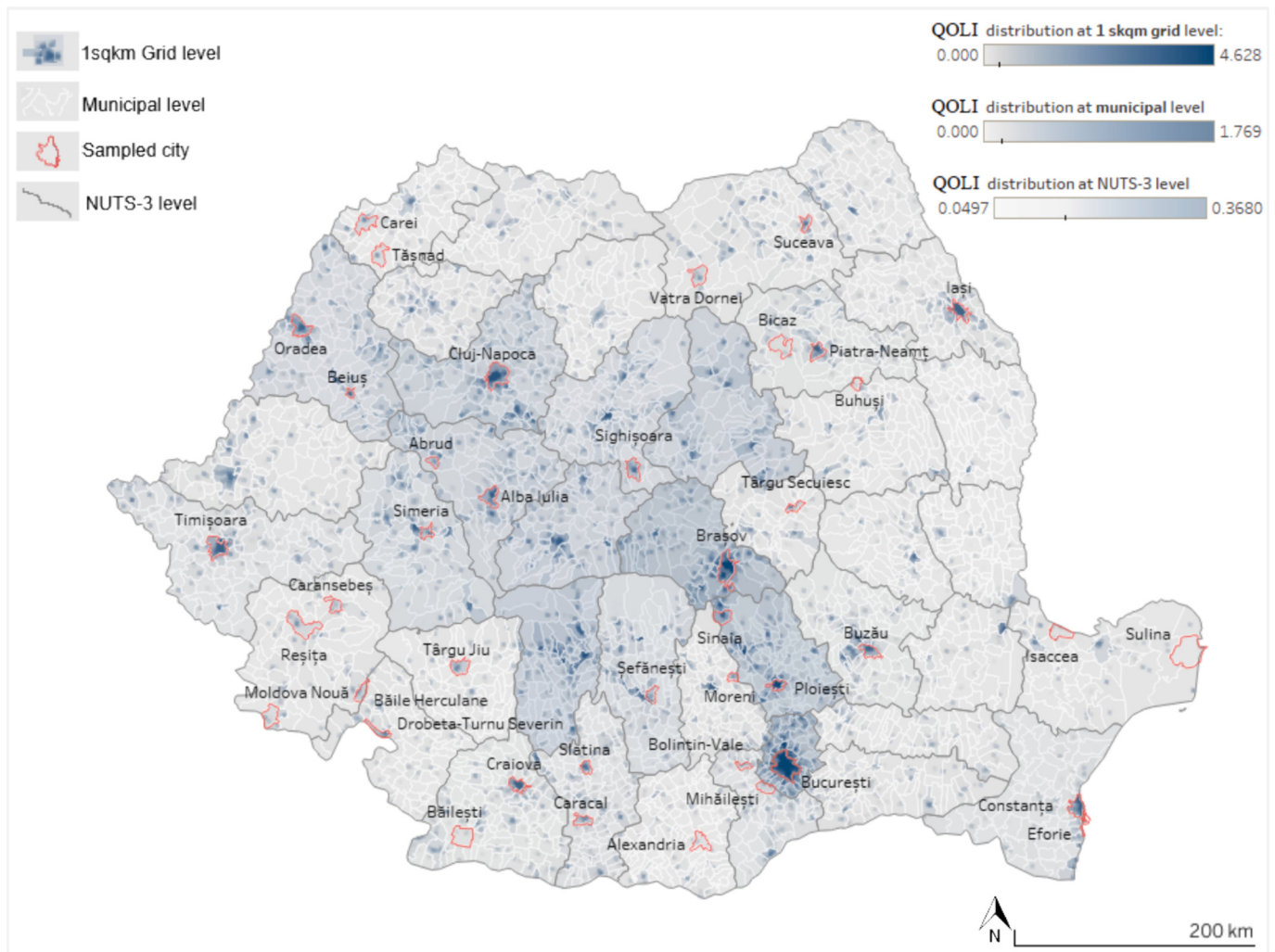


Fig. 2. Selected cities and quality of life index distribution at grid, municipality, and regional (NUTS3) scales in Romania, with colours centred on median values and maximums set at the 99th percentile for each level.

adjacent areas, spatial weights were applied, assigning a 0.5 weight to amenities in neighbouring cells. This approach captured cross-boundary effects, reflecting service influence beyond immediate locations.

QOLI scores for individual grid cells were computed by aggregating weighted amenity scores and normalising them using 2021 census data. These scores were averaged at the Local Administrative Unit (LAU) level to enable city comparisons. The spatial distribution of population and amenities is illustrated in Figs. 1 and 2, highlighting inter-city disparities and variations in access to services.

To complement QOLI, demographic and economic indicators were incorporated, as the 2021 census population the city aggregate turnover per employee metric controlled for variations in local economic activity. Additionally, aggregated Safety & Trust variables, derived from survey data, captured perceptions of security, trust, and governance across cities.

2.5. Limitations

A limitation of our study is that the dimensions and results are inevitably shaped by the structure of the Urban Barometer dataset. Although the survey follows the Eurobarometer design and is stratified to ensure national representativeness of the urban population, the dataset of city satisfaction remains bounded by the Romanian case. In addition, data were collected between 1 July and 15 August 2020, in the midst of the COVID-19 pandemic, when perceptions of healthcare,

mobility, and governance may have been strongly conditioned by the crisis. These context-specific responses should be interpreted with caution, as they may not fully reflect long-term evaluations of urban quality of life.

A further limitation arises from the conceptual framing, which inherits the domain structure of Eurobarometer Flash 419 (European Commission, 2015), itself a second wave of Flash Eurobarometer 366 (European Commission, 2012) developed by experts from DG REGIO (Directorate-General for Regional and Urban Policy) in collaboration with the Urban Audit team (Eurostat/European Commission). This framework stratifies urban well-being into socioeconomic, cultural, environmental, and institutional categories. Such constraints are common in comparative urban well-being research (Castelli et al., 2023; Olsen et al., 2019; Węziak-Białowolska, 2016) and should be borne in mind when generalising the findings.

A further consideration concerns the QOLI index, which relies on volunteered geographic information from OpenStreetMap. These data are typically more complete in wealthier and better-educated areas, though neighbourhood effects mean that poorer regions adjacent to affluent ones can also benefit from higher levels of coverage (Bright et al., 2018). Such patterns emphasise the partial yet compensatory logics of crowdsourced knowledge and the possibility of what Leszczynski and Elwood (2022) term ‘glitch epistemologies’ in computational approaches to cities. Given that larger Romanian cities tend to have higher educational attainment (Petrovici & Poenaru, 2025), we partially

address this potential bias through a robustness check for large-city effects.

3. Results

3.1. Categorical principal components

The analysis of 27 items addressing urban satisfaction revealed five principal components, presented in Table 1 that capture key dimensions of city life, together, account for 58 % of dataset variance. While partly reflecting the conceptual framing inherited from the Eurobarometer tradition, this structure is also consistent with findings in prior comparative studies: facilities and services emerge as central to urban well-being (Castelli et al., 2023; Dempsey et al., 2011; McCrea et al., 2011), subjective satisfaction reflects broader life evaluations (Diener & Suh, 1997; Okulicz-Kozaryn & Valente, 2019), safety and trust are core mediators of urban life (Mouratidis, 2018; Mouratidis & Poortinga, 2020; Olsen et al., 2019), governance captures institutional quality (Stimson & Marans, 2011; Węziak-Białowska, 2016), while environmental quality echoes established findings on pollution, cleanliness, and green space as determinants of satisfaction (Kytä et al., 2013; Lee & Maheswaran, 2011; Pacione, 2003; Seaman et al., 2010; Syamili et al., 2023).

Facilities & Services, accounting for 15 % of variance, encapsulates access to urban amenities such as transport, parks, and cultural venues (see Table 1 for loadings). The second dimension, Satisfaction, explains 12 % of variance and is shaped by financial well-being and overall life satisfaction, emphasizing financial stability's role in urban living.

Safety & Trust, contributing 12 % to variance, combines variables related to perceived neighbourhood safety and communal trust. Strongly influenced by safety perceptions, this dimension illustrates how secure environments frame residents' experiences. Governance, the fourth dimension, accounts for 10 % of variance and derives strength from variables such as housing availability and trust in local government.

Had the city satisfaction variable, measured on a 4-point Likert scale (mean = 2.964, SD = 0.927), been incorporated, it would have shown a dominant loading of 0.983 on Safety & Trust, with a communality value of 0.848. The ω coefficient, the Kaiser-Meyer-Olkin (KMO) measure, and total variance explained would have remained unaffected. In modelling, this relationship is handled by designating city satisfaction as the dependent variable, while Safety & Trust excludes the Likert-based measure. Environmental quality, the final dimension, explains 9 % of variance and includes variables related to noise, pollution, and cleanliness of spaces (Table 2).

3.2. City level bivariate analysis

Fig. 4 illustrates relationships between city satisfaction, QOLI, population, and turnover per employee in order to offer a visual overview of correlations observed in bivariate analysis. With 41 cases and noticeable heteroscedasticity, analysis serves as a preliminary examination, contextualising subsequent multilevel regression results. The weak and not significant correlation between QOLI and city satisfaction ($r = 0.190$, $p = 0.235$) suggests that urban well-being is not solely driven by

availability of infrastructure but also by how it is perceived and inhabited. The spatial arrangement of amenities does not merely offer access but structures daily life in ways that shape subjective experiences of security, belonging, and possibility. This finding suggests that infrastructure does not act directly or mechanically; its effects pass through lived experience, resonances of space, reverberations of the built world.

City satisfaction shows a modest correlation with turnover per employee ($r = 0.312$, $p = 0.047$), which is marginally significant. This relationship implies that cities with slightly higher economic productivity per employee tend to experience elevated satisfaction levels. However, the weak nature of this correlation indicates that economic productivity alone does not dictate satisfaction, as other factors play a more prominent role.

A strong correlation is observed between QOLI and population size ($r = 0.762$, $p < 0.001$), despite population being used as a normalising factor in constructing the index. Cities with larger populations achieve higher QOLI scores, reflecting wider availability of infrastructure and diversity of services in denser environments. This finding aligns with the idea that larger cities are better equipped to meet service demands and expectations.

Additionally, turnover per employee and QOLI demonstrate a strong correlation ($r = 0.627$, $p < 0.001$) suggesting that cities with higher quality indicators also show elevated economic output per employee. This connection supports the view that well-developed environments bolster economic productivity and performance.

Though not visually represented, the Safety & Trust component, which includes perceptions of safety and trust, displays mixed correlations with other variables. The relationship between Safety & Trust and city satisfaction, measured as a dependent variable, is moderate and significant ($r = 0.357$, $p = 0.022$). Cities where residents feel safer and report higher trust tend to exhibit greater satisfaction. However, Safety & Trust correlates weakly with QOLI ($r = -0.239$, $p = 0.133$) and turnover per employee ($r = -0.101$, $p = 0.530$). These weak associations imply that subjective perceptions of safety are only minimally connected to objective indicators of life or economic performance.

Taken as a whole, these findings reveal that subjective satisfaction operates largely independently of conventional economic or service-based metrics. Meanwhile, objective indicators such as QOLI and population size exhibit strong interrelations, suggesting that when incorporated into regression models, they may act as control variables, influencing explanatory power of predictors.

3.3. Hierarchical logistic regression

Fig. 3 schematically presents constructs and variables employed in hierarchical regression to estimate satisfaction in Romanian cities. The estimates for satisfaction, derived from four models, are shown in Table 3 along with the summary of fit estimates. Model 1, a pooled regression, focuses on individual-level predictors and applies weights based on population. Model 2 advances this framework by introducing a hierarchical structure, incorporating individual and city-level variables, including population, turnover, and unemployment. Model 3 refines the analysis by introducing Safety and Trust, both as an individual predictor and as a city-level aggregated variable. To encompass service provision, Model 4 builds upon previous models by incorporating QOLI, enriching

Table 2
Categorical Principal Components Analysis: validity measures.

PC	Dimension	Eigenvalue	Variance accounted for	McDonald's ω	KMO	χ^2 (df)
1	Facilities & Services	3.93	15 %	0.93	0.92	
2	Satisfaction	3.24	12 %	0.89	0.95	
3	Safety & Trust	3.15	12 %	0.91	0.94	
4	Governance	2.79	10 %	0.9	0.92	
5	Environmental Quality	2.43	9 %	0.94	0.89	
	Total	15.54	58 %	0.93	0.92	135,729 (351)***

Note: Significance levels are denoted as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

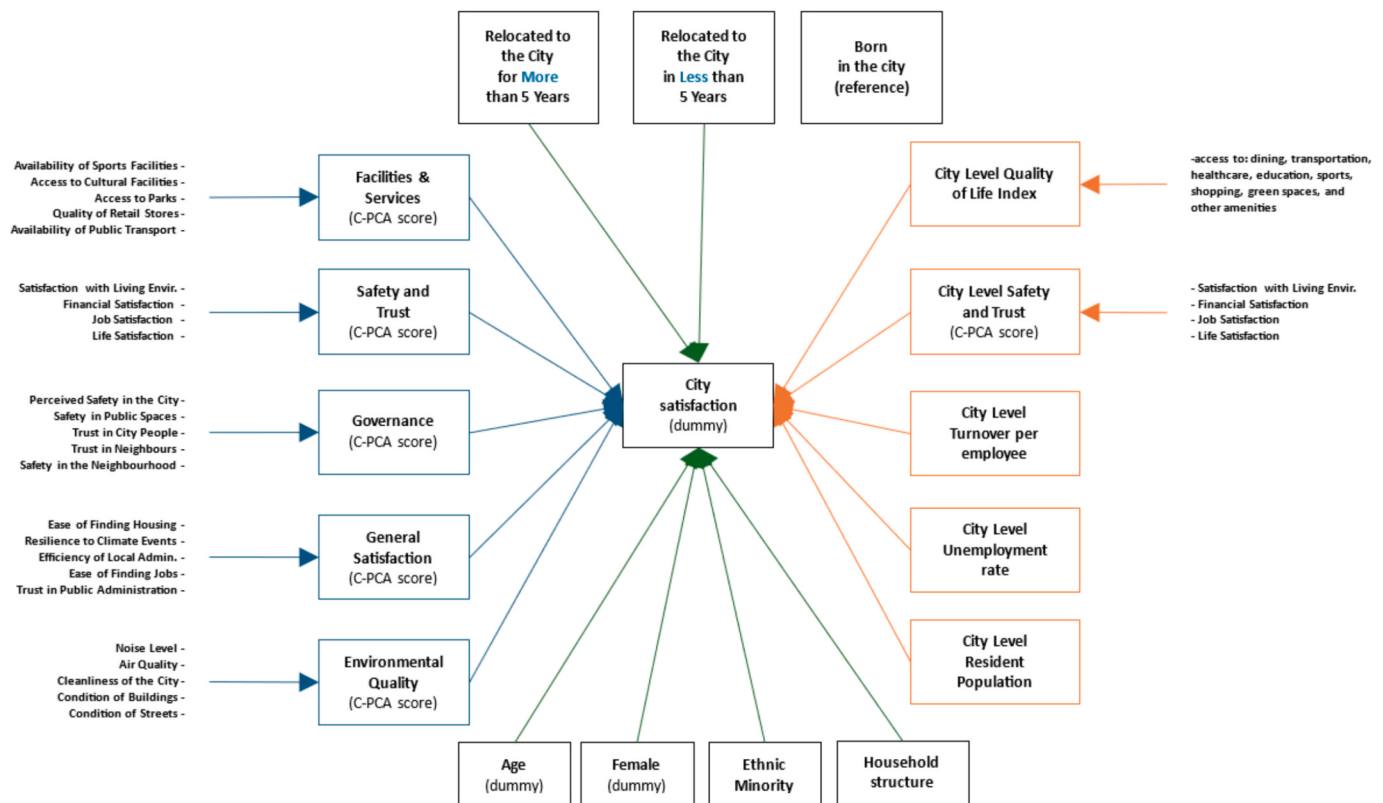


Fig. 3. Constructs and variables organised by type and hierarchical levels for estimating city satisfaction in Romanian cities.

predictors introduced in Model 3.

Satisfaction with urban life is influenced by a range of individual-level predictors. Facilities and services positively affect satisfaction, though coefficients decrease from 0.337*** in the pooled model to 0.225*** in the final model, suggesting that city contexts temper evaluations of services. Environmental quality maintains a positive role, with coefficients ranging from 0.181*** to 0.234*** across models. The emphasis on air, noise, and cleanliness becomes evident. Governance, initially insignificant, gains relevance in hierarchical models, reaching 0.132***. Trust in local administration, shaped by broader urban context, appears to matter more when factors are controlled. Safety and trust, when added as predictors, enhance satisfaction ($\beta = 0.108^{**}$). People who feel secure and trust others report positive urban experiences. General satisfaction, capturing aspects such as housing, financial stability, employment, and quality, remains a dominant predictor, with coefficients spanning from 0.701*** in the pooled model to 0.717–0.750*** in hierarchical models. The inclusion of Safety and Trust moderates its effect, indicating that perceptions of safety interact with general well-being.

Among control variables, age contributes positively to satisfaction (β between 0.064 and 0.085), and women report higher satisfaction than men (β between 0.140 and 0.145**). Longer residency correlates positively with satisfaction, as those living in the city for over five years report higher coefficients (β ranging from 0.164** to 0.423***). The attachment formed through residency, reflected in greater familiarity and ties, could explain this effect.

Household composition reveals significant differences, with extended family setups showing higher satisfaction than single-parent households. Coefficients peak at 0.430*** in the pooled model and range between 0.264 and 0.279 in hierarchical models. The impact of social ties, particularly within networks, emerges as a potential explanation for this pattern.

At the city level, population exerts a strong effect on satisfaction, growing from 0.470*** in the second model to 0.775*** in the final

model. Larger cities, offering a diversity of services and opportunities, appear more appealing. Economic indicators, on the other hand, have limited effects. Turnover per employee shows a minor, non-significant impact ($\beta \approx 0.047$ –0.063), and unemployment coefficients hover around zero. City-level Safety and Trust averages do not shape satisfaction, reinforcing the dominance of individual, localised perceptions over aggregated measures.

The role of QOLI emerges as paradoxical. Though devised to measure access to crucial urban amenities, healthcare, green spaces, public transport, it reveals instead a negative association ($\beta = -0.396^{*}$). Even when adjusting for population, the chasm between objective availability and subjective fulfilment remains pronounced. Such a paradox questions the assumption that infrastructure alone directly nourishes well-being. Were infrastructure an independent force, higher QOLI values would naturally correspond with greater satisfaction. Yet findings show infrastructure's significance depends upon broader conditions. We evoke this interconnection as the truss of social space, a structure where urban amenities gain meaning only through institutional trust, feelings of security, and rhythms of governance. Where confidence in municipal authorities falters, even richest infrastructural landscapes fail to foster contentment. Urban well-being thus emerges not merely from provision, but from strength and steadiness of social bonds that hold experience together.

The regression results reinforce this paradox. Despite high levels of infrastructure, satisfaction varies substantially. The significance of Safety & Trust ($\beta = 0.108$) and Governance ($\beta = 0.132^{***}$), even as QOLI remains weak or negative, suggests that residents do not experience infrastructure as a stand-alone asset but as part of institutional mediation. Rather than viewing infrastructure as a neutral provision, results point the way urban services become functional through institutional filters regulating access, reliability, and perception. Where governance is trusted, infrastructure is seen as effective; where trust is lacking, even well-developed services fail to produce satisfaction.

The models show notable improvements in fit as contextual variables

Table 3
Logistic regression analysis: estimates for the city satisfaction.

Factors	1. Pooled LR	2. HLR _{City}	3. HLR _{City} with Safety & Trust	4. HLR _{City} with QOLI, Safety & Trust
Individual level factors				
Facilities and services	0.337*** (0.031)	0.285*** (0.030)	0.222*** (0.036)	0.225*** (0.036)
Environmental quality	0.234*** (0.030)	0.176*** (0.033)	0.182*** (0.033)	0.181*** (0.033)
Governance	−0.004 (0.027)	0.131*** (0.031)	0.131*** (0.031)	0.132*** (0.031)
General satisfaction	0.701*** (0.032)	0.750*** (0.034)	0.718*** (0.035)	0.717*** (0.035)
Safety and trust			0.111** (0.038)	0.108** (0.038)
Individual level control				
Age	0.085*** (0.024)	0.067* (0.027)	0.064* (0.027)	0.064* (0.027)
Female (dummy)	0.140** (0.048)	0.140** (0.051)	0.143** (0.051)	0.145** (0.051)
Ethnic minority (dummy)	−0.056 (0.117)	−0.080 (0.146)	−0.087 (0.146)	−0.083 (0.145)
Years living in the city (reference: born in city)				
Lived in city > 5 years	0.423*** (0.056)	0.167** (0.062)	0.166** (0.062)	0.164** (0.062)
Moved to city < 5 years	−0.021 (0.108)	−0.150 (0.127)	−0.157 (0.127)	−0.157 (0.127)
Household composition (reference: single parent household)				
Single person	0.133 (0.114)	0.044 (0.126)	0.044 (0.126)	0.053 (0.126)
Couple no children	0.006 (0.104)	−0.019 (0.115)	−0.025 (0.116)	−0.012 (0.115)
Couple with children	0.166 (0.106)	0.024 (0.117)	0.021 (0.118)	0.037 (0.117)
Extended family	0.430*** (0.125)	0.276* (0.140)	0.264 (0.140)	0.279* (0.140)
City level factors				
Resident population		0.470*** (0.128)	0.501*** (0.127)	0.775*** (0.165)
Turnover per employee		0.049 (0.112)	0.063 (0.112)	0.047 (0.106)
Unemployment		−0.001 (0.121)	−0.032 (0.121)	−0.021 (0.114)
Safety & Trust (city level)			0.196 (0.277)	0.021 (0.272)
Quality of Life Index				−0.396* (0.164)
Intercept	1.391*** (0.104)	1.662*** (0.152)	1.657*** (0.152)	1.568*** (0.150)
Random effects: σ_{city}		0.634*** (0.401)	0.624*** (0.389)	0.581*** (0.338)
Random effects: ic_{city}		11 %	11 %	9 %
Level				
Sample size: n_{city}	41	41	41	41
Sample size: $n_{observations}$	13,380	13,380	13,380	13,380
Fit metrics				
R^2 Nagelkerke/conditional	0.180	0.350	0.355	0.354
R^2 McFadden/marginal	0.121	0.270	0.279	0.288
RMSE	0.373	0.359	0.359	0.359
Residual deviance	11,326	9883	9874	9868
Log-likelihood	−5846	−4942	−4937	−4934
AIC	11,724	9919	9914	9910
BIC	11,844	10,054	10,064	10,068
LR test vs. Null model (χ^2)	1982***	2390***	2399***	2405***

The models are weighted based on resident population *** $p < 0.001$, ** $p < 0.010$, * $p < 0.050$.

are introduced. Conditional R^2 rises from 0.180 in pooled model to 0.354–0.355 in hierarchical ones, while McFadden's R^2 improves from 0.121 to values between 0.270 and 0.288. Residual deviance decreases, with pooled model recording 11,326 compared to 9868 in final model. The likelihood ratio test confirms significant improvements, with χ^2 increasing from 1982*** to 2405***. The intraclass correlation coefficient (ICC) reveals that 9–11 % of variance originates from city-level differences, although individual variables play a dominant role.

Safety and Trust stand out as primary drivers of satisfaction at the individual level. Supporting factors, such as availability of facilities, environmental quality, and satisfaction, consistently contribute positively. However, the negative coefficient associated with QOLI shows that availability of services does not automatically translate into perceived satisfaction. The population size of a city influences satisfaction, but other economic indicators show little relevance.

To verify that our findings are not dependent on the dichotomisation of the dependent variable or on the use of a hierarchical specification, we re-estimated the models using pooled OLS, binary logit, and ordered logit with city-clustered standard errors. The results, reported in [Appendix A \(Table A1\)](#), confirm that coefficients remain consistent in sign and significance, with the ordered logit providing the strongest fit. However, the hierarchical specification remains preferable, as it accounts for the non-trivial share of variance attributable to city-level differences (ICC between 9 and 11 %), which clustered SE cannot capture. As a further sensitivity test, Model 4 was estimated with a hierarchical multinomial logistic regression ([Appendix B, Table B1](#)). The results are substantively unchanged, indicating that the integration of C-PCA components with hierarchical models yields stable estimates across alternative specifications.

3.4. Robustness check: the large city effect

To examine robustness of findings and assess role large cities play in shaping satisfaction, we re-estimated Model 4 (Hierarchical LR_{City}) under three scenarios. The first scenario considered full sample of cities. The second excluded capital city, Bucharest, while the third removed cities with populations exceeding 300,000, that is Bucharest, Cluj-Napoca, Iași, and Timișoara. [Table 4](#) summarises logistic regression coefficients under three robustness scenarios and reports the corresponding model fit metrics, showing changes in AIC, BIC, and RMSE as major cities are progressively excluded.

Because QOLI relies on volunteered geographic information from OpenStreetMap, which tends to be more complete in large or affluent urban areas ([Bright et al., 2018](#)), this exercise also addresses potential ‘glitch epistemologies’ when computational indicators reflect uneven digital traces ([Leszczynski & Elwood, 2022](#)). In this way, the check evaluates whether predictors of satisfaction are shaped by socioeconomic dynamics and population pressures specific to large cities.

Across models, QOLI consistently displays a negative and significant relationship with city satisfaction. The coefficient, while remaining significant, diminishes in magnitude from $\beta = -0.396^*$ in full sample to $\beta = -0.277^*$ when larger cities are excluded. A Wald test for coefficient equality across scenarios does not reject equality ($p > 0.10$). The disconnect between service availability and satisfaction is not limited to large urban centres. Rather, it appears as a widespread phenomenon across cities. Still, the reduced magnitude suggests large cities amplify dissatisfaction, possibly due to congestion, lengthy commutes, and disparities in service distribution. The persistence of negative QOLI coefficient across models underscores a policy implication: improving service availability alone does not ensure increased satisfaction. Even in cities with access to healthcare, transport, and green spaces, perceptions of unequal access, overcrowding, or inefficiencies remain sources of dissatisfaction.

Among variables that show increasing coefficients across models, Safety and Trust exhibits an upward trend as larger cities are excluded, despite no significant changes in Wald test results. This resilience

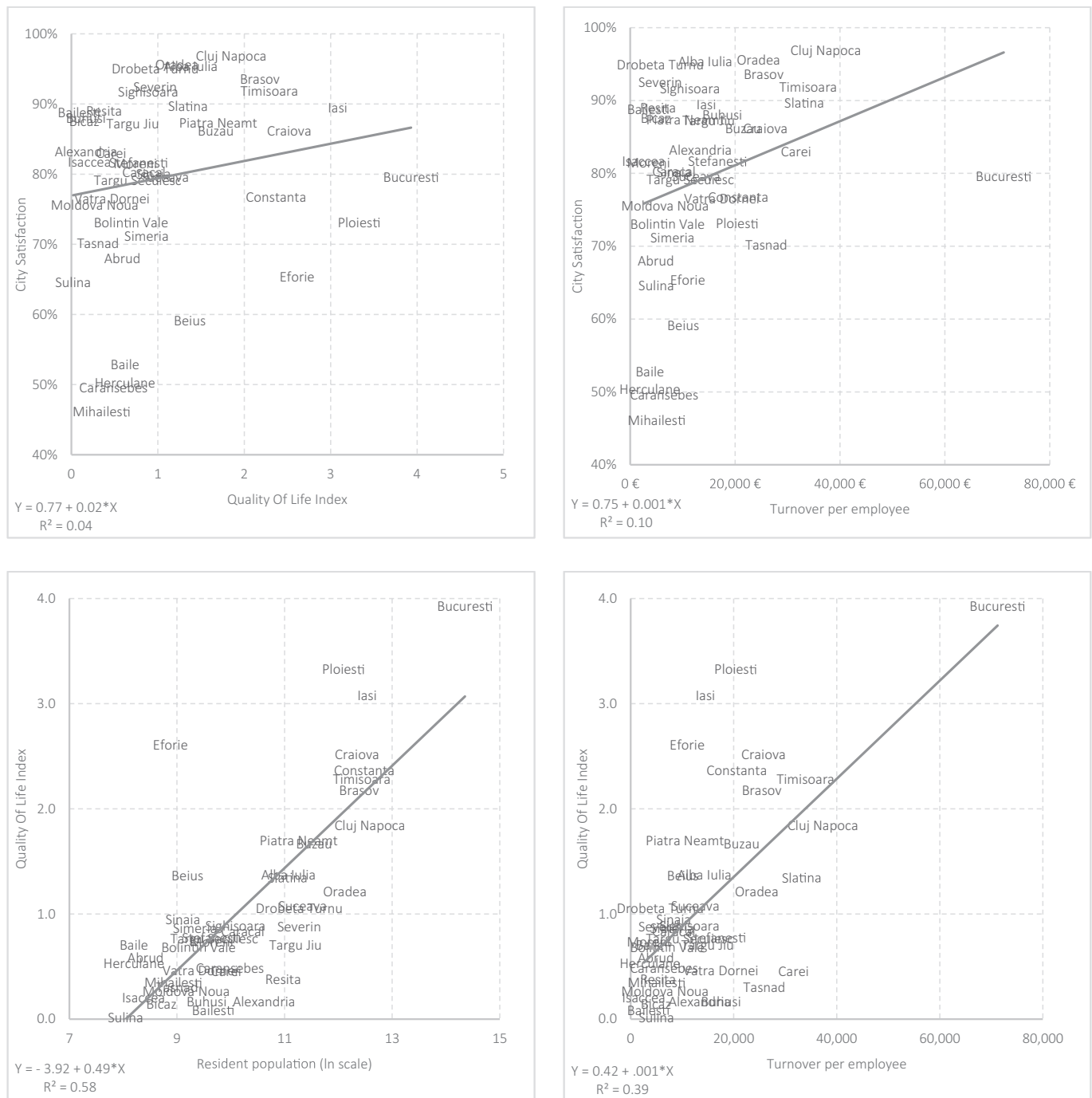


Fig. 4. Relationship between city satisfaction, quality of life index, resident population, and turnover per employee across selected Romanian cities.

demonstrates the role of social capital in boosting satisfaction, particularly in smaller cities where trust and community ties may be stronger. Extended family households also display a stronger effect when larger cities are excluded, with coefficient increasing from $\beta = 0.279^*$ in full sample to $\beta = 0.386$. The embeddedness provided by extended families appears more beneficial in smaller cities, where formal support systems may be limited and family networks often play a role. Conversely, household types such as single individuals and couples without children show limited or insignificant effects on satisfaction ($\beta = 0.053$ and $\beta = -0.012$, respectively). This suggests that embeddedness within larger structures, rather than household size, drives satisfaction gains.

The relationship between General Satisfaction and Facilities and Services exhibits a marginal decline across robustness models, though

Wald test confirms these differences are not statistically significant. This pattern hints at perceived reduction in amenities, services, and opportunities as city size decreases. Population size maintains a stable association with satisfaction across models, though a slight increase in coefficient when large cities are excluded suggests residents of smaller cities may value size differently. The enhanced satisfaction in larger cities could reflect access to opportunities and services. Governance's stability across models points to its role in ensuring effective administration and service delivery, which are integral to fostering confidence and satisfaction.

Perceptions of urban satisfaction are shaped not only by conditions but by how environments are experienced, evoking feelings of stability, security, or alienation. Such insights resonate with the broader idea that

Table 4
Logistic regression analysis: estimates for the city satisfaction.

Factors	All cities	Excluding capital city	Excluding larger cities (above > 300 T)
Individual level factors			
Facilities and services	0.225*** (0.036)	0.222*** (0.038)	0.202*** (0.037)
Environmental quality	0.181*** (0.033)	0.186*** (0.034)	0.157*** (0.034)
Governance	0.132*** (0.031)	0.138*** (0.037)	0.116*** (0.033)
Safety and Trust	0.108** (0.038)	0.122*** (0.033)	0.136*** (0.038)
General satisfaction	0.717*** (0.035)	0.701*** (0.036)	0.682*** (0.038)
Individual level control			
Age	0.064* (0.027)	0.079** (0.027)	0.077** (0.028)
Female (dummy)	0.145** (0.051)	0.140** (0.053)	0.105* (0.054)
Ethnic minority (dummy)	−0.083 (0.145)	−0.115 (0.146)	−0.109 (0.150)
Years living in the city (reference: born in city)			
Lived in city > 5 years	0.164** (0.062)	0.148* (0.064)	0.206** (0.066)
Moved to city < 5 years	−0.157 (0.127)	−0.186 (0.132)	−0.184 (0.134)
Household composition (reference: single parent household)			
Single person	0.053 (0.126)	0.067 (0.129)	0.076 (0.132)
Couple no children	−0.012 (0.115)	0.009 (0.118)	0.032 (0.121)
Couple with children	0.037 (0.117)	0.060 (0.120)	0.078 (0.123)
Extended family	0.279* (0.140)	0.327* (0.145)	0.386** (0.148)
City level factors			
Resident population	0.775*** (0.165)	0.782*** (0.162)	0.794*** (0.170)
Turnover per employee	0.047 (0.106)	0.057 (0.101)	0.045 (0.105)
Unemployment	−0.021 (0.114)	−0.035 (0.118)	0.043 (0.118)
Safety & Trust (city level)	0.021 (0.272)	−0.329 (0.255)	−0.116 (0.267)
Quality of Life Index	−0.396* (0.164)	−0.285* (0.137)	−0.277* (0.141)
Intercept	1.568*** (0.150)	1.639*** (0.149)	1.593*** (0.156)
Random effects: σ_{city}	0.581*** (0.338)	0.556*** (0.309)	0.574*** (0.329)
Random effects: ICC _{City Level}	9.3 %	8.6 %	9.1 %
Sample size: N _{city}	41	40	37
Sample size: N _{observations}	13,380	12,881	11,378
Fit metrics			
R ² conditional	0.354	0.349	0.327
R ² marginal	0.288	0.288	0.260
RMSE	0.359	0.359	0.372
Residual deviance	9868	9446	8908
Log-Likelihood	−4934	−4723	−4454
AIC	9910	9488	8950
BIC	10,068	9645	9104
LR test vs. null model (χ^2)	2405***	2331***	2054***

The Pooled LR is weighted based on resident population. *** $p < 0.001$, ** $p < 0.010$, * $p < 0.050$.

infrastructure exceeds its functional essence, echoing profoundly within the rhythms of urban life, reverberations of the built world. The spatial distribution of amenities, arrangement of streetscapes, and continuity of green spaces contribute to well-being in ways beyond access and size of the city.

Model fit improves as major cities are excluded, evidenced by

reduction in AIC from 9910 to 8950. BIC moves in the same direction; RMSE rises slightly after exclusions, which indicates higher unexplained variance in smaller-city subsamples. This improvement suggests removing complexity of large urban centres simplifies overall variability in satisfaction. However, R^2 values remain stable across models, indicating core predictors retain explanatory relevance regardless of sample composition. Excluding major cities does, however, result in a slight increase in RMSE, reflecting introduction of unexplained variance. This variance points to contradictory effect of large cities, which contribute to both infrastructure and service provision as well as variability in subjective well-being.

4. Discussion

4.1. Main results

Our analysis of city satisfaction in 41 Romanian cities provide insights into subjective factors of quality of life (Facilities & services, Safety, Governance) and on objective indicators (QOLI, infrastructure) at the urban level, but also on their relationships and weights. Our first contribution is to bridge subjective (Safety & Trust, Governance, Environmental Quality, General Satisfaction) and objective (QOLI) dimensions within a single empirical design, validating a five-dimension structure via C-PCA and then testing its predictive power on city satisfaction. This approach allows bridging the subjective-objective gap in urban quality research in the literature on the satisfaction with life in urban agglomerations (Alfaro-Navarro et al., 2024; McKay et al., 2024). While previous studies focused on either amenities or well-being, this study integrates both perspectives to explain satisfaction in a more general way. Our second contribution is to document, after adjusting for city context (population, unemployment, turnover per employee) and using hierarchical models justified by ICC $\approx$ 9–11 %, a robust and counterintuitive association: QOLI is weakly or negatively related to city satisfaction, whereas Safety & Trust and Governance remain positive and significant (Table 3).

Regarding the individual level and subjective factors, from the analysis of the Romanian Urban Barometer 2020 questionnaire, it is clear that Facilities & Services play an essential role, for example with access to retail stores or parks, that feelings of Safety and Trust with neighbours or in public spaces are considered important, as well as Governance dimensions such as efficiency and reliability of local administration, while sentiment of quality of the Environment is also important, especially in terms of noise or air quality. In our estimates, General Satisfaction is the strongest individual predictor, followed by Facilities & Services and Environmental Quality; Safety & Trust and Governance remain significant even when entered jointly with these factors (see coefficients in Table 3). Turning to the spatialized quality of life index, we find a paradox: a weak correlation is observed between the latter and satisfaction of inhabitants of Romanian cities, which suggests that satisfaction felt by inhabitants (even their Safety & Trust perceptions) may be far from objective measures in the QOLI index, and in particular amenities found in a cell of 1 km². In a way, a better infrastructure offer does not necessarily imply higher satisfaction (Dempsey et al., 2011; Gonzalez-Torres & Lizana, 2024). Relative to prior work emphasizing provision effects (e.g., Kyttä et al., 2013; Mouratidis & Poortinga, 2020), our contribution is to show that provision alone is insufficient once institutional and safety perceptions are accounted for, thereby specifying a mechanism—*institutional mediation*—rather than a simple availability–satisfaction linkage.

This paradox matters, for at least two reasons. First, it questions perception of inhabitants of urban agglomerations and their relationship to infrastructure, which is often considered essential to happiness (Murgante et al., 2024). After all, cities are first and foremost considered the place where maximum amenities at service of human beings are concentrated, which explains both success and their endurable existence, especially in terms of positive (Węziak-Białowska, 2016).

Moreover, the paradox that we highlight here questions the most advanced policies in terms of infrastructure or metabolism. Those policies advocate provision, in the largest cities, of all infrastructures necessary for daily life within a perimeter of a few hundred meters, or at least at walkable distance (Silva et al., 2025). These include urban approaches and 15-minute city policies (Murgante et al., 2024), which are based on the idea that well-being of a group of city dwellers is based on ability to travel quickly and without a vehicle to all places that contribute to daily existence, with exception of workplace (De Vos et al., 2021). However, it is precisely this possibility that we test with our spatialized QOLI indicator. Our results nuance these policy narratives: even where the spatial offer appears dense (high QOLI), satisfaction depends on whether residents *trust* institutions to deliver access fairly and reliably and *feel safe* using the offer. This aligns with literature on perceived vs. objective accessibility gaps and extends it to a post-socialist context.

The evidence indicates that analysis of well-being must go beyond infrastructure availability, and has also to rely on other factors, more related to economic, social and psychological characteristics of populations. In particular, our results show that certain factors can be important and play a role in perception that residents have of a liveable city. The first is size of cities, which clearly plays a decisive role, as level of infrastructure and quality tends to increase with surface area or number of inhabitants, as shown by strong correlation between QOLI and resident population size (Mouratidis & Yiannakou, 2021). Yet, unlike studies that equate larger size with higher well-being, our multilevel results indicate that population size is positive while QOLI can remain negative, suggesting congestion/expectation channels rather than pure scale benefits (consistent with our robustness checks excluding very large cities).

Beyond material provision, residents' satisfaction is shaped by horizons of expectation they associate with urban life. A mismatch between urban environments and expectations can generate frustration, particularly when improvements are unevenly distributed or fail to meet symbolic expectations tied to upward mobility and modernity. We interpret this as an *expectation-governance* mechanism: high provision raises aspirations, but if governance and safety perceptions lag, dissonance depresses satisfaction. This specifies how our findings connect to subjective well-being literature on adaptation and aspiration gaps. This anticipatory dimension suggests that well-being is not merely a reflection of conditions but also a response to perceived trajectory of a city's development.

The second, again, concerns the important role played by Safety & Trust variable (see important scores achieved in pooled and hierarchical models in Table 3). It can be assumed that some of major components of this variable, such as trust in neighbours (see Table 1), play an important role here (Gonzalez-Torres & Lizana, 2024). Thus, beyond an individual feeling of quality of life, the latter is also, and perhaps above all, result of an individual's insertion into a community of people, and into a neighbourhood network, which provides a sense of security and well-being for local dwellers. Our contribution vis-à-vis this literature is to show that Safety & Trust matters more at the individual and inter-individual level than as a city-level aggregate (Table 3), indicating that localised experiences—not city means—drive satisfaction.

These results encourage us to insist on two dimensions of satisfaction with life in the city: the volume and quality of infrastructure (objective quality), and the network of local actors and neighbourhoods (subjective quality). For us, these are key characteristics of understanding levels of well-being and quality of life in urban context today (Kytä et al., 2013; Mouratidis et al., 2024).

4.2. The question of infrastructure

The number or quality of infrastructure is often associated in literature or policies with a level of perceived quality. This relationship is understandable because it marks one of the characteristics of urban

fabric: the geographical accumulation of infrastructures, a key trope of Lefebvre's (1992) analytical approach. In addition, it is also one of the symbols of the distinction between urban and rural areas. The latter are generally characterised by the weakest presence of infrastructure, particularly public infrastructure (roads, hospitals, maternity wards, post offices) and long distances required to reach them, often giving rise to feelings of discontent described as the geography of discontent, with an increase in the extreme vote for these territories (Bourdin & Torre, 2025). This situation is supposed to contrast with that of urban agglomerations, in which services are much more readily available nearby, the level of satisfaction of the population due to geographical proximity often making it possible to keep extreme votes away. However, it must be noted that in our sample of cities results are different, and that availability of infrastructure does not guarantee importance of the level of satisfaction of urban populations. The COVID-19 period made clear that the mere availability of infrastructure was not sufficient to ensure satisfaction, since perceptions of safety, trust in institutions, and equitable access became decisive in the perceptions of well-being and the efforts to stay safe (Torre, 2025).

One of the explanations put forward for this counterintuitive result is related to quality and accessibility of urban services. The quality of these services can be questioned: an administration may be deficient (which refers to quality of governance, and especially Efficiency of Local Administration and Trust in Public Administration in our data) or transport infrastructure proved inadequate, some services may be accessible above all to wealthiest or unemployed people (Vallée et al., 2011; van Wee & Ettema, 2016). Another explanation lies in systemic nature of urban infrastructure: multiplication of infrastructures and volume of populations can lead to congestion effects and difficult neighbourhoods due to crowding effects. It can even become difficult and dangerous to live in city because of promiscuity it causes, as COVID-19 period has shown (De Vos et al., 2021; Ferencuhová et al., 2025; Torre, 2025). It is important to recall that our data were collected in mid-2020, during the height of the COVID-19 pandemic, a context that likely amplified concerns about healthcare, mobility, and governance. Consistent with this, our large-city robustness shows the negative QOLI effect attenuates when excluding the largest cities, suggesting congestion/expectation pressures as plausible channels rather than measurement artefacts.

One explanation for this result is that functionality of urban services depends not merely on existence, but on how deeply they resonate within social and institutional harmonies. The quality of governance – reflected in rhythm of administrative efficiency and currents of trust in public institutions – profoundly shapes whether residents perceive infrastructure as accessible and reliable. Even the richest network of transport or municipal amenities can appear inadequate when trust falters, or when access feels unjustly distributed. This relation forms what we evoke as truss of social space, a structure woven from interdependencies linking infrastructure, institutional stability, and confidence. Rather than regarding urban infrastructure as an isolated driver of well-being, satisfaction emerges through governance's mediation and embedding services within texture of everyday social life. Moreover, systemic nature of amenities itself can stir discontent, densely layered infrastructure might intensify congestion, foster inefficiencies, or nourish perceptions that services benefit selected groups rather than community as whole (Bourdin & Torre, 2025). Our contribution is to empirically separate these channels within one model family and to show that the *sign* of the provision effect depends on the concurrent levels of Safety & Trust and Governance—an interaction that future work can test explicitly.

Infrastructure constitutes an active backdrop to urban life; its presence, form, and accessibility shape how residents experience the environment. Institutional trust and governance affect how infrastructure is used (as captured in truss of social space), while the material form of built environment resonates with urban life, shaping encounters, rhythms, and perceptions of place (reverberation of built world).

Addressing urban dissatisfaction requires more than expansion of infrastructure – it demands attention to how spatial configurations interact with affective and symbolic dimensions of life. In terms of policy implication, infrastructure investment should be paired with governance reforms that raise perceived fairness, reliability, and safety; otherwise, increases in provision may not translate into higher satisfaction. These results also argue in favor of concerted territorial governance policies that are more focused on taking into account the expectations of local populations, who often put forward dimensions of well-being before the systematic installation of new infrastructure.

4.3. Networks of local actors and neighbourhood

This study highlights the role played by subjective dimensions of well-being, and in particular dimension of neighbourhood or family networks or quality of institutions. It can be seen that neighbourhood relations (Xu et al., 2024) re considered fundamental by respondents, especially for safety and trust characteristics that they imply at level of their environment. In particular, it appears that when these variables are introduced as predictors, they clearly improve general level of satisfaction (Table 3), which shows their importance and expectations they arouse in representations of city dwellers (Dogan & Lee, 2024; Mouratidis & Poortinga, 2020). Crucially, our multilevel results indicate that these effects operate primarily at the (inter)individual level (micro-embeddedness) rather than through city-level averages, aligning with collective efficacy research while specifying scale.

Moreover, importance of these local networks and especially their family or friendship nature is manifested in difference in satisfaction between people who have lived in a city for more or less than 5 years (Ferenčuhová et al., 2025). The former clearly show greater sense of well-being, linked to fact that they are better integrated into local social fabric and find support in terms of neighbourhoods. This feeling can also be positively linked to age, which makes it possible to build and solidify networks. In the same vein, extended families have higher degree of satisfaction than single-parent households, which again reveals importance of social component in perception of well-being or quality of life. This dimension can also be linked to population size, which clearly indicates positive effect on satisfaction. Here, opportunities for meetings and contacts have influence on residents' perception of quality of life. Our contribution here is to show that residency length and extended-family or friendship structures proxy for embeddedness that amplifies Safety & Trust effects, complementing infrastructure provision in explaining satisfaction.

The role of social embeddedness in shaping satisfaction also relates to way residents interpret their place within evolving urban fabric. The tension between image of city and realities of life is mediated through social networks, where expectations about infrastructural development, governance, and community life take shape. When urban transformations fail to align with expectations, they not only influence well-being but also affect collective trust and neighbourhood cohesion, reinforcing warp of anticipation as a structuring force in experience.

The perception of safety and availability of social infrastructure is a critical component in explaining variation in quality of life across neighbourhoods. For instance, presence of strong community-led infrastructure is seen as crucial factor in disadvantaged areas, helping to build trust and resilience among residents (Makkonen & Inkinen, 2024). This aligns with findings that indicate high levels of satisfaction are often tied not just to physical environment but to collective efficacy within neighbourhoods (Mouratidis et al., 2024).

5. Conclusion

The aim of this article was to contribute to objective and subjective analyses of well-being of urban populations, based on a sample of 41

Romanian cities. The results, obtained on basis of a principled component analysis based on survey data from Urban Barometer, and city level bivariate analysis taking into account level of facilities and services within a narrow geographical area, showed paradoxical realities. In particular, there are no clear correlations between level of facilities and services and quality of well-being or quality of life perceived by populations. Thus, high level of infrastructure does not necessarily guarantee high level of satisfaction for populations. On the other hand, dimensions of governance and relationships within neighbourhood and family networks are essential to good perception of quality of life of populations.

These results, although limited to case of Romania's cities, raise questions about policies for development or planning. Indeed, they question idea that provision of infrastructure and services naturally contributes to increase in well-being of populations, and that geographical proximity to services represents essential guarantee of well-being. On the other hand, they reaffirm crucial role played by institutions in terms of governance and quality of public services, but even more importantly insist on importance of quality of neighbourhood and family networks, as well as safety and trust they provide to people living in urban areas, thus increasing level of well-being. Thus, the importance of the subjective dimensions of quality of life (safety, trust, social inclusion) is absolutely central to urban development strategies and must be carefully considered by public decision-makers in their governance policies. However, as the data were collected in mid-2020, during the COVID-19 pandemic, some of the strong effects we observe for health-care, mobility, and governance may reflect the heightened salience of these issues in a period of crisis. In this study, we bridge strands of literature, debates on the paradoxical relationship between subjective and objective quality of life, research on governance and institutional trust shaping urban experiences, and critical perspectives on infrastructure as a social construct. Through these lens, we capture tensions between material provision, territorial governance structures, and urban expectations, condensing them in three syntagms: the truss of social space, the reverberation of the built world, and the warp of anticipation, to glimpse why cities with high-quality infrastructure may still generate dissatisfaction, and why urban well-being is contingent upon institutional mediation and social imaginaries.

CRedit authorship contribution statement

Norbert Petrovici: Writing – review & editing, Writing – original draft, Visualization, Software, Methodology, Formal analysis, Data curation, Conceptualization. **Sébastien Bourdin:** Writing – review & editing, Writing – original draft, Validation, Supervision, Formal analysis, Conceptualization. **André Torre:** Writing – review & editing, Writing – original draft, Validation, Supervision, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Robustness checks with pooled estimators

Table A1 reports four alternative pooled models estimated with city-clustered standard errors. These robustness checks compare specifications that treat the dependent variable as either binary, continuous, or ordinal, and assess whether results remain consistent once hierarchical effects are ignored. The binary OLS model (OLS-BIN, CR2) follows the standard dichotomous coding of city satisfaction. The OLS specification with a four-point Likert scale (OLS-LIKERT, CR2) uses all the data from the original survey. The binary logit (LOGIT, CR2) provides a more appropriate fit for the binary outcome, while the proportional-odds ordered logit (PO-LOGIT, HC1) retains the ordinal structure of the dependent variable.

Because the dataset includes 41 clusters, we applied small-sample corrections (Zeileis et al., 2020). For the linear and binary logit models we used CR2 adjustments, which produce more reliable inference under limited cluster counts. For the ordered logit, where CR2 is not yet available (Christensen, 2019), we relied on the conventional HC1 correction (Zeileis et al., 2020). All specifications are weighted by resident population.

The comparison shows clear differences in fit. OLS-BIN achieves modest explanatory power ($R^2 = 0.131$), while OLS-LIKERT produces inflated R^2 values (0.791) because the ordinal outcome is treated as continuous. The binary logit improves on OLS-BIN with higher pseudo- R^2 (0.224) and lower deviance, but the proportional-odds ordered logit performs best, with McFadden $R^2 = 0.713$, Nagelkerke $R^2 = 0.896$ similar in magnitude to the OLS fit, yet with much lower AIC/BIC (8524/8688). These results confirm that retaining the ordinal structure yields the strongest fit.

Coefficient patterns are broadly consistent across models. General satisfaction is strongly positive throughout, underscoring its central role in shaping perceptions of city life. Governance displays sensitivity to specification: it is positive in OLS-BIN, null in binary logit, and negative when the dependent variable is treated as ordinal (OLS-LIKERT, PO-LOGIT). Environmental quality is significant in the logit models but not in OLS. Safety and trust appear marginal in pooled linear and binary models but becomes clearly negative and significant in PO-LOGIT, indicating that dissatisfaction with safety systematically lowers city satisfaction when the ordinal outcome is preserved. Control variables show expected signs but weaker robustness, with age and long-term residence occasionally significant, while gender and minority status do not display consistent effects.

At the city level, population size shows specification-dependent effects: positive in OLS-BIN and logit, negative in OLS-LIKERT and ordered logit. Turnover per employee and unemployment remain insignificant across all models, and aggregated safety/trust at city level does not reach significance. The Quality of Life Index (QOLI) is negative in OLS-BIN and logit, weakly positive in OLS-LIKERT, and null in PO-LOGIT, reinforcing the paradox identified in the main text: infrastructure provision does not automatically translate into satisfaction.

The **Appendix A** results show that pooled ordered logit yields the strongest statistical fit. Yet, the hierarchical specification in the main text remains the most appropriate, because it both respects the ordinal outcome and captures the non-trivial share of variance attributable to city-level differences (ICC of 9–11 %). The hierarchical model's fit indices (especially reduction in AIC and improved pseudo- R^2 relative to pooled logit) show that it captures structure that pooled models miss. This justifies the choice made in the main text: to rely on hierarchical logistic regression as the theoretically and empirically grounded specification, with the appendix robustness checks demonstrating that the main findings do not hinge on modelling assumptions.

Table A1

Robustness checks of city satisfaction models with city-clustered standard errors.

Factors	OLS-BIN, CR2	OLS-LIKERT, CR2	LOGIT, CR2	PO-LOGIT, HC1
Individual level factors				
Facilities and services	0.024* (0.012)	−0.003 (0.016)	0.223** (0.076)	−0.115 (0.084)
Environmental quality	0.017 (0.011)	−0.004 (0.006)	0.217* (0.111)	0.130** (0.061)
Governance	0.025** (0.011)	−0.076*** (0.014)	0.121 (0.082)	−0.835*** (0.089)
Safety and Trust	0.014* (0.008)	0.004 (0.011)	0.093 (0.065)	−0.415*** (0.065)
General satisfaction	0.076*** (0.012)	0.771*** (0.019)	0.655*** (0.096)	6.777*** (0.315)
Individual level controls				
Age	0.014** (0.005)	0.001 (0.006)	0.100*** (0.036)	0.050 (0.043)
Female (dummy)	0.017* (0.009)	−0.012 (0.009)	0.140* (0.074)	−0.068 (0.073)
Ethnic minority (dummy)	−0.004 (0.028)	0.026 (0.019)	−0.034 (0.192)	0.224 (0.162)
Years living in the city (ref: born in city)				
Lived in city > 5 years	0.025* (0.013)	0.010 (0.010)	0.244** (0.104)	0.169* (0.089)
Moved to city < 5 years	−0.022 (0.017)	0.039 (0.023)	−0.195 (0.124)	0.230 (0.161)
Household composition (ref: single parent)				
Single person	0.021 (0.023)	−0.007 (0.026)	0.127 (0.154)	0.112 (0.207)
Couple no children	0.002 (0.025)	−0.003 (0.021)	0.019 (0.165)	0.204 (0.167)
Couple with children	0.032 (0.022)	0.005 (0.023)	0.210 (0.137)	0.135 (0.184)
Extended family	0.052* (0.028)	−0.012 (0.030)	0.389* (0.198)	0.059 (0.234)
City level factors				
Resident population	0.094*** (0.024)	−0.038** (0.017)	0.709*** (0.193)	−0.211* (0.121)
Turnover per employee	0.014 (0.016)	0.000 (0.017)	0.075 (0.107)	−0.102 (0.107)
Unemployment	0.003 (0.022)	−0.016 (0.022)	0.000 (0.121)	−0.182 (0.121)
Safety & Trust (city level)	−0.040 (0.040)	−0.028 (0.025)	−0.257 (0.274)	−0.213 (0.162)
Quality of Life Index	−0.037** (0.015)	0.021* (0.011)	−0.260* (0.126)	0.003 (0.081)
Intercept	0.758*** (0.026)	3.035*** (0.025)	1.418*** (0.191)	1 2 = −9.482 2 3 = −4.731 3 4 = 3.194
Fit metrics				
R^2	0.131	0.791	—	—
Adjusted R^2	0.13	0.791	—	—
RMSE	0.371	0.374	—	—
McFadden R^2	0.117	0.586	0.154	0.713
Cox–Snell R^2	0.131	0.791	0.141	0.808
Nagelkerke R^2	0.187	0.85	0.224	0.896
AIC	13,696.07	14,163.21	13,696.07	8524.03
BIC	13,852.80	14,319.78	13,852.80	8688.05

Note: All regressions are weighted based on resident population. Standard errors clustered at the city level. *** $p < 0.001$, ** $p < 0.010$, * $p < 0.050$.

Appendix B. Robustness checks with hierarchical multinomial logistic estimators

As an additional sensitivity check, we estimated Model 4 using a hierarchical multinomial specification of city satisfaction. Results are consistent with those in the main text (Table 3). The C-PCA components of general satisfaction, governance, and safety and trust retain strong positive effects. For example, the odds ratio for respondents who ‘strongly agree’ with general satisfaction is 4.776 ($p < 0.001$), while job ease reaches 4.009 ($p < 0.001$). Environmental perceptions remain relevant, with air quality significant at 1.811 ($p < 0.001$), while street condition is associated with lower satisfaction ($OR = 0.636$, $p < 0.001$). At the city level, population size continues to be positive ($OR = 2.243$, $p < 0.001$), and QOLI is again negative ($OR = 0.774$, $p = 0.051$). Turnover and unemployment remain weak and insignificant. Model fit values are close to those of the binary hierarchical logistic specification: conditional R^2 is 0.353, marginal R^2 is 0.299, ICC is 0.077, and the LR test against the null model is highly significant ($\chi^2(75) = 1864.2$, $p < 0.001$). These results indicate that the substantive conclusions are not dependent on the use of C-PCA scores in a hierarchical logistic specification, since the hierarchical multinomial framework produces comparable effects.

Table B1
Hierarchical multinomial logistic regression of city satisfaction.

Factor (ref. = strongly disagree)	Categories	Coef. (SE)	OR	Sig.
Individual level factors				
Sports facilities	2. rather disagree	−0.172 (0.090)	0.842	.
	3. somewhat agree	−0.075 (0.097)	0.928	
	4. strongly agree	−0.296 (0.124)	0.744	*
Cultural facilities	2. rather disagree	−0.049 (0.092)	0.952	
	3. somewhat agree	−0.085 (0.098)	0.918	
	4. strongly agree	−0.184 (0.124)	0.832	
Parks	2. rather disagree	−0.113 (0.102)	0.893	
	3. somewhat agree	0.022 (0.109)	1.022	
	4. strongly agree	0.150 (0.128)	1.162	
Retail stores	2. rather disagree	0.014 (0.120)	1.014	
	3. somewhat agree	0.161 (0.119)	1.175	
	4. strongly agree	0.314 (0.130)	1.369	*
Public transport	2. rather disagree	−0.053 (0.077)	0.948	
	3. somewhat agree	0.154 (0.083)	1.167	.
	4. strongly agree	0.178 (0.110)	1.195	
Public spaces	2. rather disagree	0.245 (0.103)	1.277	*
	3. somewhat agree	0.360 (0.108)	1.433	***
	4. strongly agree	0.236 (0.128)	1.267	.
Schools	2. rather disagree	0.118 (0.106)	1.125	
	3. somewhat agree	0.193 (0.107)	1.212	.
	4. strongly agree	0.232 (0.126)	1.261	.
Health services	2. rather disagree	0.134 (0.079)	1.143	.
	3. somewhat agree	0.381 (0.085)	1.464	***
	4. strongly agree	0.327 (0.122)	1.387	**
Housing ease	2. rather disagree	−0.075 (0.082)	0.928	
	3. somewhat agree	−0.027 (0.087)	0.973	
	4. strongly agree	−0.047 (0.108)	0.955	
Climate resilience	2. rather disagree	−0.083 (0.083)	0.921	
	3. somewhat agree	0.096 (0.091)	1.101	
	4. strongly agree	0.043 (0.113)	1.043	
Admin efficiency	2. rather disagree	0.161 (0.089)	1.174	.
	3. somewhat agree	0.415 (0.095)	1.514	***
	4. strongly agree	0.397 (0.122)	1.488	**
Job ease	2. rather disagree	0.887 (0.075)	2.429	***
	3. somewhat agree	0.278 (0.079)	1.32	***
	4. strongly agree	1.388 (0.122)	4.009	***
Trust public admin	2. rather disagree	0.134 (0.089)	1.144	
	3. somewhat agree	0.357 (0.093)	1.429	***
	4. strongly agree	0.428 (0.115)	1.534	***
Noise level	2. rather disagree	0.139 (0.099)	1.149	
	3. somewhat agree	0.315 (0.105)	1.370	**
	4. strongly agree	0.160 (0.129)	1.174	
Air quality	2. rather disagree	0.158 (0.099)	1.171	
	3. somewhat agree	0.512 (0.106)	1.669	***
	4. strongly agree	0.594 (0.126)	1.811	***
Cleanliness	2. rather disagree	0.014 (0.088)	1.014	
	3. somewhat agree	−0.024 (0.095)	0.976	
	4. strongly agree	0.174 (0.124)	1.19	
Building condition	2. rather disagree	−0.000 (0.096)	1.000	
	3. somewhat agree	0.099 (0.103)	1.104	
	4. strongly agree	−0.223 (0.132)	0.800	.
Street condition	2. rather disagree	−0.292 (0.087)	0.746	***
	3. somewhat agree	−0.309 (0.097)	0.735	**
	4. strongly agree	−0.453 (0.124)	0.636	***
Individual-level controls				
Age (std.)		0.163 (0.027)	1.177	***
Female		0.127 (0.051)	1.135	*
Place satisfaction	2. rather disagree	0.480 (0.118)	1.616	***
	3. somewhat agree	1.248 (0.115)	3.485	***

(continued on next page)

Table B1 (continued)

Factor (ref. = strongly disagree)	Categories	Coef. (SE)	OR	Sig.
Financial satisfaction	4. strongly agree	1.564 (0.128)	4.776	***
	2. rather disagree	−0.143 (0.100)	0.867	
	3. somewhat agree	0.121 (0.100)	1.129	
	4. strongly agree	−0.253 (0.117)	0.776	
City-Level factors				
City admin efficiency		−1.400 (1.126)	0.247	***
City trust public admin		1.882 (1.175)	6.560	
Resident population		0.808 (0.157)	2.243	
Turnover per employee (cap)		0.104 (0.100)	1.11	
Unemployment		0.043 (0.107)	1.044	
QOLI (std.)		−0.256 (0.131)	0.774	.
Intercept				
Random effects				
σ _{city}		0.524		
ICC _{city}		0.077		
Sample size				
N _{city}		41		
N _{observations}		12,881		
Fit measures				
R ² conditional		0.353		
R ² marginal		0.299		
RMSE		0.352		
Residual deviance		12,811		
Log-Likelihood		−5097.30		
AIC		10,334		
BIC		10,857		
LR test vs. null model (χ ²)		1864.2 (df = 75)***		

Data availability

Data will be made available on request.

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