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Urbanometric analysis of data-driven urban wellbeing – an exploration of spatially dependent city love in Flanders

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ABSTRACT

This study offers a novel contribution to the emerging place-based wellbeing research. The paper examines spatial wellbeing dimensions of an interdependent system of places. It presents and tests an urbanometric approach for identifying the key factors that shape urban wellbeing ('city love') in an open system of functionally interconnected municipalities. The paper uses the Flemish urban-rural system in Belgium as an empirical test case. Based on an extensive data set, a Beta regression model is developed to measure the impact of both 'soul' factors (such as social capital, governance, and cultural services) and 'body' factors (such as green infrastructure and bike-walkability) on city love, while accounting for the moderating effects of regional agglomeration factors. The findings show the importance of connectivity between urban agglomerations, revealing that municipalities closer to urban centres rely less on local facilities, while those outside large cities depend more on local amenities for urban satisfaction. This paper offers a new quantitative perspective for data-driven urban planning, transforming the landscape of conventional urban studies and ways of analyzing the functioning of cities in a complex system of municipalities.

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KEYWORDS

Urban wellbeing; city love; urbanometrics; regional connectivity; agglomeration effects; sustainable urban development

Highlights

- Develops an urbanometric framework to analyse spatially dependent city love.
- Examines urban wellbeing across 299 Flemish municipalities in Belgium.
- Social capital and governance emerge as the strongest drivers of city love.
- Bike-walkability, green infrastructure and cultural services enhance wellbeing.
- Regional connectivity moderates the role of local amenities in urban satisfaction.

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1. Introduction: scope and aims

Measuring the Unmeasurable’ has become a great challenge in modern scientific research (Nijkamp et al., 1985, 2012). The scientific annals of human history are marked by a constant search for evidence-based, new knowledge, a persistent undertaking to analyse and understand the complex world around us. The ‘quantitative revolution’ has driven scientific progress across disciplines, including geography and urban planning, enabling advanced spatial analysis and innovations such as Geographic Information Systems (GIS) and geodesign techniques (Fotheringham et al., 2000; Goodchild et al., 2024; Kwan & Schwanen, 2009; Nijkamp, 2012; Sheppard, 2001; Wooldridge & Morgan, 1937; Zipf, 1949). This wave of scientific curiosity has extended into various fields, including geography, urban architecture and spatial planning, propelling these disciplines into the digital age with groundbreaking advancements in, for example, geo-science (Scholten & Lepper, 1991) or geodesign techniques (Steinitz, 2012; Wilson,; Wilson & Fotheringham, 2007).

Human settlements mirror the dynamic complexity of social and economic geographic behaviors shaped by wellbeing factors. Clearly, in the vibrant streets and towering skyscrapers of modern cities, the essence of socio-economic development unfolds – housing, employment, culture, mobility, and spatial planning all intertwine in a multifaceted co-evolution of human life. Each urban environment is a dynamic ecosystem, buzzing with unique functions and diverse possibilities. Urban settlements have evolved through the interplay of social, economic, cultural, and technological forces, resulting in diverse forms, functions, and spatial patterns across cities, towns, and villages. This plurality and heterogeneity of urban dynamics extends beyond the city borders, encompassing their surrounding suburbs and peri-urban spaces, where a broad array of human habitation and varied socio-economic activities flourishes (Batabyal et al., 2019; Kourtiti et al., 2022). To grasp the essence of interconnected human settlements, it becomes essential to adopt a multi-dimensional analytical perspective, one that quantitatively explores the evolving land use, the intricate socio-economic functions of cities, and the urban interdependencies with their surroundings.

This paper aims to reshape established research practices in urban analysis and planning through a novel evidence-based exploration, fostering a new era of urban-rural synergy. This study highlights the great potential of detailed, multidimensional urban and rural data analytics, emphasizing its great importance in shaping planning and policy (Dewa & Buchori, 2025). It outlines the transformative force of data-driven development and evidence-based spatial planning, reshaping our understanding of cities and towns and their complex and interdependent functioning in the modern digital era. Next, the research undertakes an innovative exploration, employing advanced spatial-econometric and statistical approaches emerging in modern urban studies (Lin et al., 2017; Zhu et al., 2019). It provides an illustration of the analytical power of ‘urbanometrics’ as a new quantitative study of urban phenomena (Lee et al., 2021; Li & Zeng, 2024; Smith et al., 2023; Wang et al., 2023), thus offering new insights into the multiscalar functioning of cities and towns and laying the foundation for sustainable and resilient habitat designs of geographical space.

While much research has examined urban wellbeing and livability through composite indices, rankings, or subjective satisfaction measures, it often treats cities and municipal-

ities as spatially independent units. This paper advances the literature by conceptualizing urban wellbeing as a spatially embedded, relational phenomenon. By operationalizing wellbeing through the integrative concept of ‘city love’ within an urbanometric and spatial-econometric framework, the study explicitly accounts for intermunicipal dependencies and agglomeration effects, offering a novel perspective on the spatial dynamics of urban wellbeing.

Taking the urban system of Flanders as a case study, this study explores the dynamic interaction between the built environment and its functions, aiming to achieve an evidence-based understanding of the forces shaping the economic behaviour and wellbeing of citizens, through the use of quantitative econometric analysis of spatial wellbeing culminating in *city love* research.

The structure of the paper is as follows: It starts in Section 2 by providing content and context on the rise of the modern city, setting next a novel research perspective, and defining the wellbeing scope of the study. A broad literature review is undertaken, revealing the landscape of relevant studies and methodologies within the domain of urban dynamic functional evolution against the background of contemporaneous wellbeing research. The conceptual research framework and the type of data for empirical analytical modelling are described in Section 3. The identification of various data sources contributes to a comprehensive repository of information available for empirical analysis. This is further dealt with in Section 4, where the process of selecting critical indicators prioritizes key aspects of urban citizen functions, while the spatial-econometric methodology ensures a robust analytical framework aligned with the wellbeing and city love scope of the study. The empirical analysis section serves to refine and enrich our understanding of the complex and interdependent landscape of human settlements and to test our hypothesis on spatially dependent city love.

2. Urban development revisited from a wellbeing perspective

2.1. Rise of the modern city

Modern city systems are a relatively recent phenomenon in urban history (Tellier, 2009). Since the 1950s, the global urbanization rate has intensified, prompting the United Nations to label the current era as the ‘century of cities’ (Nijkamp & Kourtit, 2013; UN-Habitat, 2010a, 2010b). This structural mega-trend towards the ‘*New Urban World*’ (Kourtit, 2019) finds its roots in the economies of density, interaction, and proximity that flourish in large cities. However, given recent economic, social, technological, and health-related changes, the empirical validity of evidence-based trend analyses has become a matter of data-driven research. It is noteworthy that traditional agglomeration advantages, once driving the appeal of urban living, now fuel a high-pressure housing crisis in inner cities, pushing low- and medium-income groups to the margins (see e.g. Florida, 2017). Simultaneously, a significant shift in locational preferences becomes evident, with many individuals seeking lower-density settlement patterns, giving rise to poly-central urban systems and the rapid emergence of peri-urban areas (Elburz et al., 2025). Traditional agglomeration theory needs to be re-shaped for significant changes in livability motives (Fusco Girardet et al., 2023).

As mentioned by Cottineau et al. (2018), early publications on agglomeration economies in the USA (Henderson, 1986; Moomaw, 1988; Sveikaukas, 1975) did not explicitly define cities but were based on established Standard Metropolitan Statistical Areas, delineated by the United States Census Bureau as functional commuting areas, and therefore covering the spatial extent of labour markets. As evidenced in the works of Cottineau et al. (2018), Rosenthal and Strange (2001) and Mori and Smith (2015), the choice of geographical scale, as well as industries under investigation, can influence the estimation of agglomeration effects. This leads Cottineau et al. (2018) to suggest that there is no single definition of geographic scale, but that the chosen methodology needs to adapt to the theoretical questions that are posed.

In the age of modern information and communication technology (ICT), a new horizon of spatial development possibilities appears to unfold. Digital technology opens doors for combining the advantages of low-density living with access to urban amenities and activities (e.g. teleworking, online services) (Arranz-López & Soria-Lara, 2022; Komalawati & Lim, 2021; Mouratidis & Peters, 2022). The COVID-19 pandemic has acted as a catalyst, raising awareness of potential health risks associated with dense city living. As a result, people are nowadays more inclined to seek alternative settlements outside densely concentrated urban agglomerations with improved access to hybrid workspaces (Di Marino et al., 2023; Rode et al., 2021). In this strong force field of change, the previously unwavering hypothesis of continuously expanding urbanization faces serious questioning, necessitating a new contextualization and operational study of the interdependent urban space-economy. At the focal point of the current research is a data-based analysis focused on the nature of urbanization trends, closely connected with evolving locational preferences of citizens in search of wellbeing, the potential of digital technology, and the emerging health concerns associated with high-density living in urban centres (Beenackers et al., 2024; Cox et al., 2018; Godfrey & Julien, 2005).

As mentioned, we have in recent decades entered the '*New Urban World*' (Kourtiti, 2019), where cities go beyond their traditional roles and transform into hybrid cyber places teeming with an abundance of information on human behaviour, public policy and material and immaterial flows. Additionally, they emerge as digital cyber places, acting as digital hubs that facilitate both internal and external virtual connectivity.

In facing the centripetal and centrifugal forces of real-world geography, the basic force field that shapes settlement systems, we recognize the significance of agglomeration theory in understanding city formation and growth. Scholarly contributions in regional science and urban economics have mainly emphasized positive stimuli driving physical movement into urban areas, including scale advantages, urbanization advantages, and agglomeration advantages (Cardoso & Meijers, 2021; D'Acci, 2021; Giuliano et al., 2019).

More recently, negative externalities of urban agglomerations have also come to the forefront, ranging from congestion and environmental degradation to safety concerns, socioeconomic disparities, and health vulnerabilities (Correia & Roseland, 2022; Ooi & Phua, 2007; Santos et al., 2010; Turok & McGranahan, 2013). Cities now face a delicate balancing act, navigating the digital era that enables online services and virtual communication, potentially stimulating also an outflux towards peri-urban areas. The COVID-19 pandemic has highlighted the need to reevaluate urban livability, housing demands, and working conditions, while also demonstrating the potential of digital technology in developing innovative peri-urban 'electronic cottage' systems (Komminos, 2002, 2019;

Sanchez-Sepulved et al., 2024 Sassen & Kourtit, 2021; Uyttebrouck et al., 2025; Zhu & Xu, 2023). Consequently, a new vision of urban geography seems to emerge, seeking to articulate citizens' demands for safe and livable spaces, leveraging digital technology's potential, and addressing health-induced concerns for urban centres' livability (Nijkamp et al., 2024). The development and testing of a new geography of urban density, human interaction, and social proximity become essential in urban research (Allam et al., 2021, 2022; Kourtit, 2019; Moreno, 2016, 2024; Moreno et al., 2021; Nijkamp et al., 2024). In pursuit of this, empirical exploration of the 'new urban space' becomes imperative, necessitating evidence-based quantitative urban connectivity research (Batty, 2012; Clifton et al., 2008; Glaeser & Kahn, 2004; Glaeser et al., 2021; Song & Knaap, 2007). Setting out on the unexplored frontiers of urban econometric analysis and urbanometrics, more insight may be gained into the multifaceted dynamics of urban, peri-urban, metropolitan and rural areas. This study sets out to offer a novel quantitative contribution.

2.2. City analytics and urbanometrics

Urban geography, urban economics, population dynamics, demography, urban planning, health science, environmental studies and other disciplines each offer a unique perspective on the complexity of urban landscapes (e.g., Glaeser & Kahn, 2004; Poot & Pawar, 2013; Wolman et al., 2024). Understanding these complexities requires interdisciplinary approaches. Seven essential pathways towards a holistic understanding of the functioning of such urban complexities can be traced from the extant literature (see, e.g. Abujder Ochoa et al., 2025; Li et al., 2024; McPhearson et al., 2016):

- *Interaction between people and land use*: The essence of any city lies in the dynamic relationship between its inhabitants and the physical urban environment. This interaction between people and urban form holds the key to understanding the fundamental dynamics shaping the essence of a city (Qi et al., 2024).
- *Network interaction and urban connectivity*: Cities prosper through the interactions and relationships among citizens, businesses, administrations, and visitors. These interconnected networks emphasize the vibrant social fabric that connects the complex framework of urban life (see Liang et al., 2024; Neal, 2012).
- *Urban economy and infrastructure*: The vitality of a city arises from its economic engine, producing resources essential for building and maintaining resilient infrastructure that meets the present and future needs of citizens (Kapucu et al., 2024).
- *Interconnected structure and function*: Urban structure and functioning operate in a two-way relationship, where physical structures influence and are influenced by their functions. This mutual dependency underscores the inseparability of form and substance in shaping urban systems (Zhang et al., 2023).
- *Information technology*: Transformative advancements in digital tools significantly impact urban structure and functions through their interactions, transforming the way cities operate in the digital age (Bellone et al., 2022).
- *Multifaceted approaches*: Disciplinary diversity enhances the search for a better knowledge base, guiding data-driven understanding and development of modern urban evolution (Joyce & Javidroozi, 2024).

- *Unifying quantitative analysis*: Exploring multifaceted urban complexities calls for a shared conceptual and methodological foundation. Such a foundation integrates disciplines like urbanometrics, urban sociometrics, urban data analytics, morphometrics, and AI-driven urban planning (Son et al., 2023).

Advances in digital tools and computer-aided urban data analytics have driven the emergence of a new quantitative research approach in urban studies, sometimes referred to as *urbanometrics* (Kandt & Batty, 2021). A better understanding of urban form and land use implications for critical issues - such as urban livability, sense of place, wellbeing, and economic development - can support evidence-based policies for sustainable urban development (Dewa & Buchori, 2025; Turner et al., 2020).

The availability of extensive urban data and spatial analysis methodologies allows for comprehensive analysis on both complex and large-scale levels. These approaches include historic centres as well as the rapidly growing suburban and ex-urban peripheries, where much of today's urbanization takes place (De Vidovich, 2024). Such analyses open new perspectives in urban research, including large-scale regional, national, and international comparisons of urban systems, investigations of relationships between various urban phenomena, and examinations of morphological transformations over time (Hu et al., 2022; Rozenblat, 2018).

The recent wealth of data and analytical techniques facilitates detailed analyses, allowing researchers to describe many aspects of urban land use with spatial precision (Li et al., 2021; Reba and Seto, 2020; Ye et al., 2016). Expanding traditional analysis from historic-cultural cities to include recent urban, suburban, and ex-urban growth demands comprehensive data-driven approaches to understand the dynamics of contemporary urbanization (Castells-Quintana & Wenban-Smith, 2019; Kourtiti & Nijkamp, 2022). This study will later present an integrated analysis of these interconnected urban systems from a wellbeing and happiness perspective.

2.3. Wellbeing and the city

In the rich history of human civilization, evidence-based research on human wellbeing and happiness usually finds its core in the historical and vibrant heart of towns and cities. Burger et al. (2026) have recently published an informed contribution on the geography of *happiness* and *wellbeing*. The latter concept is a rather comprehensive and structural state of someone's personality or mind (including social and personal life satisfaction, psychological self-acceptance and fulfilling socio-economic conditions and relationships). Happiness is a related but more situation-determined concept; it is more subjectively oriented, with relatively more instantaneous feelings of joy, contentment and friendship. In practice, however, these concepts are often mixed, e.g. in the geography of happiness (see e.g. Vaz, 2023). Related concepts are *quality of life* (a broad notion describing how people experience or value their external environmental and life situation, e.g. health condition, personal freedom, social capital, environmental quality) and *livability* (subjective perception of fulfillment of conditions of personal life?, e.g. safety, housing situation, healthcare, or quality of education).

Research in this field is often driven by curiosity to explore compelling questions, such as: *Where do we truly find happy people, and can cities indeed create happiness?* Understanding the complexities of place-based happiness becomes essential to understand the profound connection between living environments and human wellbeing. To explore this, we must seek both quantitative indicators that illustrate the essence of urban joy ('city love'), as well as the potential drivers contributing to such satisfaction. Indicators of the former may take the form of direct expressions through survey methods, where individuals openly share their happiness levels, or indirect signals distilled from social media and open-access platforms. Furthermore, insights from happiness research in the social sciences may add valuable dimensions to our understanding of the attraction forces of urban areas (e.g. socio-economic opportunities, cultural vibrancy) (Blanchflower, 2021; Blanchflower & Oswald, 2011; Burger & Veenhoven, 2023; Morrison, 2021; Nijkamp et al., 2024; Okulicz-Kozaryn et al., 2024). Additionally, observing geographical behavioral responses, such as relocations or migrations to happier areas, highlights the push-pull effects that shape happiness patterns as a result of the complex and interconnected relationship between people and their chosen urban habitats (further discussed in Kourtit et al., 2024a).

Interesting novel research on the geographical drivers contributing to human wellbeing can be found in the statistical quantification of urban livability, which has often attempted to create composite indicators and develop comparative rankings as policy-relevant measurements of a global priority for creating healthy living environments. These approaches align with the needs of modern city planning to outline measurable policy targets (Giles-Corti et al., 2022). Although Higgs et al. (2022, p. 322) note that 'existing frameworks for policy-relevant spatial urban indicators of livability have limited scope for reproducibility, replicability and generalizability' – due to a lack of methodological clarity, reliance on commercial data, and overreliance on cross-sectional data, etc. – we find that the quantitative studies focusing on livability indices are nonetheless relatively similar.

An illustrative example can be found in Valcárcel-Aguiar and Murias (2019), who identify indicators across three distinct environments: economic, social, and physical. The economic environment includes income, employment, cost of living, and economic inequality. The social environment combines human capital with civic involvement and insecurity. Finally, the physical environment includes both human-made infrastructure and facilities, as well as social congestion, overcrowding, and environmental pollution. In this context, Higgs et al. (2019) expand the research scope to seven livability domains, proposing multiple indicators towards an Urban Livability Index, namely: (i) Transport: train stations, tram stops, bus stops; (ii) Social infrastructure: education, sport & recreation, culture & leisure, early years, community centres, health & social services; (iii) Employment; (iv) Walkability: convenience stores, newsagents, petrol stations, convenience destinations, supermarkets, dwellings in neighborhoods, etc.; (v) Housing: affordable housing; (vi) Green infrastructure: distance to public open spaces, size of public open spaces; and (vii) Ambient environment: air pollution.

In the past years, a new concept has been introduced in wellbeing research, viz. 'City Love' (see e.g. Kourtit et al., 2024b). City love is an indicator that mirrors and measures the degree of citizens' attachment to a city or its neighbourhoods, including its historical-

Table 1. Body and soul indicators of ‘city love’ (adapted from Kourtiti et al., 2024a).

Amenities	Body/soul factor	Local/regional significance
Social capital (social fabric and contacts)	Soul	Local
Safety	Soul	Local
Vibrancy (cultural and recreational events)	Soul	Regional
Perceptions of culture and recreation	Soul	Local
Aesthetics, appearance	Soul	Local
Governance (trust in authorities)	Soul	Local
Cultural and recreational facilities	Body	Regional
Public services (healthcare, schools, etc.)	Body	Regional
Economy – job opportunities	Body	Regional
Transport infrastructure	Body	Local
Bike- and walkability	Body	Local

cultural heritage, its architecture and urban ambiance, and its social community sense. City love is related to feelings of home, loyalty, protection, and pride.

Recent studies have made an attempt to operationalize the concept of city love, exploring and measuring systematically the attributes of urban contentment through ‘soul’ and ‘body’ indicators and examining both the values of image, reputation, aesthetics, arts and symbols, and vibrancy of the city, as well as the more functional and physical attributes included in the more standard livability approaches presented earlier (see Kourtiti et al., 2020). In a recent contribution, Kourtiti et al. (2024b) explore the ‘city love’ concept further across 5 ‘body’ and 6 ‘soul’-related amenities, highlighted in Table 1, postulating differences in geographic relevance, including specific characteristics, such as safety and social capital being predominantly relevant at the local level, while factors such as economic opportunities and cultural and recreational facilities are considered as more appropriate at a regional scale. Indicators for city love constituents may be acquired from surveys, statistical databases, social media platforms or general open access information channels. Our study uses mainly the first two data sources.

The study seeks to reinforce the city love concept by highlighting the relevance of extra-mural facilities and public amenities in a local ‘city love’ study, empirically validating that concepts of ‘city love’/livability need to account for regional dependencies. Such spatial interactions among municipalities are not only determined by relative attraction differences between adjacent places, but also by the geographic accessibility and the quality of infrastructure (not only for cars and public transport but also for slow modes of transport like bicycles). Consequently, the quality of connectivity among places is explicitly included in our analysis. This approach brings us close to the current worldwide debate on 15-minute cities inspired by Moreno (2024). In contemporaneous studies, this 15-minute city concept is broadened towards inter-municipal levels through the concept of X-minute cities, in which environmental-benign transport modes may be used as sustainable connectivity arteries among adjacent places (see e.g. Bouzouina et al., 2026; Kourtiti et al., 2026).

In conclusion, observations based on urban quantitative analysis and urbanometrics may lead to a better understanding of the complex forces shaping wellbeing in our cities and leveraging data-driven policy with cutting-edge quantitative modelling. This approach can also provide added value in securing sustainable and resilient urban landscapes that can thrive in complex interconnected systems of cities, in which human wellbeing is respected and prioritized.

3. Conceptual model and research hypothesis

Following the discussion of Cottineau et al. (2018) that the delineation of spatial scale should reflect the theoretical questions, our hypothesis frames the concept of ‘city love’ within a scale of Local Administrative Units (or ‘municipalities’). Local Administrative Units are furthermore relevant geographic scales within a Western European context, wherein, unlike the context of the United States, in which the theory of urban agglomerations has originated, intermunicipal distances are generally smaller with a well-connected transportation network. This accounts for the reflection of Giuliano et al. (2019) that, as a result of reduced transportation and communication costs, agglomeration benefits can be considered at a regional scale. Finally, the municipal scale is relevant at the level of governance, whereby Local Administrative Units still hold significant responsibilities and fit the political theory that democracy and governance efficiency are better suited to smaller administrative units, operating closer to the level of residents (Ciommi et al., 2019).

The literature review and research framing from the previous section then indicate that the human appreciation of a city or municipality may depend both on local amenities and on amenities that can be reached in nearby or adjacent municipalities. Such amenity values of agglomeration economies have been mentioned by Glaeser et al. (2001). This calls for a multi-level conceptual model of urban appreciation by residents, where certain amenities are predominantly relevant at the local level, while others appear to be demanded on a more supra-regional scale (following the central place theory developed by Christaller, 1936). In this framework, local and regional amenities are expected to complement each other in shaping overall urban appreciation.

As mentioned above, the ‘city love’ concept can be dismantled into ‘body’ and ‘soul’ factors. The ‘body’ encompasses physical and functional amenities (e.g. facilities and infrastructure), while the ‘soul’ incorporates social and cultural dimensions (e.g. social capital, safety, ambiance). The conceptual multi-level model is illustrated in Figure 1.

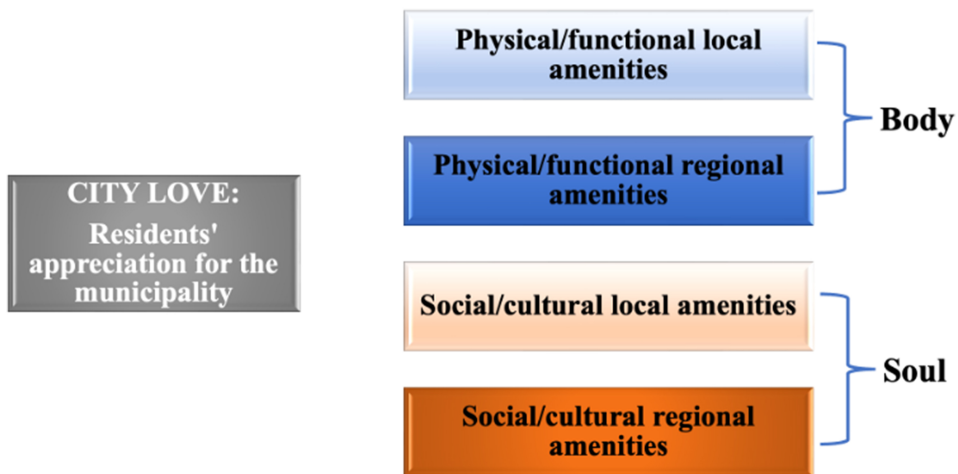


Figure 1. Conceptual ‘body’ - ‘soul’ framework of city love.

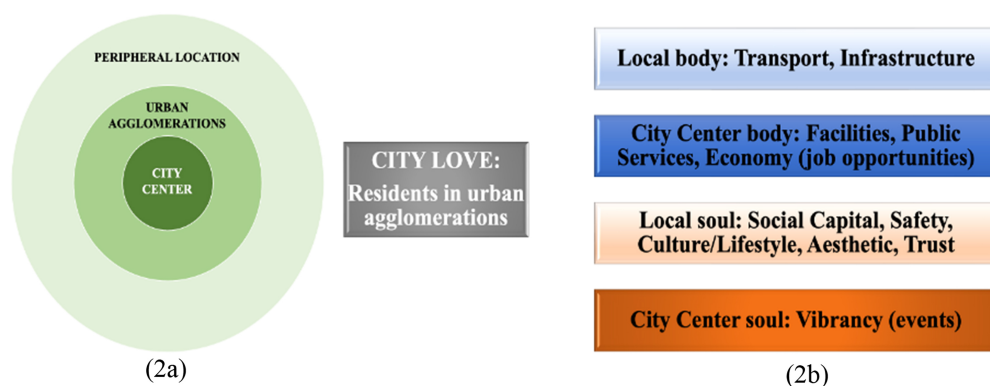


Figure 2. Framework model of urban structure (2a) and city love composition (2b).

However, there may also be a difference between rarely experienced amenities, such as theatre shows or concerts, and the more day-to-day services, such as grocery shopping and bank services. This is in line with traditional central place theory.

In the present study, we will test an urban functional interaction hypothesis based on the theoretical assumption that there is a variety of factors influencing ‘city love’ in municipalities close to city centers because large city centres – with their wealth of services and amenities – are within easy reach of adjacent municipalities. This is the so-called urban agglomeration hypothesis (see Figure 2a for an illustration). According to a previous study by Kourtiti et al. (2024b), certain amenities, such as those reported in Table 1, seem to be more appreciated even at a further distance, while other amenities are more appreciated within the local catchment area. In Figure 2b, ‘city love’ in urban agglomerations depends on distinct ‘body’ and ‘soul’ factors in the local municipality and neighboring city centres.

The figure illustrates how residents’ appreciation of municipalities is shaped by a combination of local and supra-local ‘body’ and ‘soul’ amenities within an interconnected urban agglomeration structure.

The above observations lead to the formulation of the following hypothesis, which we aim to test in our study: *City love for urban agglomerations is positively influenced by facilities, public services, economy, and vibrancy in their adjacent municipalities.* This hypothesis is essentially inspired by Waldo Tobler’s (1970) first law of geography, namely that ‘everything is related to everything else, but near things are more related than distant things’ and further follows Alonso’s (1973) concept of ‘borrowed size’ where, due to the presence of spatial interdependencies, smaller places can ‘borrow’ agglomeration benefits from larger urban centres. It directly follows Meijers et al.’s (2016) hypothesis that places in proximity to larger centres might have fewer available amenities than places similar in size, which are more isolated and less interconnected. Literature has identified multiple amenities and functions that an urban agglomeration can offer and which could be relevant interaction terms for the construction of local ‘city love’, among others: (i) consumer amenities (e.g. Tabuchi & Yoshida, 2000), (ii) presence of a variety of specialized goods and services (Berry & Waldfoegel, 2010; Burger et al., 2014), (iii) provision of specialized public services (Dahlberg et al., 2012; Ebertz, 2013), (iv) provision of jobs (e.g. Coffey &

Shearmur, 2008). We will now test in Section 4 this hypothesis using a rich data source from the Dutch-speaking Flemish region of Belgium.

4. Data and research methods

The empirical study of interrelated ‘city love’ phenomena focuses on the Dutch-speaking Flemish region of Belgium, which measures 13,522 km² and has a population of 6.82 million as of 2023. This region is divided into 300 municipalities, encompassing urban, peri-urban, and rural settlements. The largest cities in the region are Antwerp (with 541,417 residents), Ghent (with 268,917 residents), Bruges (with 119,823 residents), Leuven (with 103,137 residents), Aalst (with 90,221 residents), and Mechelen (with 88,850 residents) (Statistiek Vlaanderen, 2024). The relatively modest size of Flemish cities is partly due to historic administrative fragmentation, creating many independent municipalities in close proximity and of relatively small size, and partly due to a preference for rural or peri-urban living, particularly given the limited distances and the good road and railway network in the area. Therefore, the region offers an interesting combination of urban, peri-urban, and rural forms, as well as a potential spatial interdependence for the creation of local wellbeing. Recognizing the regional centrality function of the larger cities – in terms of healthcare, education, administration, and leisure – previous studies have recognized 13 important urban agglomerations in Flanders, consisting of a centre city, an urban agglomeration – morphologically identified by a continuous built environment – and a banlieue with a predominant residential function, where the local residents gravitate towards the central agglomeration for commuting and migration (Lin et al., 2017; Van Hecke & Vanderstraeten, 2014).

For each of the 300 Flemish municipalities, data was collected from the 2023 survey of the Home Affairs Agency of the Flemish Government (Agentschap Binnenlands Bestuur, 2024) and official statistical agencies (Provincies in Cijfers, 2024), for variables corresponding to relevant factors from the Urban Livability Index (Higgs et al., 2019) and the City Love concept (Kourtiti et al., 2024a, 2024b), namely: (i) Social capital; (ii) Governance; (iii) Bike- and walkability; (iv) Transport; (v) Perception of cultural/recreational services; (vi) Green infrastructure; (vii) Housing; (viii) Ambient environment; (ix) Economy/employment; (x) Safety; and (xi) Facilities. These factors were represented by multiple indicators, as listed in Table 2 and considered a priori to belong to the composite factors based on theoretical concepts and earlier studies documented above. Survey data among citizens on urban-rural satisfaction and wellbeing served as the outcome variable of the model.

Table 2 provides some basic statistics for the indicators that were collected, with a majority of indicators consisting of percentage-based values. The only variables that are not included as percentages are the number of jobs per inhabitant, the registered crimes per 1000 inhabitants, and the available municipal/urban facilities. Special mention should be made of the latter, since this indicator is a compound factor that was calculated in a recent study by De Maesschalck and Van Hecke (2023). It includes a wide range of indicators, spread across 8 dimensions in Table 3.

The authors of the study (De Maesschalck & Van Hecke, 2023) combined these eight categories by creating a weighted sum score, resulting in the total availability of facilities,

Table 2. Liveability factors and underlying indicators ($n = 299$).

Factor	Indicator	Mean	St. dev.	Min	Max
Social capital	% of people satisfied with the contacts in their neighbourhood	0.81	0.05	0.60	0.90
	% of people considering that the neighbourhood has a strong social fabric	0.51	0.06	0.31	0.68
Governance	% of people with much trust in municipal government	0.30	0.09	0.08	0.57
	% of people satisfied with communication from the municipal government	0.56	0.09	0.34	0.80
Bike- and walkability	% of people with much trust in the police	0.45	0.05	0.33	0.61
	% of people satisfied with the state of cycling lanes	0.43	0.11	0.19	0.78
	% of people agreeing that there are enough cycling lanes in the municipality	0.50	0.12	0.13	0.83
	% of people satisfied with the state of pedestrian walkways	0.47	0.09	0.19	0.72
	% of people agreeing that it is safe to cycle in the municipality	0.49	0.10	0.23	0.79
Public transport	% of people agreeing that there are enough public transport options	0.52	0.14	0.09	0.91
Private transport	% of people agreeing that there is enough car parking space	0.58	0.09	0.28	0.80
Perception of cultural/recreational services	% of people satisfied with cultural facilities	0.59	0.18	0.16	0.91
	% of people satisfied with sports facilities	0.71	0.15	0.23	0.94
	% of people satisfied with restaurants	0.68	0.15	0.30	0.93
	% of people satisfied with opportunities to go out	0.51	0.14	0.17	0.85
	% of people satisfied with shopping facilities	0.56	0.16	0.15	0.91
Green infrastructure	% of people satisfied with forests or parks in their own municipality	0.81	0.09	0.52	0.96
Housing	% of people satisfied with their house	0.89	0.03	0.75	0.96
Ambient environment	% of people experience occasional or often noise from neighbours	0.33	0.05	0.21	0.47
	% of people experience occasional or often noise from bars, restaurants, and companies	0.16	0.04	0.08	0.31
	% of people experience occasional or often problems with littering	0.71	0.06	0.49	0.82
	% of people experience occasional or often problems with vandalism	0.16	0.07	0.02	0.44
Economy/Employment	Logarithm of the total number of employees (salaried + self-employed), divided by population	-1.14	0.43	-2.13	0.69
Safety	Logarithm of registered crimes per 1000 inhabitants	3.83	0.34	2.98	4.88
Facilities	Facilities per inhabitant ¹	0.83	0.31	0.39	2.21

Note: ¹facilities per inhabitant based on a compound factor calculated by De Maesschalck and Van Hecke (2023).

Table 3. Range of indicators across 8 dimensions.

Dimensions	Indicators
1. <i>Education</i>	Number of institutions and children/students in kindergarten, elementary school, secondary school, university college, university, and arts-based education
1. <i>Health care</i>	Number of hospital beds in general hospitals, psychiatric hospitals, hospital staff, general practitioners, dentists, maternity wards, surgical day hospitalization, childcare, elderly care, and centres for general wellbeing.
1. <i>Public and business services</i>	Banks, health insurance funds, postal offices, temporary employment agencies and services, real estate agencies, police, courts, and tax offices.
1. <i>Personal services</i>	Hairdressers, beauty salons, fitness, saunas, massage parlors, tattoo/piercing shops, laundromats, shoe/key repair shops, clothing/electronic repair shops, photographers, printers, animal trimming services, garages, car washes, and betting agencies.
1. <i>Hotels, restaurants, bars</i>	Restaurants, cafés, types of tourist accommodations, and employment statistics in hospitality.
1. <i>Shops</i>	Number of shops and employees.
1. <i>Culture and recreation</i>	Museums, cinemas, libraries, cultural centres, and a number of sports clubs.
1. <i>Sports</i>	Swimming pools, sports halls, tennis courts, athletics tracks, cycling tracks, ice skating/roller skating venues, pool/snooker halls, and bowling alleys.

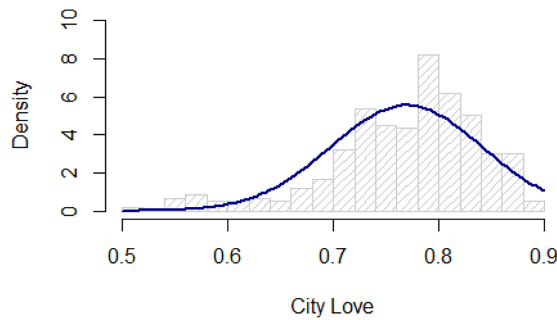


Figure 3. Histogram of city love across flemish municipalities.

adjusted for the number of inhabitants. This final score will be used in our analysis and serves as a simplified proxy to include different types of amenities mentioned at the end of Section 3, namely ‘consumer amenities’, ‘presence of a variety of specialized goods and services’, and ‘provision of specialized public services’. The remaining multi-indicator factors identified in Table 2 were recalculated as simple average scores, taking advantage of the fact that all indicators within a factor are of the same measurement level – i.e. percentage values – thus not assigning any preference-based weights to individual indicators. As such, 12 independent factors are identified. These explanatory factors are postulated to be significant in the formation of the ‘city love’ concept. The ‘city love’ concept itself is operationalized as the average score of three indicators: (i) the percentage of individuals expressing enjoyment of living in their municipality, (ii) the percentage of individuals expressing satisfaction with their municipality, and (iii) the percentage of individuals indicating pride in their municipality. As can be seen from Figure 3, on average, Flemish residents are quite satisfied with their municipality, with a left-skewed distribution.

The distribution shows generally high levels of city love across municipalities, with limited dispersion, suggesting that differences in urban satisfaction are more strongly related to qualitative and relational factors than to extreme structural disparities.

From the data discussed in Table 2, indicating that the majority of factors are proportions, and from the skewed distribution of the dependent variable, it is clear that the collected data presents challenges for traditional empirical methods. For instance, Douma and Weedon (2019) mention how standard assumptions of normally distributed error terms and constant variance are often violated in such cases, since proportions typically range between zero and one and tend to have non-constant variance across predictor values. In this context, Ferrari and Cribari-Neto (2004) propose a Beta regression as an alternative, specifically designed for continuous variables that are constrained between 0 and 1, while also being particularly useful when the dependent variable is non-normally distributed and skewed towards the upper or lower bounds by using a logit link function. Specifically, the Beta regression approach connects the dependent variable to a set of predictors using a linear model with unknown coefficients and a specified link function. A key advantage of the Beta regression model is also its flexibility, as it allows the Beta distribution to assume various shapes, including left-skewed, right-skewed, and uniform distributions. The present research uses the empirical estimation methodology within the

betareg R-package developed by Cribari-Neto and Zeileis (2010). The empirical results are presented in Section 6.

5. Empirical econometric results on city love

In this section, we present the results from the empirical analysis of the factors contributing to urban contentment, referred to as ‘city love’. To understand the key drivers of ‘city love’ across municipalities, we applied Beta regression models. The dependent variable in the analysis is ‘city love’, which represents the level of urban contentment within a municipality. The models account for several factors, including social capital, governance, bike- and walkability, and more. We first introduce the econometric models used in our analysis to examine the impact of these factors on ‘city love’:

- *Model 1 (without moderation effect)*

$$\text{City Love}_i = \beta_0 + \beta_1 \text{Social Capital}_i + \beta_2 \text{Governance}_i + \beta_3 \text{Bike-Walkability}_i + \beta_4 \text{Public transport}_i + \beta_5 \text{Private transport}_i + \beta_6 \text{Cultural Services}_i + \beta_7 \text{Green Infrastructure}_i + \beta_8 \text{Housing}_i + \beta_9 \text{Ambient environment}_i + \beta_{10} \text{Economy/employment}_i + \beta_{11} \text{Safety}_i + \beta_{12} \text{Facilities}_i + \epsilon_i,$$

where City Love_i is the level of satisfaction residents show towards their municipality i , calculated as the average of three related variables: i.e. enjoyment of living in the municipality, satisfaction with the municipality, and pride in the municipality. The other variables represent the factors affecting ‘city love’ (social capital, governance, etc.), and ϵ_i is the error term.

- *Model 2 (with moderation effect)*

$$\text{City Love}_i = \beta_0 + \beta_1 \text{Social Capital}_i + \beta_2 \text{Governance}_i + \beta_3 \text{Bike-Walkability}_i + \beta_4 \text{Public transport}_i + \beta_5 \text{Private transport}_i + \beta_6 \text{Cultural Services}_i + \beta_7 \text{Green Infrastructure}_i + \beta_8 \text{Housing}_i + \beta_9 \text{Ambient environment}_i + \beta_{10} \text{Economy/employment}_i + \beta_{11} \text{Safety}_i + \beta_{12} \text{Facilities}_i + \delta_1 (\text{Centre city})_i + \delta_2 (\text{City agglomeration})_i + \mu \text{Interaction Terms} + \epsilon_i,$$

where $\delta_{1,2}$ are dummy variables for centre cities and urban agglomerations, and the interaction term assesses how the effect of facilities (including consumer amenities, variety of specialized goods and services, provision of specialized public services), the economy, public transport, and private transport varies for different urban forms.

After introducing the econometric models, we now proceed with the statistical outcomes and analysis. We will first offer some general statistical outcomes. In Table 4, the mean factor scores per factor are compared for three typologies of municipalities: centre cities, city agglomerations, and municipalities outside of the agglomeration effects of centre cities. To identify whether or not differences were statistically significant, an analysis of variance (ANOVA) was performed with Tukey’s Honest Significant Difference (HSD) post-hoc comparison test. While differences are relatively modest, the analysis seems to indicate that the social fabric is stronger in municipalities outside of urban agglomerations and on the outskirts than it is in the centre cities. Outside of the cities, people appear to be generally more satisfied with their housing, as well as private trans-

Table 4. Comparison of mean factor scores by municipality type.

Factor	Centre city	City agglomeration	Outside of agglomeration
Social capital	0.622 ^{a, b}	0.654 ^{b, c}	0.677 ^{a, c}
Governance	0.425	0.450	0.435
Bike- and walkability	0.477	0.487	0.465
Public transport	0.627 ^a	0.575 ^b	0.462 ^{a, b}
Private transport	0.522 ^{a, b}	0.593 ^b	0.594 ^a
Perception of cultural/recreational services	0.740 ^{a, b}	0.589 ^b	0.585 ^a
Green infrastructure	0.786	0.812	0.814
Housing	0.872 ^{a, b}	0.893 ^b	0.898 ^a
Ambient environment	0.368 ^{a, b}	0.334 ^b	0.337 ^a
Economy/Employment	-0.703 ^{a, b}	-1.135 ^{b, c}	-1.260 ^{a, c}
Safety	4.273 ^{a, b}	3.794 ^b	3.720 ^a
Facilities	1.385 ^{a, b}	0.694 ^b	0.751 ^a
City love	0.750	0.763	0.778

Note: Superscripts ^{a, b, c} denote pairwise significant differences at $p \leq 0.05$.

portation – related to the availability of parking – while crime rates are lower and the ambient environment is of better quality – i.e. there are fewer complaints about noise, littering, etc. On the other hand, cities offer better public transportation options, more and better cultural/recreational services, and facilities in general, while also providing more employment opportunities. Interestingly, such positive and negative aspects might balance each other out, considering that there are no marked differences in ‘city love’ between the different typologies.

While individual factor differences provide some insight into typological differences between municipalities, our primary interest lies in identifying the factors that contribute to the assessment of spatial contentment and livability, referred to in our study on ‘city love’. To that end, a range of regression model applications was performed. Table 5 presents the results of Beta regression models, with ‘city love’ as the dependent vari-

Table 5. Beta regression results without and with the moderation effect.

Factor	Beta regression without a moderation effect		Beta regression with a moderation effect	
	Estimate	S.E.	Estimate	S.E.
Intercept	-3.199***	0.523	-3.058***	0.519
Social capital	2.877***	0.328	2.758***	0.320
Governance	2.446***	0.204	2.469***	0.199
Bike- and walkability	0.374**	0.136	0.379**	0.133
Public transport	-0.142	0.092	-0.108	0.096
Private transport (parking)	-0.229	0.168	-0.136	0.166
Perception of cultural/recreational services	0.883***	0.122	0.965***	0.121
Green infrastructure	0.693***	0.140	0.698***	0.136
Housing	0.848°	0.481	0.749	0.467
Ambient environment	-0.714	0.449	-0.647	0.445
Economy/Employment	-0.025	0.030	-0.048	0.044
Safety	-0.032	0.058	-0.034	0.056
Facilities	-0.034	0.054	-0.218*	0.093
Dummy centre city			-0.128	0.195
Dummy centre city * Facilities			0.257*	0.125
Dummy centre city * Economy			0.156	0.107
Dummy city agglomeration			0.084	0.153
Dummy city agglomeration * Facilities			-0.115	0.150
Dummy city agglomeration * Economy			0.059	0.061
Log likelihood	616 (on 14 Df)		626.2 (on 20 Df)	
Pseudo R ²	0.795		0.808	

Note: *** ≤ 0.001 , ** ≤ 0.01 , * ≤ 0.05 , ° ≤ 0.1 .

able and without (model 1) or with the agglomeration effect as a moderating variable (model 2).

The first model indicates that, in general, 'soul' factors appear to be the more significant contributors to the attachments felt for one's municipality, with social capital (2.877, p -value < 0.001), governance (2.446, p -value < 0.001), perception of cultural/recreational services (0.883, p -value < 0.001), and green infrastructure – as part of a city's aesthetics/appearance (0.693, p -value < 0.001) – all being strongly significant. In terms of 'body'-related factors, bike- and walkability (0.374, p -value = 0.006) is significantly positively correlated with 'city love'. Interestingly, better transportation – operationalized as satisfaction with public transport and availability of parking spaces – shows no significant effect. This contrasts with the positive effect of bike- and walkability, which might indicate that the latter is more locally-oriented and hence relevant for contentment with the local living environment, while the former is more externally oriented and linked to general connectivity rather than local livability.

Interestingly, and contrary to expectations, economic conditions and the provision and state of public facilities were not significant in model 1. To test the hypothesis that this non-significance might be related to agglomeration effects, model 2 introduces additional moderating effects based on urban agglomeration. Two dummy variables identify the municipalities that are centre cities, or that are situated within the urban agglomeration of the central cities, with the expectation being that the presence and quality of local facilities are of less importance for these latter municipalities, since they are well-connected to urban centres providing these facilities. On the other hand, municipalities outside of urban agglomerations – operating as a reference category in the model – are expected to be more self-sustained, and the presence of local facilities might therefore be of more importance for local livability and satisfaction. Models were tested with four explanatory variables included as a moderation effect, namely: facilities, economy (job opportunities), public transport, and private transport. All of these were identified as factors with regional significance and/or being important for regional linkages. However, due to the relatively small sample size ($n = 299$) and the fact that adding interaction effects can quickly increase the number of variables and add significant model complexity, we followed a stepwise approach to introducing additional interaction elements and only retained interactions if the Log Likelihood Ratio Test indicated a significant improvement for model fit. Neither public nor private transport interactions had a significant effect on model fit (p -value = 0.286, $Df = 4$) and were therefore ultimately not retained in model 2.

Compared to model 1, in the Beta regression results with moderation effects, identified significant relationships – containing social capital, governance, bike- and walkability, perception of cultural/recreational services, and green infrastructure as explanatory variables, and 'city love' as the dependent variable – appear to remain intact. Interestingly, the variable denoting the level of local facilities has become significant in model 2 (−0.218, p -value = 0.018). The negative value is surprising and would indicate that places that score higher in facility level have lower 'city love' scores. Considering the significance of the direct effect only after moderating variables were introduced, might indicate that the inclusion of interaction terms has changed the estimates of the main effects by accounting for variability in the data that was previously unmodeled. It therefore becomes relevant to also take these interaction terms between urban form and facili-

ties into account. Taking into account both the direct effect of facilities (-0.218 , p -value = 0.018) and the indirect effect of the interaction between facilities for centre cities (0.257 , p -value = 0.039) and agglomerations (-0.115 , p -value = 0.441) would indicate that the total effect of facilities on city love is more important for centre cities (0.039) and less important for agglomerations (-0.333) than for the reference category of municipalities laying outside of urban agglomerations (where the total effect is -0.218). While this seemingly provides some validation to the hypothesis that for municipalities with good accessibility to well-equipped urban centres, local municipal facilities are of less importance for livability/‘city love’, the non-significance of the interaction term for agglomerations means that we cannot make strong conclusions from the empirical results.

Using a likelihood ratio test, we further evaluated whether the moderation model is an improvement over model 1. With a likelihood ratio statistic of 20.5 for 6 degrees of freedom, the statistic is greater than the critical value of the chi-square distribution (12.592), indicating that model 2 is a significant improvement over model 1 (p -value = 0.002).

The Beta regression results in Table 5 offer valuable insights into the factors that drive ‘city love’. The key findings are summarized as follows:

- *Social Capital and Governance*

Social capital (2.758 , p -value < 0.001) and governance (2.469 , p -value < 0.001) show the strongest positive effects on ‘city love’. This suggests that higher levels of social cohesion and trust in local government are significant contributors to urban satisfaction. These findings align with the notion that cities with strong social networks and effective governance tend to have more satisfied residents.

- *Cultural services and green infrastructure*

Both cultural/recreational services (0.965 , p -value < 0.001) and green infrastructure (0.698 , p -value < 0.001) significantly contribute to ‘city love’. The availability of cultural amenities and green spaces enhances urban life and satisfaction. This emphasizes the importance of aesthetic quality and cultural richness in fostering a strong sense of place.

- *Bike-walkability*

Bike and walkability (0.379 , p -value = 0.004) show a positive correlation with ‘city love’, indicating that cities with better infrastructure for walking and cycling contribute positively to residents’ satisfaction. Although important, bike and walkability are less influential than social and governance factors.

- *Public and private transportation*

Neither public, nor private – measured as parking availability – showed a significant effect on ‘city love’. Compared with the positive effect of bike- and walkability, this might indicate that the relatively small scale of most municipalities – i.e. the level at which ‘city love’ is being measured – means that cycling and walking are preferred means of navigation, contributing to people’s general satisfaction, while private car use and public transport are potentially more useful for interregional trips and a number of larger Flemish cities such as Antwerp or Ghent.

- *Economic conditions and facilities*

Economic conditions and public facilities were not significant in Model 1, which suggests that these factors may not have as direct an impact on urban contentment for

certain municipalities. This is an important finding of examining potential moderating effects, which are incorporated in Model 2. After integration of the moderation effects of urban form in Model 2, the direct effects of public utilities became significant and negative (-0.218 , p -value = 0.018), thus suggesting that municipalities with higher facility levels had comparatively lower 'city love' scores and facilities, on their own, did not contribute to a positive perception of residents. These results can be further elaborated when also taking into account the interaction effects.

- *Agglomeration/interaction effects*

Model 2 introduces moderation effects based on urban agglomeration, including dummy variables for centre cities and agglomerations and interaction terms between these urban forms, facilities, and economic conditions. Only the interaction term between centre cities and facilities had a significant and positive value. Leading to the conclusion that within our sample, there were no large differences in the effects of economic conditions on 'city love' for centre cities, urban agglomerations, or municipalities outside of the urban agglomeration. In terms of the effect of facilities, there was some empirical support for the benefits played by available facilities for centre cities, where the total effects on 'city love' became slightly positive (0.039), as compared to a total effects score of -0.218 for the reference category of municipalities outside of urban agglomerations. Our hypothesis on agglomeration effects of urban amenities is less strongly supported since the interaction effect between agglomerations and facilities remained non-significant. Since, however, the direct effect of facilities only turned significant after inclusion of the interaction terms, it can still be directive to also assess the indirect and total effects for agglomerations, which appeared more negative (-0.333). This might suggest that municipalities within urban agglomerations are less dependent on local facilities for 'city love' due to the accessibility of amenities in nearby urban centres, compared to municipalities outside urban agglomerations, however, are more reliant on local amenities for urban satisfaction. However, the non-significance of the interaction terms and the negative values of the score would warrant more in-depth research, ideally taking advantage of larger sample sizes with more diversity in urban forms.

- *Likelihood ratio test*

The likelihood ratio statistic (20.5 for 6 degrees of freedom) confirms that Model 2 improves the fit over Model 1, providing some evidence that regional connectivity and agglomeration effects need to be accounted for when studying urban satisfaction.

Overall, 'city love' is most strongly influenced by social cohesion, governance, and cultural amenities, while everyday mobility - particularly bike- and walkability - also contributes positively to local wellbeing. Traditional transport modes, such as car use and public transport, appear less relevant at the municipal scale. These patterns can be interpreted through frameworks such as New Urbanism (which promotes walkable communities), CalmMobility (emphasizing predictable, human-scaled mobility), and the 15-Minute City (which reduces reliance on cars). This suggests that investments in walkable and bikeable infrastructure, alongside strong social and cultural provisions, may support 'city love' in local contexts.

From a broader perspective, these findings contribute to ongoing debates on sustainable urban transitions and human-centred urbanism. This aligns with contemporary

planning paradigms that emphasize inclusive governance, social cohesion, and everyday livability as central pillars of sustainable urban development. Moreover, by highlighting the role of regional connectivity and local amenities in shaping urban contentment, our study not only enhances understanding of local ‘city love’ but also extends the relevance of these findings to broader discussions in the field, beyond the Belgian/Flemish context.

6. Conclusions and outlook

Studies on livability and urban contentment and wellbeing have provided a rich catalogue of potential contributing factors to place-based happiness and ‘city love’. With the progress in (longitudinal) data collection and urbanometrics, models and methods are becoming more robust, detailed, and place-specific. One aspect that remains less explored, both in data collection and analysis, is the effect of connectivity and regional relationships within the context of local livability. Often, models are applied to data that is locally collected, within administrative boundaries. However, villages, towns, and cities form interconnected networks, and therefore the absence of certain functions might not be negatively perceived in cases where neighbouring towns/cities can cover such needs. This is particularly relevant for relatively densely populated regions such as Flanders (Belgium), where distances are small, and transport connectivity is rather adequate.

In the present paper, we have examined whether the recent and operational concept of ‘city love’ in Flemish municipalities is purely inward-focused or whether agglomeration effects are at play in this relationship. The moderating effect of urban agglomerations highlighted in our empirical analysis suggests that place-based happiness is contingent upon the connectivity of a municipality/town/city within a regional network of cities or towns. This aligns with Brian Berry’s (1964) proposition that cities are ‘systems in systems of cities’, and extends Tobler’s (1970) first law of geography by emphasizing that proximity and accessibility – the ‘near things’ – contribute substantially to place-based happiness.

This finding confirms that accessibility to amenities in nearby places significantly influences the level of wellbeing – or ‘city love’ – within a given municipality. Municipalities well-connected to central urban hubs exhibit reduced dependence on local facilities due to the availability of amenities in neighbouring areas. In contrast, municipalities outside of urban agglomerations, where connectivity is less direct, demonstrate a greater reliance on local amenities to sustain livability and satisfaction. This distinction underscores the importance of connectivity in urban satisfaction and emphasizes that regional dynamics must be considered when studying urban contentment.

These findings offer several practical implications for policymakers. Municipalities embedded within urban agglomerations may benefit more from improving connectivity to regional amenities rather than duplicating local facilities. In contrast, municipalities outside major agglomerations, where connectivity is less direct, rely more on local amenities and social infrastructure to sustain urban wellbeing. This suggests a need for targeted local investment in these areas. Across all contexts, the strong influence of social capital and governance underscores the importance of participatory planning, transparent communication, and community-building initiatives. These should be prioritized alongside investments in physical infrastructure to foster urban wellbeing.

While our Beta regression models confirmed the strong influence of factors like social capital, governance, and green infrastructure on city love, the moderation effect of connectivity emphasized the need for further advances in spatial econometrics. Specifically, the moderation model (model 2) improved our understanding of urban satisfaction by revealing how regional connectivity influences local contentment, with the interaction between agglomeration and facilities being particularly significant. These findings suggest that spatial econometric methods, which account for the interconnectedness of urban networks, are essential for capturing the complexity of urban satisfaction.

This study has some clear limitations. The available data should ideally cover more periods and might be of a more granular nature. Especially the human factors related to space appreciation and city love might need more detail. Nevertheless, the methodology here is rather generic and may provide a promising analytical frame for studies elsewhere.

Looking forward, this study suggests several important avenues for future research. Further development of spatial econometric models, particularly those incorporating regional networks and longitudinal data, could provide more profound insights into how agglomeration effects evolve over time and contribute to urban wellbeing. Moreover, integrating digital connectivity metrics and transportation networks into urbanometric studies would help explore the interplay between physical and virtual proximity, expanding our understanding of how urban happiness is shaped by both traditional and modern forms of connectivity. Particularly in relation to connectivity, a deeper exploration of the role of transportation could be warranted. Even though our study did not yield significant model improvements by including transportation as interacting variables, larger sample sizes and more exact measurements of public and private transportation connections might be hypothesized to play important – and different – roles in ‘city love’ and the potential agglomeration effects.

In conclusion, this study not only validates the role of regional connectivity in determining ‘city love’ but also emphasizes the importance of spatial econometric approaches for understanding the complex interdependencies of urban systems. Policymakers should consider these insights when designing interventions aimed at improving urban and regional livability, as such efforts must address both localized and networked amenities to foster sustainable and connected communities. In addition, future studies could link the concept of ‘city love’ to observed mobility patterns, social capital dynamics, or climate resilience indicators to further explore how urban environments shape wellbeing across interconnected urban systems.

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