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What matters where: multi-scalar citizen satisfaction in Brussels via cross-group multicriteria satisfaction analysis

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Abstract

Understanding how citizen satisfaction varies within a fragmented metropolis requires more than a single pooled index. This paper develops a transferable cross-group MUlticriteria Satisfaction Analysis (MUSA) framework that fits comparable preference-disaggregation models for municipalities and socio-geographically grouped municipalities, enabling like-for-like comparison of importance and satisfaction on common scales. Its novelty lies in making such comparisons methodologically consistent and substantively interpretable across territorial units, with a policy contribution that is primarily diagnostic and comparative rather than prescriptive. Using an original trilingual survey in the Brussels-Capital Region, we fit pooled, municipality-level, and municipality-group models across four dimensions: mobility and infrastructure, health and education, culture and community, and public safety and order. The pooled model indicates moderate overall satisfaction. Health and education emerges as the most influential and best-performing dimension, whereas public safety and order combines high importance with the weakest satisfaction. Municipality-level models reveal substantial spatial dispersion, but because single-municipality samples are uneven, municipality-group models provide the main comparative lens. At that level, the results show distinct priority structures: some groups exhibit one dominant high-importance, low-performance lever, whereas others require broader multicriteria improvement. The framework, therefore, helps identify priority domains within territorial units and benchmark municipalities and municipality groups on a common analytical basis, while making sample imbalance and model uncertainty explicit.

Keywords: citizen satisfaction; Brussels-Capital Region; urban governance; MUlticriteria Satisfaction Analysis (MUSA); multiple criteria decision aiding; public policy

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1. Introduction

Citizen satisfaction surveys are increasingly used alongside administrative indicators to assess how residents experience urban services and local quality of life (Narbón-Perpiñá and De Witte, 2018). Their value is especially high in fragmented metropolitan settings, where municipalities operate under a shared regional framework but offer different service environments, governance conditions, and everyday constraints. In such settings, a single pooled satisfaction score can obscure the within-city heterogeneity that policymakers need to diagnose. Brussels is a demanding case in this respect: its 19 municipalities are tightly connected within one metropolitan region, yet they differ sharply in sociodemographic composition, built environment, and administrative context.

The challenge is not only empirical but also methodological. Satisfaction is multidimensional, ordinal, and context dependent. Similar overall satisfaction scores may arise from different importance–performance configurations, and a municipality may perform well on one domain while underperforming on another. A useful analytical framework must therefore do more than summarize average satisfaction. It must preserve the structure of multiple criteria, support consistent comparison across territorial units, and yield outputs that can inform local policy priorities without overstating the precision of subgroup-level inference.

We adopt the MUlticriteria Satisfaction Analysis (MUSA) method, originally developed by Grigoroudis and Siskos (2002), because it is well-suited to ordinal satisfaction data and yields interpretable outputs: global and partial satisfaction indices, importance weights, and action-oriented diagrams. The paper's methodological contribution lies in how these models are compared and interpreted across territorial units. Specifically, we develop a cross-group MUlticriteria Satisfaction Analysis (MUSA) framework that fits parallel models for municipalities and socio-geographically grouped municipalities under a shared questionnaire, criteria tree, ordinal treatment, normalization, and post-optimality settings. This design addresses a gap in prior MUSA applications, which have generally focused on one pooled population, one service, or one institution at a time. The novelty of the present study does not lie simply in applying MUSA to Brussels or in scaling the method to many territorial units. Rather, it lies in combining cross-group comparison logic with an interpretation protocol tailored to uneven local samples and diagnostic policy use. The paper makes three contributions. First, it formalizes a like-for-like comparison design for disaggregated MUSA analysis in which all territorial segments are fit under the same analytical specification. Second, it introduces an interpretation protocol that combines municipality-level detail with municipality-group models and stability diagnostics, which is important when single-municipality estimates are more fragile. Third, it provides a Brussels application whose policy value is diagnostic and comparative rather than causal or fully prescriptive: the framework is used to identify which dimensions underperform, where priorities differ, and when the evidence supports targeted intervention versus broader multi-criteria improvement.

The remainder of the paper is structured as follows. Section 2 positions the study in the literature and clarifies the gap relative to prior MUSA applications. Section 3 presents the data, modeling framework, grouping logic, and interpretation protocol. Section 4 reports pooled, municipality-level, and municipality-group findings. Section 5 synthesizes the analytical implications and policy use of the results, and Section 6 concludes with contributions, limitations, and directions for future research.

2. Background, gaps, and positioning

Citizen satisfaction complements objective performance measures because it captures how residents experience services, places, and institutions in everyday life. The literature has long noted that subjective assessments should not replace objective indicators, but can reveal aspects of service quality, expectations, and lived conditions that administrative outputs miss (Parks et al., 1981; Whitaker, 1980; Bouckaert and Van de Walle, 2003). For fragmented metropolitan governance, the key issue is not only whether average satisfaction differs across municipalities but also whether those differences reflect a common evaluative structure or distinct importance–performance patterns across localities (Ma et al., 2020; Kitchin and Moore-Cherry, 2021).

Brussels provides a demanding setting for this problem. The Brussels-Capital Region is politically and administratively fragmented, yet its municipalities are tightly interconnected in daily mobility, housing, employment, and service use. At the same time, socio-spatial segregation remains pronounced, and municipal conditions vary even within the same regional framework (Haandrikman et al., 2023; Verdonck et al., 2011). These features make direct municipality-by-municipality comparison analytically nontrivial: satisfaction may differ across municipalities, but the structure of satisfaction may also differ in ways that complicate simple ranking.

Multiple criteria decision aiding methods are useful in this context because they preserve the multidimensional structure of evaluation while keeping trade-offs explicit (Jelokhani-Niaraki et al., 2019; Nalmpantis et al., 2019; Chae et al., 2021; Huang et al., 2025). Within that family, MUSA is particularly suitable for the present study because it learns monotone value functions and criterion weights directly from ordinal survey responses (Grigoroudis and Siskos, 2002). It therefore matches the analytical requirements of the Brussels case: the survey covers multiple policy domains, the response scales are ordinal, and the outputs must remain interpretable for territorial diagnosis rather than collapse into a single aggregate barometer.

MUSA has been applied in a range of domains (Tsafarakis et al., 2018; Vieira et al., 2023; Kyriakidis and Tsafarakis, 2025), and public-service applications show that it can recover an interpretable importance– performance structure, including criterion weights, satisfaction indices, and action or improvement diagrams (Manolitzas and Yannacopoulos, 2013; Corrente et al., 2023; Karasmanaki et al., 2023). However, these studies also reveal important limitations for fragmented urban applications. Manolitzas and Yannacopoulos (2013) analyze a web survey on Citizens' Service Centers through a pooled model for respondents in Athens, but do not examine whether satisfaction structures differ systematically across groups or regions. Corrente et al. (2023) extend MUSA to urban environmental management, yet their application is based on a small, site-specific student sample, which the authors themselves acknowledge as limited in scale and in need of replication on a larger population. Karasmanaki et al. (2023) use a much larger nationwide sample, but still analyze one pooled population within a single policy environment; moreover, respondents are treated as potential rather than actual investors, and the authors note that the results may be sensitive to later changes in the energy context. Taken together, this literature demonstrates the diagnostic usefulness of MUSA, but leaves three issues insufficiently addressed for fragmented urban settings:

1. Cross-group comparability is rarely treated as an explicit design requirement. Fitting separate models for different groups does not, by itself, justify direct comparison. For instance,

Manolitzas and Yannacopoulos (2013) applied MUSA to evaluate public services in Greece and collected sociodemographic information, but the analysis itself was conducted on the pooled sample rather than through a comparative multi-group design. Meaningful comparability also requires alignment in the questionnaire, criteria tree, ordinal treatment, normalization, and interpretation rules.

2. Prior studies often give limited attention to sample heterogeneity, scale effects, and uneven subgroup sizes. In territorial applications, small or imbalanced subsamples may yield unstable weights or extreme satisfaction values that are diagnostically interesting but fragile for comparison. In Huang et al. (2024), respondents were grouped into urban and suburban citizens only when subgroup sizes were sufficiently large. In settings with smaller or more uneven territorial subsamples, it is therefore more appropriate to treat model stability itself as part of the analytical framework rather than as a secondary concern.
3. Action and improvement diagrams in MUSA are best interpreted as diagnostic decision-aid tools (Grigoroudis and Siskos, 2002): they help identify strong and weak points and prioritize improvement efforts, while model stability, uncertainty, and the limits of subgroup-level analysis should also be taken into account.

These gaps motivate the design adopted here. The analytical value lies in the comparison protocol itself: a common survey and shared modeling specification are used to make pooled, municipality-level, and municipality-group results interpretable on the same basis, while stability diagnostics guide how strongly each level should be read. The Brussels application, therefore, extends prior MUSA practice from a single-population diagnostic tool toward a transferable framework for comparable urban benchmarking.

3. Methodology and data

As illustrated in Fig. 1, the MUSA approach decomposes the global satisfaction of each participant, also called the decision maker (DM), into partial satisfactions over a set of criteria (and, when applicable, subcriteria). The left panel summarizes the data input: each DM (assume that there are M DMs) provides ordinal judgments for global satisfaction (y^j) and for each criterion g_i (assume that there are n criteria $G = \{g_1, \ldots, g_n\}$) (x_i^j). The right panel depicts preference learning: a linear-programming model estimates monotone value functions for the global and partial satisfactions together with nonnegative criterion weights, such that the additive aggregation $Y^* \approx \sum_i b_i X_i^*$ best fits the observed ordinal information. This two-stage view clarifies roles: respondents only supply simple ratings, while the optimization recovers normalized satisfaction values at each level, criterion (and subcriterion) weights, and diagnostics used to build action and improvement diagrams. In short, MUSA offers a transparent, reproducible mapping from citizens' ordinal feedback to a structured picture of what drives overall satisfaction and where improvements matter most.

Formally, the global and partial satisfaction functions satisfy:

$$\begin{cases} Y^* = \sum_{i=1}^{n} b_i X_i^* \\ \sum_{i=1}^{n} b_i = 1 \end{cases}. \tag{1}$$

Here, b_i is the weight of criterion i. The functions Y^*, X_i^* are normalized to [0,100], with $y^{*1} = x_i^{*1} = 0$ and $y^{*\alpha} = x_i^{*\alpha_i} = 100$ for all i, matching the ordered satisfaction levels $1, \ldots, \alpha, \alpha_i$. We assume monotonicity (strictly increasing scales); hence, the following preferences hold:

$$\begin{aligned} y^{*m} < y^{*m+1} &\Leftrightarrow y^{*m} \prec y^{*m+1}, \quad m = 1, \ldots, \alpha - 1, \\ x_i^{*k} < x_i^{*k+1} &\Leftrightarrow x_i^{*k} \prec x_i^{*k+1}, \quad k = 1, \ldots, \alpha_i - 1, \end{aligned} \tag{2}$$

where $\prec$ denotes "strictly less preferred." To construct piecewise stepwise value functions, we introduce marginal increments between adjacent satisfaction levels, enforce strictly increasing scales via small positive thresholds γ:

$$\begin{aligned} z'_m &= y^{*m+1} - y^{*m} \geq \gamma, \quad m = 1, \ldots, \alpha - 1, \\ w'_{ik} &= x_i^{*k+1} - x_i^{*k} \geq \gamma_i, \quad k = 1, \ldots, \alpha_i - 1. \end{aligned} \tag{3}$$

With M participants, the resulting linear programming (LP) reads

$$\text{Minimize} \quad F = \sum_{j=1}^{M} (\sigma_j^+ + \sigma_j^-)$$

s.t.

$$\begin{aligned} &\sum_{i=1}^{n} \sum_{k=1}^{t_{ji}-1} w'_{ik} - \sum_{m=1}^{t_j-1} z'_m - \sigma_j^+ + \sigma_j^- = \gamma \cdot (t_j - 1) - \sum_{i=1}^{n} \gamma_i \cdot (t_{ji} - 1), \forall\, j = 1, 2, \ldots, M, \\ &\sum_{m=1}^{\alpha-1} z'_m = 100 - \gamma \cdot (\alpha - 1), \\ &\sum_{i=1}^{n} \sum_{k=1}^{\alpha_i-1} w'_{ik} = 100 - \sum_{i=1}^{n} \gamma_i \cdot (\alpha_i - 1), \\ &z'_m, w'_{ik}, \sigma_j^+, \sigma_j^- \geq 0, \quad \forall m, k, j, i. \end{aligned} \tag{4}$$

Here, $\sigma_j^{\pm}$ and $\sigma_{ji}^{\pm}$ capture, respectively, the over/underestimation errors at the global and criterion aggregation levels for participant j. Relative to the original MUSA formulation, we adopt a strict additivity at the criterion level. The LP seeks value functions that minimize the total deviation from the ordinal information across all respondents. Following the optimal solution, MUSA performs a post-optimality (near-optimal) analysis: an ε-optimal polyhedron around the optimum F^* is explored, and the resulting solutions are averaged to obtain the final satisfaction functions and weights (Grigoroudis and Siskos, 2002). MUSA can produce a rich set of diagnostics than we report here. In this study, however, we confine attention to two decision-oriented outputs: satisfaction and importance:

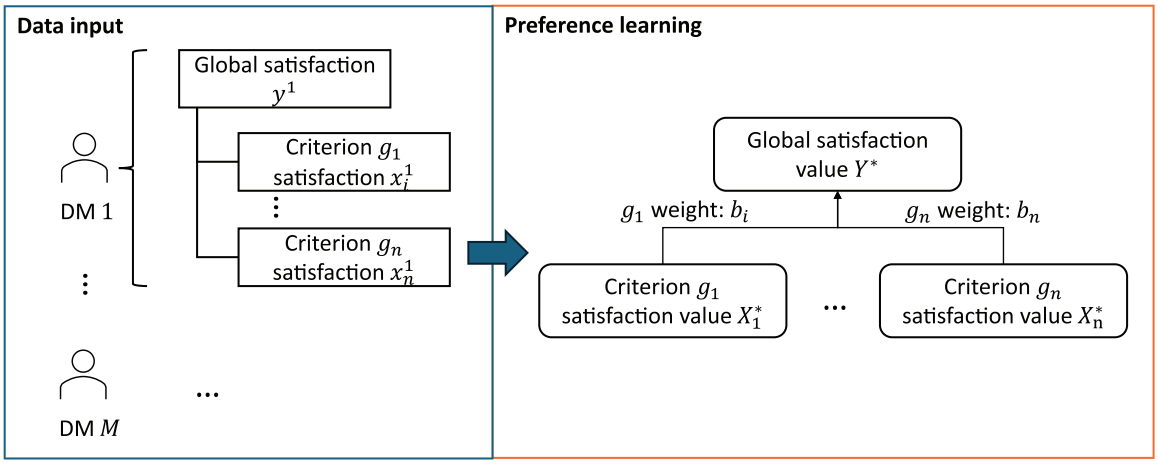


Fig. 1. Conceptual structure of the MUSA model. Left: data input from DMs, who provide ordinal ratings for global and criterion satisfactions. Right: preference learning via a linear program that estimates monotone value functions for partial satisfactions (X_i^*) and global satisfaction (Y^*), as well as criterion weights b_i. The outputs are normalized satisfaction values and importance weights that support subsequent action and improvement analysis.

- *Global satisfaction index S*: an overall score (on a 0–1 or 0–100% scale) representing the collective satisfaction level of respondents.
- *Criteria weights* b_i: the relative importance of each satisfaction dimension (criterion) in explaining the global satisfaction.
- *Criteria satisfaction indices* S_i for each criterion and subcriterion: these indices indicate the achieved satisfaction level in each specific area (also on a 0–1 scale, where higher values mean higher satisfaction).
- *Action diagrams*: graphical representations plotting criteria on a two-dimensional plane to facilitate the interpretation of results. The action diagram positions each criterion according to its relative importance (weight) and its performance (satisfaction level). This resembles an importance–performance analysis: it highlights which criteria are strong points (high satisfaction, high importance), "low priority" (low importance, various satisfaction), or critical "action areas" (high importance but low satisfaction).

3.1. Survey design and data collection

We fielded a trilingual online survey (French, Dutch, and English) in late 2024–early 2025 across the 19 municipalities of the Brussels-Capital Region. Respondents evaluated their municipality on a structured set of subcriteria $g_{i,j}$ grouped under four broader criteria g_i (mobility an infrastructure, health & education, culture & community, public safety & order), as mapped in Table 1. Following the MUSA paradigm, all item responses are treated as ordinal judgments: items use five-point satisfaction scales (*extremely dissatisfied* → *extremely satisfied*), some use five-point agreement formulations (*definitely not* → *definitely yes*), and section-level items capture criterion-level satisfaction. Crucially, MUSA's preference-disaggregation estimates monotone value functions for each item,

Table 1
Survey criteria (g_i) and subcriteria ($g_{i,j}$) used in the Brussels study. All items were rated on a five-level Likert scale (1=*very dissatisfied*, 5=*very satisfied*)

Criterion	Subcriterion	Description
Mobility & infrastructure (g_1)	Housing price-quality ratio ($g_{1,1}$)	Perceived value for money of housing in the area.
	Road and building maintenance ($g_{1,2}$)	Condition of roads, sidewalks, and public buildings.
	Green spaces ($g_{1,3}$)	Availability and upkeep of parks and greenery.
	Cleanliness of public facilities ($g_{1,4}$)	Cleanliness of streets and public spaces; waste management.
	Public transport possibilities ($g_{1,5}$)	Availability, coverage, and reliability of public transport.
Health & education (g_2)	Public health services ($g_{2,1}$)	Quality and accessibility of clinics, hospitals, and preventive care.
	Cost of healthcare and social security ($g_{2,2}$)	Affordability and adequacy of healthcare and social support.
	Quality of schools ($g_{2,3}$)	Perceived quality of local primary and secondary education.
	Mental health guidance in schools ($g_{2,4}$)	Availability of counselling and mental-health support for students.
Culture & community (g_3)	Community involvement opportunities ($g_{3,1}$)	Events, participatory processes, and volunteering opportunities.
	Support for local businesses ($g_{3,2}$)	Initiatives supporting shops, markets, and start-ups.
	Sustainability initiatives ($g_{3,3}$)	Recycling, energy-efficiency, and other environmental programs.
	Diversity in entertainment initiatives ($g_{3,4}$)	Variety and inclusiveness of cultural and recreational offer.
Public safety & order (g_4)	Police and emergency response ($g_{4,1}$)	Perceived effectiveness and promptness of police, fire, and ambulance.
	Safety outside at night ($g_{4,2}$)	Perceived safety when walking alone at night.
	Initiatives against racism and discrimination ($g_{4,3}$)	Actions promoting tolerance and addressing discrimination.
	Traffic management in hazards/disasters ($g_{4,4}$)	Preparedness and management of traffic and public order in emergencies.
	Road distribution fairness ($g_{4,5}$)	Perceived equity of road/traffic distribution and congestion patterns.

so it can accommodate heterogeneous response formats and even different numbers of scale points across items without imposing cardinal comparability ex ante; the model internally rescales each ordinal scale when reconstructing global and partial satisfactions. This allows us to combine satisfaction and agreement wordings in a single analysis while preserving their ordinal meaning. Full question wording and response options are provided in Tables A1,A2 in the Appendix.

3.2. Cross-group MUSA framework: from territorial and sociodemographic segmentation to like-for-like comparison

Rather than fitting a single pooled MUSA model to all respondents, we operationalize a cross-group MUSA framework in three steps: segment the population into meaningful, policy-relevant

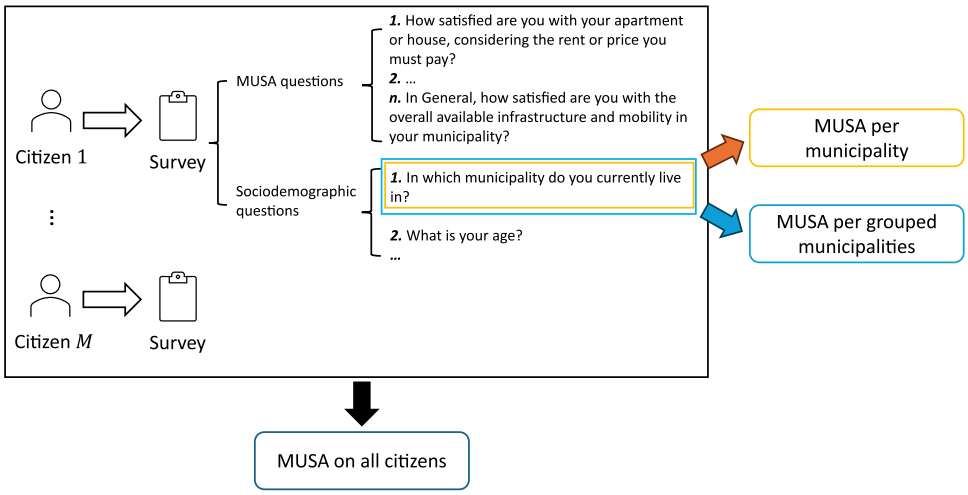


Fig. 2. Cross-group MUSA workflow. Each response is simultaneously analyzed in three tracks: per municipality (orange), per municipality group (light blue), and region-wide (deep blue). Identical specifications ensure like-for-like comparison of importance, performance, and improvement priorities.

groups; estimate the same MUSA specification within each segment; and compare the resulting importance, performance, and improvement leverage across segments on common scales.

Segments can be defined by territory (e.g., municipality of residence), sociodemographics (e.g., age, education, employment), or contextual clusters that combine geography and socioeconomics. In this study, we use two territorial lenses in parallel:

1. *Municipality models*: one MUSA per municipality (19 models), using the common criteria tree in Table 1.
2. *Municipality-group models*: nine socio-geographically homogeneous clusters of municipalities (defined below), each estimated with the same instrument and model settings.

Figure 2 sketches the workflow: a single, trilingual survey routes each record to its municipality model, its municipality-group model, and a region-wide benchmark model. The same criteria/subcriteria, ordinal treatment, normalization, handling of ties and missingness, and post-optimality diagnostics are used in all three tracks.

In addition to analyzing each municipality individually, we define nine clusters of municipalities and use them consistently throughout the analysis. This grouping both increases sample size per analytical unit and tests whether municipalities with similar socio-geographic characteristics exhibit similar satisfaction profiles. Figure 3 provides a spatial overview.

- *Group 1: Anderlecht + Molenbeek-Saint-Jean (Ander-Molen)*. Western-central municipalities with diverse, working-class populations and similar challenges regarding unemployment and security (Van Criekingen, 2011; Knieriem and Lagendijk, 2026).
- *Group 2: Auderghem + Etterbeek (Auder-Etter)*. Eastern municipalities with relatively higher income and education; Auderghem is suburban-residential, Etterbeek is more urban with EU institutions (Montgomery, 2023).

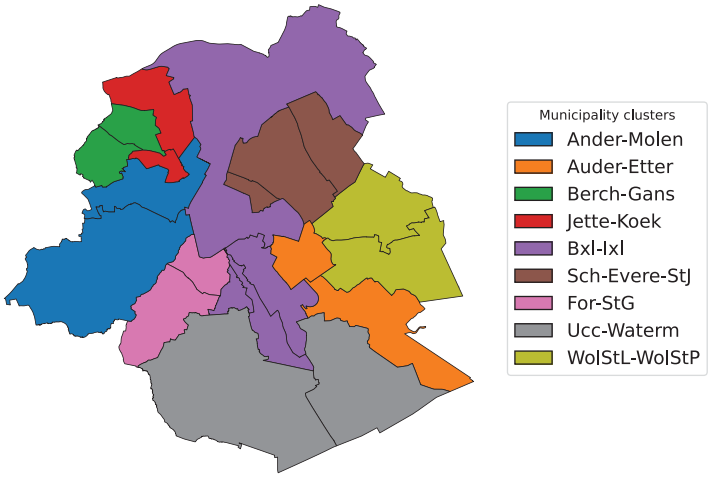


Fig. 3. Spatial distribution of the nine municipality clusters in the Brussels-Capital Region.

- *Group 3: Berchem-Sainte-Agathe + Ganshoren (Berch-Gans)*. Two small northwestern residential municipalities are often considered together due to size and similar profiles (quiet, lower density) (Costa and De Valk, 2021).
- *Group 4: Jette + Koekelberg (Jette-Koek)*. Adjacent in the northwest; Jette mixes residential and institutional functions (university hospital), Koekelberg is small and urban.
- *Group 5: Brussels City + Ixelles (Bxl-Ixl)*. Core urban area pairing central Brussels with dense, cosmopolitan Ixelles (European Quarter, universities); both face big-city issues (housing costs, congestion) and vibrant cultural scenes (Romańczyk, 2012).
- *Group 6: Schaerbeek + Evere + Saint-Josse-ten-Noode (Sch-Evere-StJ)*. Northeastern cluster: large and diverse Schaerbeek (Manço and Kanmaz, 2005), smaller residential Evere, and the dense, highly multicultural Saint-Josse; shared socio-economic challenges.
- *Group 7: Forest + Saint-Gilles (For-StG)*. Adjacent south-central municipalities; Saint-Gilles is diverse and gentrifying, Forest combines industrial legacy with green spaces (Nunez Basante, 2023).
- *Group 8: Uccle + Watermael-Boitsfort (Ucc-Waterm)*. Affluent south-eastern suburbs with high green space and reputations for quiet, high-quality living.
- *Group 9: Woluwe-Saint-Lambert + Woluwe-Saint-Pierre (WolStL-WolStP)*. Affluent eastern municipalities, often referred to collectively as "the Woluwes" (Commune of Woluwe-Saint-Pierre, 2025).

Every segment (municipality or municipality group) is estimated with the same criteria tree (Table 1) and the same MUSA settings, preserving the ordinal nature of item responses. Each model returns: global satisfaction, criterion and subcriterion satisfaction indices, criterion weights, and demanding/improvement indices. This setup allows direct answers to comparative questions, such as whether public safety & order is consistently high importance in the west-north arc (e.g., Anderlecht-Molenbeek, Schaerbeek-Evere-Saint-Josse) versus whether health & education and mobility trade places in affluent south-eastern municipalities (Uccle-Watermael, the Woluwes). In

short, the cross-group MUSA framework yields three complementary lenses: municipality models for highly local priorities, group models that pool similar municipalities to reveal robust spatial patterns, and a regional benchmark to situate local deviations–supporting targeted, place-sensitive policy rather than one-size-fits-all interventions.

3.3. Modeling choices, comparability, and robustness protocol

Cross-group comparison in this study rests on a shared analytical specification: all models are estimated from the same questionnaire, the same criteria tree, the same ordinal coding logic, the same normalization to [0,1], and the same post-optimality settings. This alignment does not remove all comparability concerns, but it substantially reduces the risk that differences in estimated weights or satisfaction scores are driven by changes in instrument design or estimation conventions rather than by differences recovered under a common specification.

The MUSA formulation used here also embodies several modeling choices that should be interpreted carefully. Monotonicity means that better evaluations on a criterion are not allowed to reduce overall satisfaction. This is appropriate for the present survey design and helps keep the estimated value functions interpretable, but it also excludes more complex patterns such as threshold effects or reversals. The additive structure plays a similar role. It provides a transparent decomposition of overall satisfaction into criterion-level contributions and is therefore well-suited to diagnostic analysis. However, it should be read as a tractable, primary representation rather than a complete behavioral account of how citizens combine multiple aspects of urban life. Likewise, each collective model summarizes the dominant latent pattern within the corresponding territorial unit; it does not imply that all respondents within that unit evaluate the city in the same way. Even under a shared specification, observed cross-group differences may still reflect response-style effects, sample composition, or unobserved contextual conditions in addition to substantive differences in lived experience.

We assess estimation stability using the average stability index (ASI), which summarizes how strongly the criterion weights vary across the H linear programs generated in the post-optimality analysis. Formally, average stability index (ASI) is computed as

$$\mathrm{ASI} = 1 - \frac{1}{n}\sum_{i=1}^{n} \frac{\sqrt{H\sum_{h=1}^{H}(b_i^h)^2 - \left(\sum_{h=1}^{H} b_i^h\right)^2}}{\frac{H}{n}\sqrt{n-1}}. \tag{5}$$

Intuitively, ASI measures the concentration of admissible solutions around the estimated weight structure. When the admissible solutions are tightly clustered, ASI approaches 1, indicating a more stable model. When they are widely dispersed, ASI decreases toward 0, indicating greater sensitivity to alternative admissible solutions. In the present study, ASI is used as a comparative stability diagnostic across the pooled, municipality-level, and municipality-group models.

Table 2
Analytical levels, sample sizes, and stability diagnostics

Analytical level	Units	N per unit	Median N	ASI range	Median ASI
Pooled region	1	722	722	0.631	0.631
Municipality	19	26–109	32	0.597–0.978	0.751
Municipality group	9	56–145	68	0.607–0.813	0.761

For interpretation, ASI indicates how much confidence should be placed in each analytical level: pooled results are used as a regional reference, municipality results as fine-grained warning signals, and municipality-group results as the main comparative lens.

This diagnostic is particularly relevant because the three analytical levels differ not only in territorial resolution but also in the heterogeneity they absorb. The pooled model combines all respondents into one regional structure, whereas the municipality and municipality-group models estimate satisfaction patterns for more territorially specific units. Table 2, therefore, reports, for each analytical level, the number of units, the sample-size distribution, and the corresponding ASI summary statistics.

Table 2 supports this interpretation. Although the pooled model uses the full sample, it has the lowest ASI, which is consistent with the fact that it blends responses from diverse territorial settings into a single regional structure. By contrast, both disaggregated levels show markedly higher stability. This suggests that territorial disaggregation recovers more coherent satisfaction structures than the pooled analysis alone. The municipality models reveal where patterns diverge across the 19 communes, while the municipality-group models summarize these contrasts into a smaller set of territorially meaningful profiles. Taken together, the two disaggregated levels provide a stronger basis for comparative diagnosis than the pooled model on its own.

The survey should also be interpreted as descriptive rather than population-representative. It was administered online, was self-selected, and was available in three languages, rather than being drawn from a probability sample. The respondent pool is therefore skewed toward younger adults and women (Table 5). Accordingly, we do not report sampling-based confidence intervals or causal interpretations. Instead, the results are used as structured evidence on the perceptions expressed by the responding sample and should ideally be read together with objective indicators and local administrative knowledge.

4. Results

The final analytic sample comprises $N=722$ valid responses. Municipality subsamples range from 26 to 109 respondents, with Brussels City providing the largest single-municipality sample, and the grouped models range from 56 to 145 respondents. Across the 19 municipalities, the average number of respondents per municipality is 38.0 (SD = 18.8), with a median of 32. Table 3 reports the distribution of respondents by municipality, and Table 4 summarizes the cross-municipality statistics. Table 5 confirms the sample skew already noted in Section 3, especially toward younger adults and women, which is one reason to interpret the results as descriptive rather than representative estimates of the Brussels population.

Table 3
Distribution of respondents by municipality (N=722)

Municipality	n	% of sample
Brussels City	109	15.1
Molenbeek-Saint-Jean	56	7.8
Schaerbeek	49	6.8
Anderlecht	39	5.4
Watermael-Boitsfort	39	5.4
Ixelles	36	5.0
Koekelberg	34	4.7
Jette	34	4.7
Saint-Gilles	33	4.6
Evere	32	4.4
Woluwe-Saint-Pierre	31	4.3
Saint-Josse-ten-Noode	31	4.3
Berchem-Sainte-Agathe	30	4.2
Etterbeek	30	4.2
Woluwe-Saint-Lambert	30	4.2
Uccle	29	4.0
Forest	28	3.9
Auderghem	26	3.6
Ganshoren	26	3.6
Total	722	100.0

Table 4
Respondents per municipality: summary across 19 municipalities

	Mean	SD	Min	Q1	Median	Q3	Max
n per municipality	38.0	18.8	26	30	32	37.5	109

4.1. Pooled and municipality-level MUSA results

To maximize discriminatory power among admissible solutions, we estimate the MUSA III variant for every segment (municipality and municipality group) (Grigoroudis and Siskos, 2002). MUSA III selects, within the post-optimal ε-optimal polyhedron, the solution that yields the most diverse (widest-spread) set of monotone value functions consistent with the ordinal evidence, thereby sharpening comparisons across criteria and segments.

As a region-wide point of reference, we first inspect the pooled MUSA. Table 6 reports the pooled MUSA III results focusing on weights and satisfaction only. Values are scaled to [0,1]. Criterion weights sum to 1; within each criterion g_i, subcriterion weights $\sum_i' b_{i,i'} = 1$. Exact item wordings and response options are listed in the Appendix A.

The pooled global satisfaction is $S = 0.639$ on the [0,1] scale. At the criterion level, health & education carries the largest weight ($b_{g_2} = 0.390$) and also attains the highest satisfaction ($S_{g_2} = 0.697$). Public safety & order is the second most salient criterion by weight ($b_{g_4} = 0.221$) but shows the lowest satisfaction ($S_{g_4} = 0.432$). Mobility & infrastructure and culture & community have lower weights ($b_{g_1} = 0.203$, $b_{g_3} = 0.186$), with satisfaction in the middle to lower part of the scale. These

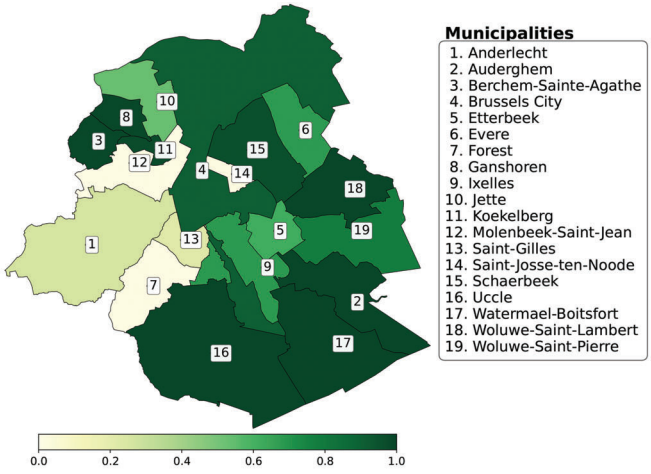
Table 5
Respondent demographics combined table (N=722)

Domain	Category	n	%
Age			
	18–24	357	49.4
	25–34	143	19.8
	35–44	49	6.8
	45–54	52	7.2
	55–64	63	8.7
	>65	52	7.2
	Prefer not to say	6	0.8
Gender			
	Female	454	62.9
	Male	261	36.1
	Prefer not to say	7	1.0
Highest education			
	Secondary school or lower	172	23.8
	College/Vocational training	86	11.9
	Bachelor's degree	235	32.5
	Postgraduate (Master/PhD)	152	21.1
	Prefer not to say	77	10.7
Employment status			
	Full-time	288	39.9
	Part-time	144	19.9
	Student	160	22.2
	Unemployed	52	7.2
	Retired	56	7.8
	Prefer not to say	22	3.0

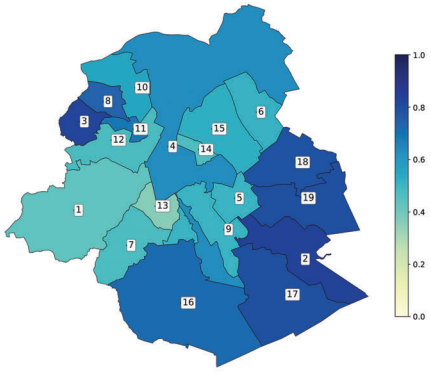
pooled results provide a benchmark, but by construction they average over heterogeneous local contexts.

The municipality models confirm that the pooled benchmark masks substantial dispersion. Global satisfaction spans almost the full [0,1] range, from 0.013 in Forest to 0.994 in Watermael-Boitsfort, with a median of 0.781 (Interquartile Range (IQR) [0.392, 0.987]). We present this range as evidence of heterogeneity rather than as definitive municipal ratings because municipality sample sizes and stability vary significantly. Still, a broad south-east versus west/north pattern is clear: high estimated satisfaction is concentrated in affluent and greener municipalities such as Watermael-Boitsfort, Uccle, and the Woluwes, whereas much lower values appear in Anderlecht, Molenbeek, Saint-Gilles, Saint-Josse, and Forest.

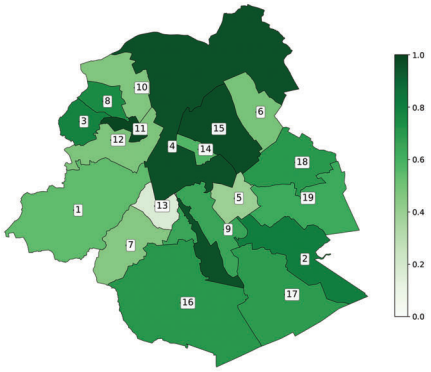
Figure 4 visualizes this geography across the overall index and the four main criteria. Mobility & infrastructure is strongest in the south-east and weaker in several western and central municipalities. Health & education is more even, but still dips in parts of the north-west and north-east. Culture & community is relatively stronger in the central, cosmopolitan core than in several peripheral western municipalities. Public safety & order is the most polarized criterion, with distinctly lower satisfaction in the west/north arc and substantially higher values in the affluent eastern and south-eastern municipalities.



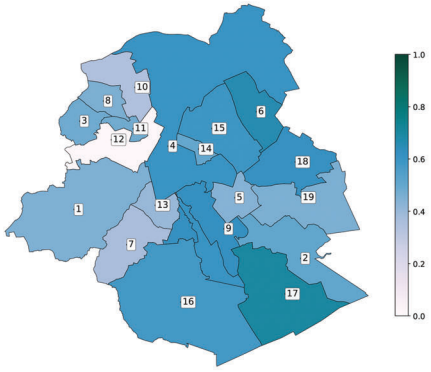
(a) Overall satisfaction (S).



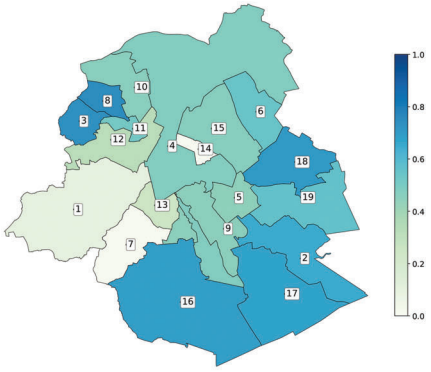
(b) g_1: Mobility & Infrastructure (S_1).



(c) g_2: Health & Education (S_2).



(d) g_3: Culture & Community (S_3).



(e) g_4: Public Safety & Order (S_4).

Fig. 4. Municipality-level satisfaction maps ($S \in [0, 1]$). Numbers on polygons index the 19 municipalities; the number-name legend appears on panel 4. Palettes are scaled so deeper greens/teals indicate higher satisfaction.

Table 6
Brussels (all respondents): subcriteria, criterion summaries, and overall satisfaction. Values on [0,1]

Code	Name ($g_{i,j}$)	Weight (b)	Satisfaction (S)
Mobility & infrastructure (g_1)		0.203	0.529
$g_{1,1}$	Housing price-quality ratio	0.204	0.597
$g_{1,2}$	Road & building maintenance	0.214	0.560
$g_{1,3}$	Green spaces	0.191	0.660
$g_{1,4}$	Cleanliness of public facilities	0.201	0.469
$g_{1,5}$	Public transport possibilities	0.191	0.659
Health & education (g_2)		0.390	0.697
$g_{2,1}$	Public health services	0.139	0.654
$g_{2,2}$	Cost of healthcare & social security	0.145	0.699
$g_{2,3}$	Quality of schools	0.565	0.782
$g_{2,4}$	Mental health guidance in schools	0.151	0.503
Culture & community (g_3)		0.186	0.450
$g_{3,1}$	Community involvement opportunities	0.247	0.559
$g_{3,2}$	Support for local businesses	0.235	0.426
$g_{3,3}$	Sustainability initiatives	0.249	0.456
$g_{3,4}$	Diversity in entertainment initiatives	0.269	0.582
Public safety & order (g_4)		0.221	0.432
$g_{4,1}$	Police & emergency response	0.188	0.608
$g_{4,2}$	Safety outside at night	0.220	0.487
$g_{4,3}$	Initiatives against racism & discrimination	0.186	0.607
$g_{4,4}$	Traffic mgmt. in hazards/disasters	0.220	0.475
$g_{4,5}$	Road distribution fairness	0.186	0.411
Overall (Global satisfaction)		—	0.639

Note: Subcriterion weights are within-criterion and sum to 1 for each g_i.

Subcriterion results illustrate why municipality findings should be read cautiously but not ignored. For example, Anderlecht assigns about 73% of its public safety & order weight to safety outside at night, with a satisfaction score close to 0.10. This is substantively informative as a local warning signal, yet it may also be amplified by sample size and model sensitivity in a single municipality. We therefore use municipality-level subcriterion extremes as exploratory cues and rely on the municipality-group comparison below for the stronger comparative interpretation.

4.2. Municipality-group comparison of satisfaction drivers

Overall and municipality-level results show that perceived place quality varies widely across Brussels, but the grouped models clarify *why* it varies. Because the nine municipality groups pool between 56 and 145 respondents and are estimated under identical settings, they provide a more comparable view of what matters locally (weights b) and how well those dimensions perform (satisfaction S). Figure 5 illustrates this contrast through the reconstructed value functions: high-performing groups such as Ucc-Waterm and WolStL-WolStP climb quickly at lower response levels, whereas For-StG and Ander-Molen remain compressed until higher reported

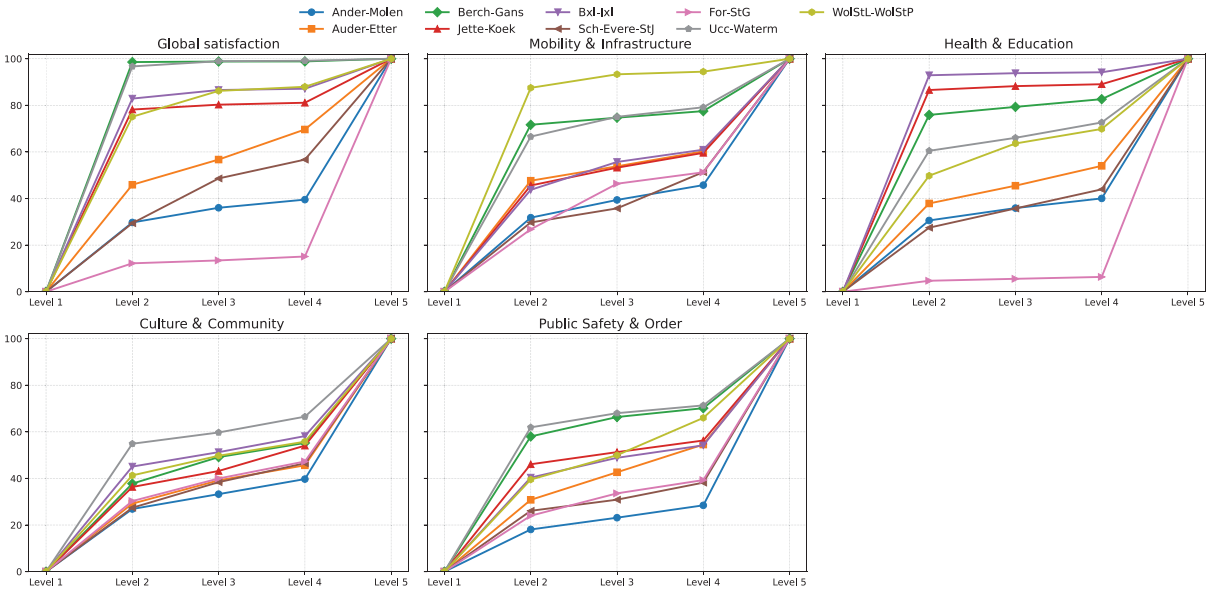


Fig. 5. Estimated satisfaction (value) functions by municipality group at the global and criterion levels. Each panel shows the reconstructed monotone value function for the five ordered response levels (1 = *very dissatisfied* to 5 = *very satisfied*), normalized to [0,100]. Lines connect group-specific points to aid comparison across clusters: steeper early segments indicate larger marginal gains in satisfaction when moving out of low ratings, while flatter segments indicate diminishing returns. Panels correspond to (top left) global satisfaction, and (criteria) mobility & infrastructure, health & education, culture & community, and public safety & order.

Table 7
Municipality-group comparison of criterion weights b and satisfaction S

		g_1		g_2		g_3		g_4	
Group	S	b_1	S_1	b_2	S_2	b_3	S_3	b_4	S_4
Anderlecht + Molenbeek	0.335	0.188	0.416	0.318	0.365	0.208	0.347	0.286	0.192
Auderghem + Etterbeek	0.673	0.315	0.613	0.222	0.503	0.194	0.443	0.270	0.537
Berchem-Ste-Agathe + Ganshoren	0.988	0.304	0.799	0.512	0.819	0.009	0.506	0.175	0.710
Jette + Koekelberg	0.800	0.100	0.603	0.694	0.887	0.103	0.445	0.103	0.515
Brussels City + Ixelles	0.852	0.073	0.614	0.764	0.942	0.081	0.574	0.082	0.477
Schaerbeek + Evere + Saint-Josse	0.468	0.235	0.420	0.273	0.381	0.209	0.437	0.282	0.316
Forest + Saint-Gilles	0.119	0.077	0.400	0.700	0.071	0.113	0.407	0.110	0.275
Uccle + Watermael-Boitsfort	0.992	0.290	0.801	0.227	0.717	0.177	0.655	0.306	0.732
Woluwe-Saint-Lambert + Woluwe-Saint-Pierre	0.872	0.626	0.927	0.139	0.679	0.126	0.499	0.109	0.633
All respondents (pooled)	0.639	0.203	0.529	0.390	0.697	0.186	0.450	0.221	0.432

levels. We interpret these differences as informative preference structures, not as proof of causal mechanisms.

Table 7 summarizes, for each municipality group and for the pooled region, global satisfaction together with criterion weights and criterion satisfaction. Three patterns stand out. First, very high overall satisfaction can emerge from different configurations. Ucc-Waterm reaches $S = 0.992$ with a relatively balanced profile and strong scores in mobility & infrastructure ($S_1 = 0.801$) and public

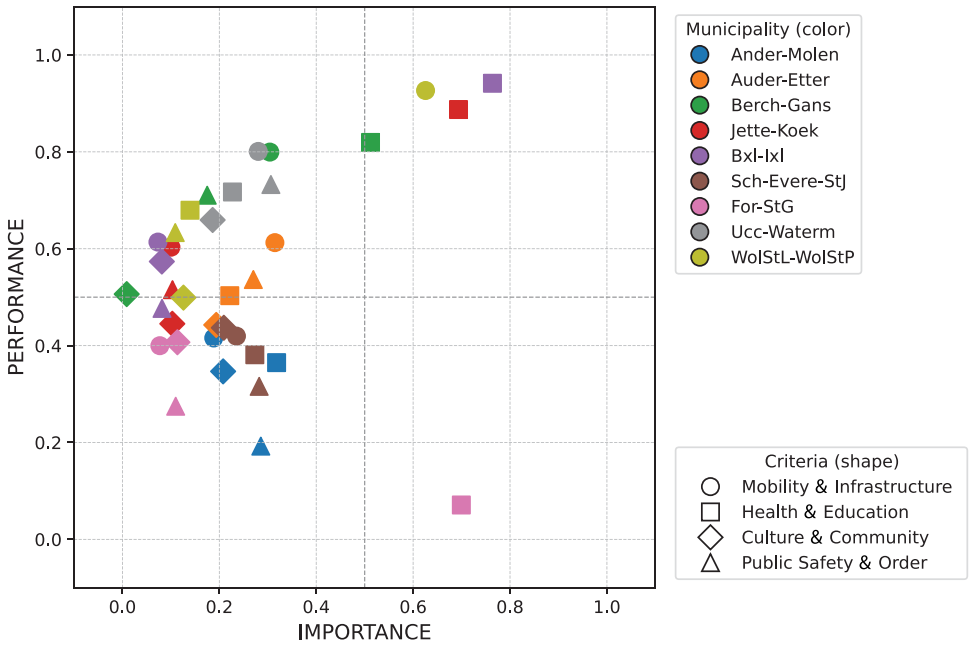


Fig. 6. Action diagram (importance b vs. satisfaction S) for the four main criteria across the nine municipality groups. Colors identify groups, and marker shapes identify criteria.

safety & order ($S_4 = 0.732$), whereas Berch-Gans reaches $S = 0.988$ through a much stronger emphasis on health & education ($b_2 = 0.512$, $S_2 = 0.819$). The Woluwe pair is the most mobility-centric group ($b_1 = 0.626$) and pairs that emphasize very high mobility satisfaction ($S_1 = 0.927$).

Second, low overall satisfaction is associated with different kinds of misalignment between weights and performance. For-StG is the clearest single-criterion warning case: health & education carries by far the largest weight ($b_2 = 0.700$) but has extremely low satisfaction ($S_2 = 0.071$). Ander-Molen and Sch-Evere-StJ are different. In both, public safety & order is among the most important criteria and also the weakest performing ones ($S_4 = 0.192$ and 0.316, respectively), but the weight profile is flatter, which means dissatisfaction is more diffuse across domains.

Third, the central and eastern high-performing groups should not be read as homogeneous "success stories." Bxl-Ixl and Jette-Koek are dominated by health & education, whereas WolStL-WolStP is dominated by mobility & infrastructure and Ucc-Waterm is comparatively balanced. The grouped comparison, therefore, shows why a single city-wide policy recipe would be misleading even when several groups report high overall satisfaction.

Figure 6 presents the action diagram for the municipality-group models. For each group and criterion, the figure plots importance b against satisfaction S on the common normalized [0,1] scale. The dashed vertical and horizontal lines divide the space into four quadrants and provide a consistent visual basis for comparison across municipality groups. In the classical MUSA interpretation, the four quadrants correspond to different decision-support meanings (Grigoroudis and Siskos, 2002). The high-importance/low-performance quadrant indicates an *action opportunity*, that is, a criterion that deserves priority attention because it matters relatively more while current satisfaction

remains weak. The high-importance/high-performance quadrant indicates a *leverage opportunity* or a domain to maintain and protect, since the criterion is both important and already performing well. The low-importance/high-performance quadrant suggests a possible *transfer of resources*, in the sense that performance is relatively strong in an area that is less central to overall satisfaction. The low-importance/low-performance quadrant corresponds to the *status quo*, where immediate intervention is usually less pressing than in the other areas.

In the present study, this quadrant logic is used as a diagnostic decision-support rule rather than as an automatic policy prescription. Specifically, a criterion is treated as an immediate action area only when it lies in the high-importance/low-performance quadrant and the corresponding municipality-group model remains sufficiently interpretable in light of Table 2. Criteria in the high-importance/high-performance quadrant are interpreted mainly as strengths to preserve, whereas criteria in the remaining two quadrants are treated more cautiously, since they do not indicate the same urgency for intervention.

Under this reading, For-StG is the clearest case for targeted intervention: health & education combines very high importance ($b_2 = 0.700$) with extremely low satisfaction ($S_2 = 0.071$). Ander-Molen and Sch-Evere-StJ also identify public safety & order as a salient weakness, but their overall weight profiles are flatter, so the implication is broader improvement rather than a single-criterion response. By contrast, Berch-Gans, Jette-Koek, and Bxl-Ixl place health & education in the high-importance/high-performance quadrant, which is better interpreted as a domain to maintain rather than a priority for corrective action. WolStL-WolStP shows a similar pattern for mobility & infrastructure.

The figure is also useful for indicating when policy should not become overly specialized. Ucc-Waterm combines relatively even weights with consistently high satisfaction, suggesting maintenance rather than rebalancing. Ander-Molen and Sch-Evere-StJ combine relatively even weights with generally weak satisfaction, indicating that an exclusively single-issue response would be too narrow. More generally, the action diagram helps distinguish between cases that call for targeted action, those that call for maintenance of existing strengths, and those that require broader multi-criteria improvement.

5. Discussion

The main analytical contribution of the Brussels application is not a new municipal ranking, but a way of reading pooled, municipality, and municipality-group MUSA models together under a shared specification. The pooled model is useful as a regional benchmark, but it conceals the fact that similar overall satisfaction levels can arise from quite different local importance–performance structures. The grouped comparison shows, in particular, that low satisfaction is not a single condition within Brussels: in some parts of the region, dissatisfaction is concentrated in one dominant criterion, whereas in others it is broader and more weakly separable across domains. This is the main reason why a pooled city-wide reading is analytically insufficient in a fragmented metropolitan setting.

The three analytical levels should therefore serve different purposes. The pooled model identifies broad regional tendencies, such as the relatively strong position of health & education and the weaker pooled performance of public safety & order, but it is not the main basis for action.

Table 8
Diagnostic policy postures implied by the municipality-group results

Policy posture	Empirical signature	Illustrative municipality-groups	Policy implication
Targeted intervention	One criterion is clearly more important than the others and performs distinctly weakly	Forest + Saint-Gilles	Prioritize the dominant weak domain first, then assess whether follow-up action is needed in adjacent domains.
Broad multi-criteria upgrading	Overall satisfaction is low and dissatisfaction is spread across several criteria, even if one of them is especially weak	Anderlecht + Molenbeek; Schaerbeek + Evere + Saint-Josse	Use bundled neighbourhood-improvement packages rather than a single-criterion fix; combine safety, public realm, and basic service improvements.
Selective incremental improvement	Overall satisfaction is moderate and no single acute deficit dominates, but one or two domains lag behind the rest	Auderghem + Etterbeek	Improve weaker domains without restructuring the full policy mix; use the stronger domains as anchors of continuity.
Maintenance of valued strengths	A highly important criterion also performs strongly	Berchem-Sainte-Agathe + Ganshoren; Jette + Koekelberg; Brussels City + Ixelles; Woluwe-Saint-Lambert + Woluwe-Saint-Pierre	Protect the currently valued domain and avoid reallocating resources away from it without additional evidence.
Balanced high-performing maintenance	Satisfaction is high across criteria and weights are relatively even	Uccle + Watermael-Boitsfort	Emphasize preservation, resilience, and monitoring for backsliding rather than major rebalancing of the policy portfolio.

Municipality models add fine-grained spatial detail and reveal local warning signals, as illustrated by the maps, yet they should not be treated as equally precise league-table observations because subgroup sizes and stability vary. Municipality-group models provide the most defensible comparative lens. They retain territorial meaning, reduce some of the fragility of single-municipality estimation, and make it easier to compare importance–performance structures rather than only overall scores. Read together with Fig. 4, the grouped results suggest that the broad west/north versus south-east contrast in Brussels is real, but also that it is produced by different combinations of safety, health–education, and infrastructure profiles rather than by one common deficit.

For policy use, the most useful synthesis is to distinguish a small number of diagnostic situations rather than to infer one recommendation for all municipalities. Table 8 summarizes the policy postures implied by the municipality-group results. These postures are intended as structured interpretations of the grouped profiles, not as automatic prescriptions, and they should be read together with local administrative evidence and the descriptive maps reported in the Results section.

Two concrete implications follow for Brussels. First, the recurrent weakness of public safety & order in the west/north arc suggests that this part of the region should not be approached through isolated municipal responses alone. In Anderlecht + Molenbeek and Schaerbeek + Evere + Saint-Josse, the grouped profiles point to diffuse dissatisfaction, with safety as a salient weakness but not the only one. That pattern is more consistent with coordinated neighborhood upgrading than with a narrowly framed safety intervention. In practice, this means combining public safety measures with visible improvements in streets, cleanliness, and access to everyday services, rather than assuming that one policy lever will resolve the broader dissatisfaction pattern.

Second, the framework helps identify where a more focused intervention logic is plausible. Forest + Saint-Gilles is the clearest example because health & education emerges there as both dominant and weak. In such a case, the most defensible policy implication is not a generic call for improvement, but a focused review of the health–education domain in that territorial context, followed by a more detailed administrative diagnosis of which service components are actually underperforming. Conversely, the high-performing groups should not simply be read as sources from which attention or resources can be withdrawn. Where high importance coincides with high satisfaction, as for health & education in several central and north-western groups or mobility & infrastructure in the Woluwes, the implication is usually maintenance and protection of valued strengths. Uccle + Watermael-Boitsfort represents a distinct high-performing case: its relatively even weights and strong satisfaction suggest that the policy task is to preserve a balanced profile rather than to push one new flagship priority.

These results also point to a useful governance distinction between benchmarking and copying. The municipality-group models make it possible to benchmark similar territorial profiles against each other, but they do not imply that one municipality can simply import another's policy mix. The maps and grouped results are better interpreted as structured prompts for place-sensitive diagnosis: they indicate where dissatisfaction is concentrated, where it is diffuse, and where existing strengths appear worth protecting. In that sense, the contribution of the framework is to organize citizen feedback into a form that can support differentiated policy conversations across Brussels rather than a single regional recipe.

6. Conclusion

This paper developed a cross-group MUSA framework for analyzing citizen satisfaction in a fragmented metropolitan setting and applied it to the Brussels-Capital Region. Its main contribution is applied and methodological: it shows how pooled, municipality-level, and municipality-group MUSA models can be estimated under a shared specification and read together for territorial benchmarking and policy diagnosis rather than for simple municipal ranking. In Brussels, this design shows that the pooled regional average masks differences not only in satisfaction levels but also in the structure of priorities across territorial units. Some municipality groups display one dominant high-importance, low-performance weakness, whereas others require broader multi-criteria upgrading or maintenance of valued strengths.

The empirical scope of the paper remains Brussels, because the survey, grouping logic, and policy interpretation are grounded in the institutional and socio-spatial structure of the Brussels-Capital Region. However, the framework itself is general. It can be expanded to other cities or metropolitan

regions whenever a common citizen satisfaction survey is implemented across internally diverse local units. Future applications could therefore use the same protocol to compare neighborhoods, districts, boroughs, or municipalities in other fragmented urban regions and to test whether similar importance–performance patterns appear beyond Brussels.

At the same time, the study should be interpreted within clear limits. The survey is self-selected and cross-sectional, so the results describe the responding sample rather than population-representative municipal means. The additive MUSA specification is intentionally parsimonious and does not model interactions among criteria. In addition, even under a shared questionnaire and common modeling settings, some observed cross-group differences may reflect sample composition, response-style effects, or contextual influences that are not directly modeled. For these reasons, the results are best read as structured comparative evidence rather than as causal findings or definitive municipal rankings.

Several directions for future research follow directly from this work:

1. More formal robustness analysis, including sensitivity to grouping choices, criteria structures, and alternative treatments of sparse subgroups. This would help determine which comparative findings remain stable across plausible modeling decisions and which depend more strongly on the chosen analytical design. Such analysis would also strengthen confidence in the interpretation of estimated weights, satisfaction scores, and action-diagram placements.
2. Dynamic extension through repeated survey waves, in order to examine whether territorial satisfaction structures remain stable over time or shift in response to policy change and urban dynamics. A longitudinal design would make it possible to distinguish more persistent structural dissatisfaction from short-term fluctuations. It would also allow the framework to be used for monitoring rather than only cross-sectional diagnosis.
3. Formal cross-group comparability checks, especially to distinguish substantive differences in preferences from differences in response behavior across territorial units. In the current study, comparability is supported by a shared survey instrument and common modeling settings, but future work could strengthen this further through explicit tests of measurement invariance or response-style adjustment. This would make cross-group interpretation more defensible in settings with stronger social or linguistic heterogeneity.
4. Closer integration of subjective satisfaction outputs with objective urban indicators such as mobility accessibility, crime, education provision, housing conditions, and environmental quality. Such integration would help clarify where subjective dissatisfaction aligns with measurable place conditions and where it does not. It would also strengthen the policy relevance of the framework by linking residents' evaluations to a broader urban evidence base.

Taken together, this study shows that citizen satisfaction analysis in fragmented cities benefits from a multi-scalar comparison design that preserves interpretability while making territorial differences visible. Although the empirical application is specific to Brussels, the proposed framework is intended to be transferable to other fragmented metropolitan regions where a common citizen satisfaction survey can be implemented across internally diverse local units. In this sense, the Brussels case serves not only as an empirical application but also as a demonstration of how cross-group MUSA analysis can support more informative within-city benchmarking, comparative diagnosis, and further methodological development in urban satisfaction research.

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Appendix A: Citizen Satisfaction Survey

The questionnaire was tailored to the Brussels context and fielded online in late 2024–early 2025. To maximize inclusiveness in a multilingual metropolis, the survey was offered in French, Dutch, and English. Eligible participants were residents aged 18+ living in one of the 19 municipalities of the Brussels-Capital Region. Items used five-point ordered scales unless stated otherwise.

Scale conventions. Unless otherwise noted, satisfaction items used a 5-point Likert scale: (1) *Extremely dissatisfied*, (2) *Somewhat dissatisfied*, (3) *Neither satisfied nor dissatisfied*, (4) *Somewhat satisfied*, and (5) *Extremely satisfied*. Agreement items used: (1) *Definitely not*, (2) *Probably not*, (3) *Might or might not*, (4) *Probably yes*, and (5) *Definitely yes*(Table A1)(Table A2).

Table A1
Core questionnaire mapped to MUSA variables (English master wording)

Code	QID	Question (response scale)
		Section 1 - - **Infrastructure & Mobility**
$g_{1,1}$	QID1	How satisfied are you with your apartment or house, considering the rent or price you must pay? (5-point satisfaction)
$g_{1,2}$	QID2	How satisfied are you with the condition of the roads and buildings in your neighbourhood? (5-point satisfaction)
$g_{1,3}$	QID3	How satisfied are you with the availability and quality of parks in your surroundings? (5-point satisfaction)

Continued

Table A1
(Continued)

Code	QID	Question (response scale)
$g_{1,4}$	QID4	How satisfied are you with the maintenance of public facilities (e.g., bus stops, public toilets, bins, playgrounds)? (5-point satisfaction)
$g_{1,5}$	QID5	How satisfied are you with the availability of public transport options around you? (5-point satisfaction)
g_1	QID6	Overall, how satisfied are you with the infrastructure and mobility in your municipality? (5-point satisfaction)
		Section 2 - - **Health & Education**
$g_{2,1}$	QID7	How satisfied are you with hospitals or medical centres in your surroundings? (5-point satisfaction)
$g_{2,2}$	QID8	How satisfied are you with the affordability of healthcare and educational opportunities in your neighbourhood? (5-point satisfaction)
$g_{2,3}$	QID9	How satisfied are you with the quality of the schools in your neighbourhood? (5-point satisfaction)
$g_{2,4}$	QID10	Are you satisfied with mental-health awareness and guidance in those schools? (5-point agreement)
g_2	QID11	Overall, how satisfied are you with health and education options in your municipality? (5-point satisfaction)
		Section 3 - - **Culture & Community**
$g_{3,1}$	QID12	How satisfied are you with community/cultural involvement opportunities in your municipality? (5-point satisfaction)
$g_{3,2}$	QID13	Are you satisfied with the presence and support of small businesses in your municipality? (5-point satisfaction)
$g_{3,3}$	QID14	How satisfied are you with the sustainability initiatives implemented in your municipality? (5-point satisfaction)
$g_{3,4}$	QID15	Are you satisfied with the diversity and inclusiveness of events and activities in your neighbourhood? (5-point agreement)
g_3	QID16	Overall, how satisfied are you with culture and community in your municipality? (5-point satisfaction)
		Section 4 - - **Public Safety &in Tables A1 and A2 Order**
$g_{4,1}$	QID17	How satisfied are you with the response of police and emergency institutions in case of an accident or event? (5-point satisfaction)
$g_{4,2}$	QID18	How satisfied are you with your (feeling of) safety at night in your municipality? (5-point satisfaction)
$g_{4,3}$	QID19	Are you satisfied with initiatives to fight racism and discrimination in your municipality? (5-point agreement)
$g_{4,4}$	QID20	How satisfied are you with traffic management in your municipality in the event of a hazard or disaster? (5-point satisfaction)
$g_{4,5}$	QID21	How satisfied are you with the space provided when using the road? (5-point satisfaction)
g_4	QID22	Overall, how satisfied are you with public safety and order in your municipality? (5-point satisfaction)
Y	QID23	Considering everything, how satisfied are you with living in your municipality? (5-point satisfaction)

Table A2
Context, residence, mobility, and sociodemographic items

Section	QID	Question (response options)
Residence	QID24	In which municipality do you currently live? (single choice; 19 municipality)
Sociodemographics	QID25	Age group (18-24, 25-34, 35-44, 45-54, 55-64, >65)
	QID26	Gender (female, male, other, prefer not to say)
	QID27	Children in care (none; 1; 2-4; >4; prefer not to say)
	QID28	Highest education (secondary or lower; college/vocational; bachelor's; postgraduate)
	QID29	Employment status (full-time; part-time; unemployed; student; retired; prefer not to say)
	QID30	If employed: profession (open text)
	QID31	Field of study (open text)
Residence history	QID32	In which municipalities have you lived in the past? (multi-select; 19 municipalities)
Open feedback	QID33	Optional: Which municipality is your favourite, and why? (open text)
	QID34	Optional: What is one aspect that could use improvement? (open text)
	QID35	Any remarks concerning this survey? (open text)