**Going beyond global indicators:**

**The benefits of livability metrics informed by theory of human need**

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**MANUSCRIPT**

***Revision***

# Abstract

Livability has, next to sustainability, risen as the guiding principle for urban planning. Despite global indicators like the Economist Intelligence Unit’s (EIU) Global Livability Ranking being the gold standard for measuring livability, they fall short in capturing the current escalation of socio-spatial inequalities in cities. The article presents an alternative by operationalizing, for the first time, the need theory-informed concept of foundational livability describing the capacity of a place to provide the goods and services people require for need satisfaction. Through a novel indicator called Foundational Livability Indicator (FLI), we show that even in a city like Vienna that is continuously ranked top in global indicators, there exist severe socio-spatial inequalities with regard to (i) availability of essential services (e.g., healthcare, education) and social infrastructures (e.g., culture, nature); (ii) residual income levels (i.e. post-tax disposable household income minus the costs of essential services); and consequently (iii) foundational livability. By providing novel empirical evidence for global trends like the spatial divide between availability and affordability of essential services as well as the cost-of-living crisis unfolding in Vienna, our results contribute to challenging the dominance of global indicators and demonstrate the benefits of human need theory-informed livability metrics for city planning.

**Keywords:** Livability, urban socio-spatial inequalities, foundational economy, human needs, cost-of-living crisis, Austria.

# Introduction: The urgent need of alternative livability metrics to global indicators

Livability has, next to sustainability, risen as the guiding principle for urban planning (Ruth & Franklin, 2014). It commonly refers to how well the characteristics of the (built) environment meet the requirements of society in a specific place (Paul & Sen, 2020). These days global indicators like the Economist Intelligence Unit’s (EIU) Global Livability Ranking or Mercer’s Quality of Life Ranking are the gold standard for measuring livability (Froud et al., 2018). As part of neoliberal global urbanism promoting city competition and data-driven governance (Acuto et al., 2021), they produce universal livability scores for cities by blending socio-economic variables with subjective survey data (Cramer-Greenbaum, 2021; Paul & Sen, 2020).

This research is prompted by the fact that despite their popularity, global indicators fall short in comprehensively capturing the recent exacerbation of spatial inequalities in cities – for instance, with regard to the provisioning of essential services like material utilities or transport (e.g., Gao et al., 2022; Higgs et al., 2019; McClanahan et al., 2024) or of social infrastructures like public spaces (e.g., Friesenecker et al., 2021; Neier, 2023; Wu et al., 2022). Often, spatial differences are inextricably linked with social inequalities making most vulnerable groups in society suffer from poor living conditions the most (e.g., Kadi et al., 2022; Lynam et al., 2023; Riepl et al., 2025), particularly since the recent cost-of-living crisis (Calafati et al., 2023). With prices for housing, energy and food rising, the income levels of households are increasingly inadequate to pay for essential services (Causa et al., 2022; Lokshin et al., 2023). This cost-of-living crisis denies people (of low socio-economic status) the satisfaction of human needs (Bassens et al., 2023; Calafati et al., 2023) – which are, basic goods and services such as healthcare or education that are required for “minimally impaired participation in social life” (Gough, 2015). Against this backdrop, the development of alternative metrics beyond global indicators is important to enable a more comprehensive understanding of livability that allows people to satisfy their basic needs (Ruth & Franklin, 2014; Sheikh & Van Ameijde, 2022).

As an alternative to global indicators, this article develops a novel indicator called Foundational Livability Indicator (FLI). It operationalizes – for the first time comprehensively – the notion of foundational livability that has been emerged from human need theory and can be described as the capacity of a place to provide the goods and services people require to satisfy needs (Calafati et al., 2023). It depends on the availability of (i) essential services such as hospitals or schools and social infrastructures such as community spaces or parks and (ii) residual income – that is, the post-tax disposable household income after paying for essential services (Froud et al., 2018). The FLI combines two existing metrics, namely Foundational Accessibility Indicator (FAI) developed by Riepl et al. (2025) used to measure (i) the availability of essential services and social infrastructures and the Foundational Economy 4 (FE4) metric developed by Bassens et al. (2023) used to proxy the affordability of essential services by estimating the residual income households have left after paying for essential services. In that sense, the FLI offers a novel approach to measuring livability by focusing on access to essential services, integrating two core dimensions of accessibility namely availability and affordability (Smith et al., 2012; Vogel et al., 2024).

To illustrate the merit of our approach, the article applies the FLI to a case study. We take the city of Vienna as it appears to be particularly interesting for our endeavors. In Austria’s capital, city planning centers around livability, considering the provision of high and equal living conditions as “the central core of the Viennese path” (City of Vienna, 2019, Preface) for the future. It also traditionally ranks top in global indicators (EIU, 2023; Mercer, 2023). At the same time, there is increasingly empirical evidence accumulating pointing towards socio-spatial inequalities in terms of livability in the city (e.g., Fersterer et al., 2019; Kadi et al., 2022; Riepl et al., 2025). We thus wonder: To what extent do spatial inequalities with regard to foundational livability exist despite Vienna’s top rankings in global indicators? This has highly important implications for Vienna’s current city planning that has been quite active in recent years, with more than 120 urban development projects being either recently finished, planned or implemented (City of Vienna, 2024a). Our analysis of foundational livability is therefore critical to understand whether current city planning in Vienna adequately addresses socio-spatial inequalities in terms of livability in the city, thus providing everyone the base to satisfy their needs.

To address these questions, the remainder of this paper is structured as follows. After this introduction, Section 2 provides background information on (foundational) livability and how we contribute to existing literature. In Section 3, we elucidate the FLI methodology and describe the case study whereas Section 4 highlights the results for essential services (via the FAI), residual income levels (via the FE4) and foundational livability (via the FLI) respectively. In Section 5, we discuss the broader implications of our findings for recent global trends in cities like the cost-of-living crisis and for city planning. Section 6 concludes by underscoring the benefits of livability metrics that are informed by theory of human needs.

# Background: Livability beyond global indicators

## Dominance of global indicators

Despite its recent popularity incited through global indicators (Acuto et al., 2021; Khorrami et al., 2021), the notion of livability[[1]](#footnote-2) can be traced back to Aristotle’s concept of eudemonia discussing the good life (Capitanio, 2017). It is “a complex, multifaceted concept” (Knox & Mayer, 2009, p. 24) that originally can be described as the degree to which “a society meets the requirements and needs of its own people” (Paul & Sen, 2020, p. 91). In more practical terminology, livability can be understood as how well the (built) environment of a place (e.g., infrastructure, ecosystems) meets people’s needs (e.g., health, education) (Ruth & Franklin, 2014).

There have been several approaches to proxy livability, ranging from some metrics taking neighborhoods (e.g., American Association of Retired Persons (AARP) livability index) as the unit of analysis, while others cities (e.g., Mercer’s Quality of Living Index) or countries (e.g., UN Human Development Index) (Ahmed et al., 2019; Khorrami et al., 2021). Early livability research was concerned with the spatial availability of amenities, borrowing research techniques from accessibility literature such as point of interest (POI) measures (e.g., distance to a specific place) (Paul & Sen, 2020). Over the course of neoliberal globalization and liberalization inter alia resulting in rising socio-economic inequalities, the integration of socio-economics like income or subjective data like life satisfaction surveys has increasingly become popular.

Despite some scientific indicators (e.g., Higgs et al., 2019; Tan et al., 2014; Wyatt, 2009), these days global indicators developed by private corporations like the EIU’s Global Livability Ranking or Mercer’s Quality of Life Ranking are the gold standard for measuring livability (Khorrami et al., 2021; Paul & Sen, 2020). They came along with the rise of material standards and consumerism since the late 1950s, initiating a conceptual crack where the original meaning close to the minimum requirements of a good life and need satisfaction was replaced by a focus on arbitrary lifestyle choices and subjective preferences (Ruth & Franklin, 2014). Their approach is to compare the livability of cities based on their subjective judgment of what livable means, largely equating it with the attractiveness of a place for business (Ahmed et al., 2019; Froud et al., 2018). As Table 1 showcases, the ranking criteria they use differ but broadly revolve around stability, healthcare, culture, environment, education and infrastructure. There are, however, large variations in how the criteria are measured and weighted (Khorrami et al., 2021). EIU, Mercer and Monocle deliberately keep their entire measurement process shielded from public scrutiny as they consider them as “proprietary methods and research” (Cramer-Greenbaum, 2021, p. 72). In 2023, Vienna was listed top in the rankings by EIU, Mercer and Monocle.

Table . Overview of global indicators (City of Vienna, 2024b; EIU, 2023; Mercer, 2023; Monocle, 2023)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Published by** | **Ranking criteria** | **First placed city in 2023** |
| **Global Liveability Index** | EIU | Stability, Healthcare, Culture & Environment, Education, Infrastructure | Vienna |
| **Quality of Living Index** | Mercer | Political & Social Environment, Medical & Health Considerations, Socio-Cultural Environment, Schools & Education, Economic Environment, Public Services & Transportation, Recreation, Consumer Goods, Housing, Natural Environment | Vienna |
| **Quality of Life Survey** | Monocle | Safety/Crime, Medical Care, Climate/Sunshine, International Connectivity, Public Transportation, Quality of Architecture, Environmental Issues & Access to Nature, Urban Design, Business Conditions, Pro-activity Policy Development, Tolerance | Vienna |

City planners often place a lot of trust in such rankings regarding them “as a valuable barometer and benchmarking tool” (Cramer-Greenbaum, 2021, p. 73) and a “validation of policy choices” (Taylor, 2011, p. 1). Commenting on Vienna’s top ranking in the 2023 EIU ranking, the Mayor of Vienna, Michael Ludwig, for instance, said this:

*“The frequent top rankings prove that Vienna is a well-functioning city, based on sound policy decisions, that is ready for the future. Everyone in our city benefits from the high quality of life, the stability, and the reliable infrastructure.”* (City of Vienna, 2024c).

Despite their prominence, such global indicators exhibit a number of caveats. This article is concerned with three major shortcomings, namely (i) their focus on “an arbitrary list of measurable social and economic indicators” (Froud et al., 2018, p. 11) instead of objective standards for livability like human need satisfaction (Brand-Correa & Steinberger, 2017; Ruth & Franklin, 2014; Sheikh & Van Ameijde, 2022), (ii) their emphasis on the potential livability of a place neglecting people’s capacity to actually access services (e.g., through sufficient levels of residual income) (Cramer-Greenbaum, 2021; Smith et al., 2012), and (iii) their generalization of living conditions assigning universal scores to cities without scrutinizing the socio-spatial inequalities within cities (Froud et al., 2018; Higgs et al., 2019).

## Foundational livability

Foundational livability is a novel concept by the Foundational Economy Collective[[2]](#footnote-3) developed as a response to the flaws yet popularity of global indicators (Froud et al., 2018). It employs an understanding of livability close to the original meaning by focusing on the minimum requirements for a good life for everyone (Calafati et al., 2023). Inspired by human need theory (Doyal & Gough, 1991; Maslow, 1943; Max-Neef, 1991) and capability approaches (Nussbaum, 2000; Sen, 1999), it focuses on the accessibility of essential services and social infrastructures, so that people can have “minimally impaired participation in social life” (Gough, 2015) and experience substantive freedom, namely “the freedom to live a life they have reason to value” (Sen, 1999, p. 295). Albeit being precise on *why* they are important and *what* they actually consist of, human need theory and capability approaches are less clear on a vision of *how* a realization could look like. The notion of foundational livability hereby yields important insights to the rather abstract and general arguments about human needs (and capabilities) by adding a material and specific context being considered as “[…] the practical analogue of the large theoretical literature on human needs and human capabilities” (Foundational Economy Collective, 2018, p. 95).

particularly of Doyal & Gough (1991). The fundamental idea behind this human need theory is that there exists “a finite number of self-evident (i.e. universal, recognizable by anyone)” (Brand-Correa & Steinberger, 2017, p. 46) and “incommensurable (thus satiable, irreducible and non-substitutable)” (ibid.) needs intrinsic to human existence. They range from adequate shelter to nutrition and healthcare and together, if sufficiently satisfied, allow everyone a “minimally impaired participation in social life” (Gough, 2015). If all needs are satisfied, foundational livability can be seen to something like substantive freedom in the Senian sense, namely “the freedom to live a life they have reason to value” (Sen, 1999, p. 295)

It underlies an eudemonic understanding of wellbeing that is concerned with enabling long-term human flourishing for everyone collectively, instead of short-term pleasure maximization of singular individuals common in hedonistic approaches (Brand-Correa & Steinberger, 2017).

Why Gough and not Maslow? Don’t argue for any of the two. Just say FE is practical analogue to both as well as capability approach. Moreover, our novel approach is that we provide for a comprehensive method compatible with planning stakeholders and policy makers. As a city planner, it is hard to ensure to provide for more personal elements such as love or affection. Foundational economy focuses more on provisioning process.

Link from need theory to FE: Albeit being precise on *why* human needs are important for sustainability and *what* they actually are, Gough’s need-based approach falls short in providing a clear vision on *how* a realization could look like (FE Collective, 2018). Yet, Gough acknowledges that “[t]he idea of non-substitutable need satisfiers entails a different conception of the economy as a network of ‘systems of provision’” (2019: 26). Thus, the concept of the FE can yield important insights to the rather abstract and general arguments about human needs (and capabilities) by adding a material and specific context. As a matter of fact, it’s social provisioning of essential goods and services is considered as “[…] the practical analogue of the large theoretical literature on human needs and human capabilities” (FE Collective, 2018: 95).

Accordingly, for a person to enjoy foundational livability all three conditions below need to be fulfilled:

1. *The spatial availability of essential services*. Essential services are captured with the concept of the foundational economy, describing the infrastructures of everyday life including the material foundations like utilities and transportation and the providential foundations like healthcare and education (Foundational Economy Collective, 2018; Hansen, 2022; Martynovich et al., 2023). It constitutes “the practical analogue of the large [sic] theoretical literature on human needs” (Foundational Economy Collective, 2018, p. 95; see Gough, 2015).
2. *The spatial availability of social infrastructures*. Social infrastructures represent “the amenities and spaces that bring people together to build meaningful relationships” (Kelsey & Kenny, 2021, p. 205), consisting of hard infrastructures (e.g., parks, public spaces) that form the basis for soft infrastructures like voluntary action in civil society or collective enjoyment, thus highly “relevant for human flourishing” (Calafati et al., 2023, p. 205).
3. *Sufficient levels of residual income*. Residual income captures the disposable income households have after paying for taxes and the cost of essential services (Bassens et al., 2023). Residual income matters because many essential services, social infrastructures and other non-essential amenities are provided via the market economy, and thus require money to acquire them (Froud et al., 2018).

Foundational livability is the practical analogue of “the large [sic] theoretical literature on human needs and human capabilities” (Foundational Economy Collective, 2018, p. 95; see Gough, 2015).

. is, in contrast to hedonismconcerned with enabling everyone in society to flourish and fully participate in the way he or she chooses. chosen form of life to enable an individual “to flourish and fully participate in her chosen form of life” (Brand-Correa & Steinberger, 2017, p. 44). Importantly, this implies

negative and minimalist: the goal is “minimally impaired participation in social life”

prioritizes long-term human flourishing over short-term pleasure maximization. short-term pleasure m the individual in the broader context of society.

For an individual to be well, she must be able to flourish and fully participate in her chosen form of life (Doyal and Gough, 1991). “Well-being is not just a matter of subjective experiences, it is a matter of what one can do or be in one's life” (O'Neill,

2006, p. 165). Eudaimonic

well-being as the enabling

of humans to reach their highest potential within the context of their society

Such a broadening of the unit of analysis allows for social institutions and political systems to be studied in light of their ability to enable individuals to flourish within them (p.44)

## Contributions

This article presents the Foundational Livability Indicator (FLI) for Vienna’s 250 census districts. It thereby aims to contribute to the current literature in three ways:

1. It contributes to the foundational economy literature by developing the first comprehensive indicator of foundational livability. While previous research only “explored empirically [foundational livability] in a preliminary way by considering gross, disposable and residual income” (Froud et al., 2018, p. 1), we By meshing the availability of essential services and social infrastructures (via the FAI) with affordability (via the residual income levels assessed by FE4), the FLI provides a novel perspective on socio-spatial inequalities that centers around the accessibility of essential services.
2. The article enriches livability research with a foundational economy and human need perspective. While other local indicators capturing livability tend to use the availability of a few services or socio-economic indicators (e.g., Benita et al., 2021; Higgs et al., 2019; Mouratidis, 2018), the FLI relies on a comprehensive set of services that represent the minimum requirements people universally rely upon for need satisfaction (Calafati et al., 2021, 2023). Moreover, it advances previous efforts to link livability with need theory (e.g., De Haan et al., 2014; Sheikh & Van Ameijde, 2022) by using Gough’s theory of human needs which has proven to be better conceptually (e.g., non-hierarchy of needs) and methodologically (e.g., objective, tangible and measurable needs) for quantitative, empirical research (e.g., Brand-Correa & Steinberger, 2017; O’Neill et al., 2018; Rojas et al., 2023).
3. It lastly complements efforts to break with the dominance of global indicators by highlighting the incomplete picture they convey with regard to living conditions for the case of Vienna in three ways (Capitanio, 2017). First, article substantiates empirical evidence for spatial inequalities (e.g., Kadi et al., 2022; Neier, 2023; Riepl et al., 2025). Second, it contributes to insights gained from other alternative indicators on how current urban trends like the spatial divide between service availability and affordability (e.g., Cramer-Greenbaum, 2021; Higgs et al., 2019) and the cost-of-living crisis (e.g., Calafati et al., 2023; Novy et al., 2024) materialize in Austria’s capital.
4. Social infrastructures represent “the amenities and spaces that bring people together to build meaningful relationships” (Kelsey & Kenny, 2021, p. 205). They consist of hard infrastructures (e.g., parks, public spaces) that in turn form the basis for soft infrastructures like voluntary action or collective enjoyment. Social infrastructures are important for wellbeing and hence foundational livability because they provide the space “relevant for human flourishing” (Calafati et al., 2023, p. 205). Table 2 showcases the social infrastructures included in the analysis namely culture and nature.

# Methodology

## Foundational Livability Indicator (FLI)

To exemplify the merits of a livability metric that is informed by human need theory, our research combines the Foundational Accessibility Indicator (FAI) by Riepl et al. (2025) with the Foundational Economy 4 (FE4) metric developed by Bassens et al. (2023) to develop the Foundational Livability Indicator (FLI) as a proxy for foundational livability. The analysis is conducted for average households per Vienna’s census districts. Additional information on the data used and the limitations of the research design can be found in the supplementary material.

**Step 1: Assessing the availability of essential services and social infrastructures via the FAI**

The FAI represents a Point of Interest (POI) metric that measures the availability of essential services and social infrastructures. Specifically, it relies upon the container method where we measure whether service providers are located within a given distance (Phillips et al., 2023). It is a common measure technique often used in accessibility research due to simple yet insightful application (e.g., see Dony et al., 2015; Luo & Wang, 2003; Phillips et al., 2023).

In our case, this means that (i) we quantify the providers of each sector of the foundational economy (e.g., healthcare) and social infrastructures (e.g., culture) per census district including neighboring areas (ii) and then divide the quantities by the population of each census district. Neighboring areas are defined as 15min isochrones from the centroid of each census district to follow the 15-minute city concept (e.g., see Moreno et al., 2021). The FAI is calculated as shown in Equation 1:

Equation

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where is the FAI for each sector s and census district d (1-250), is the sum of all service providers (per sector and census district), is the sum of service providers in the neighboring areas (per sector and census district), and is the population (per census district). A FAI value above zero for a specific sector (e.g., healthcare) and census district indicates spatial access to foundational infrastructures (e.g., doctors, pharmacy stores) that lies above the citywide average, whereas a value below zero indicates access below the average.

The study uses the eleven sector of the foundational economy to identify providers of essential services (Table 2), namely healthcare (e.g., doctors, pharmacies), social care (e.g., kindergarten, nursing homes), education (e.g., schools, libraries), housing (e.g., municipal housings), public administration (e.g., admin offices), law & order (e.g., police stations), material utilities (e.g., recycling centers, waste containers), transport (e.g., metro stations, bus stops), food (e.g., supermarket, kiosk), postal services (e.g., postal office), and banking (e.g., banks, ATM). The availability of social infrastructures is also measured with the FAI. For social infrastructures, the services providers from the sector of culture (e.g., museums, cinemas) and nature (e.g., green areas, public parks) are used. A complete list of all essential services and social infrastructures can be found in the supplementary material.

On the basis of the sectoral FAI, we also calculated the average FAI per census district, which provides a proxy for the overall availability of the essential services and social infrastructures. It should be noted that the FAI (sectoral or average) cannot address the incommensurability of essential services and social infrastructures: People need all essential services and social infrastructures at once to live a decent life (Calafati et al., 2023; Foundational Economy Collective, 2018). For instance, in the case of the sectoral FAI, but not in real life, a high number of dentists can compensate a lack of opticians. Similarly, in the case of the average FAI, an excess of healthcare providers can make up for a lack of service providers in culture.

Table : Overview of essential services and social infrastructures

|  |  |  |
| --- | --- | --- |
|  | Foundational sectors | Service providers |
| Essential services | Material utilities | Energy grid, water sewerage, telecoms, waste management (Recycling center, special deposits, waste containers) |
| Transportation | Public transport (subway, trams, bus), bike sharing, car sharing |
| Food supply | Supermarkets, bakery, kiosk, restaurant, bar, cafe |
| Postal services | Post offices |
| Retail banking | Bank, ATM, Exchange office |
| Healthcare | Hospitals, doctors, pharmacy stores, dentist optician |
| Social care | Nursing homes, kindergartens, social facilities |
| Education | Schools, libraries, universities, music schools, education center |
| Housing | Council housing |
| Law and order | Police stations |
| Public administration | City and district administration offices |
| Social infrastructures | Culture | Museums, community center, cinemas, theatres, attractions, event venues |
| Nature | Parks, gardens, green spaces, forests |

Service providers related to the energy grid, water and sewage systems, and telecommunications are excluded from our analysis due to limited data availability and methodological constraints. In addition, the analysis focuses exclusively on end-user service providers, thereby omitting upstream actors in the supply chain (e.g., farmers and food processors in the case of food provision).

**Step 2: Assessing residual income via the FE4**

The article applies the FE4 to Vienna’s 250 census districts by subtracting the monthly cost for essential services from the average monthly disposable income of households – which is the available income remaining after paying for taxes and social contributions. We follow existing research by only focusing on four of the eleven foundational sectors – namely housing, utilities, transport, food – because of limited data availability (Bassens et al., 2023; Calafati et al., 2023; Froud et al., 2018). Costs are calculated as follows:

* Housing: The cost of housing (CH) is estimated by multiplying census-district data on household composition (e.g., amount of 1-person households, 2-person households) (City of Vienna, 2023) with municipal-district data on average floor space per person (m2/p) and average rents (€/m2) (Immobilienscout24, 2023), as highlighted in Equation 1:

Equation

* Utilities: Cost for utility (CU) are estimated based on the costs of electricity, heating/cooling, and internet services. Electricity costs are calculated using current electricity prices per kilowatt-hour (kWh) from Statistics Austria (2024) combined with average household electricity consumption data by household type from E-Control (2024), Austria’s electricity and gas regulatory authority. Heating costs are similarly derived using current gas prices (kWh) (Statistics Austria, 2024), household floor space (m²), and the energy efficiency of residential buildings (kWh/m²). As no floor space data per household type is available (e.g., average floor space of 1-person households in census district), we assume a minimum of 40 m² for a one-person household throughout the city, based on Vienna’s housing policy benchmark (City of Vienna, 2013). We then apply a degressive scaling pattern to account for the fact that additional household members typically share existing common areas such as the kitchen and bathroom. Specifically, we add 32 m² for a second person—reflecting the likely inclusion of additional shared living or dining space in a two-adult household—and 16 m² for each additional person. This lower increment for third and fourth household members acknowledges that these are often children or individuals in shared living arrangements, who do not require duplicated facilities. Building energy efficiency is determined by the predominant year of construction in each census district. In collaboration with the Viennese energy consultancy Lechner & Partner (Lechner und Partner, 2024), we assign the following efficiency ratings: 250 kWh/m² for buildings constructed before 1960, 150 kWh/m² for those from 1961–1980, 100 kWh/m² for 1981–2005, and 50 kWh/m² for buildings built after 2006. Internet costs are based on current offers from the Viennese provider Drei (Drei, 2024), which charges €30 per month for a subscription providing 100 Mbit/s download speeds under the “DataNet100” package. This rate is broadly consistent with pricing from other local internet providers (Tarife.at, 2025).

Equation

* Transport: The cost for transportation (CT) in Vienna is based on the relative share (13.9%) of household[[3]](#footnote-4) expenditures used for transportation (Statistics Austria, 2020). A relative approach is suitable in the case of transport as mobility expenditures positively correlate with income (Baltruszewicz et al., 2023).

Equation 4

* Food: The estimation of the cost of food (CF) is based on the average relative share (11.8%) of household expenditures for food (Statistics Austria, 2020). Since food expenditures positively correlate with income, a relative approach is appropriate for estimating the cost for nutrition (Jovanovic, 2016).

Equation 5

**Step 3: Analysis of foundational livability in Vienna via the FLI**

The FLI synthesizes the results of the FAI and FE4 by standardizing both metrics (z-variation) and adding them with equal weight (50% FAI, 50% FE4). The FLI shows regional differences with regard to foundational livability across Vienna’s census districts. Census districts with low FLI values represent areas where living conditions are relatively poor, whereas census districts with top FLI values areas where living conditions are high.

## Case study Vienna

Vienna, the capital of Austria, is located in the northeastern part of the country, near the borders with Slovakia, Hungary, and the Czech Republic. As of 2024, it has a population of approximately 1.98 million residents, making it the most populous city in Austria. The city covers a total area of around 414.6 square kilometers, and serves as both a federal province and the administrative, cultural, and economic center of Austria (City of Vienna, 2025). Vienna consists of 23 municipal districts split into 250 census districts (*Zählbezirke*) from which we excluded mostly unhabituated ones. The remaining 237 census districts feature population sizes between 1000 and 27000 people. The historic city center constitutes the 1st municipal district (*Innere Stadt*). It is encircled by a major roadway called the *Ring* and the Danube Canal. The inner area represents the 2nd to the 9th as well as the 20th municipal district. It is separated from the outer area in the west (10th to 19th, and 23rd municipal district) by another major roadway called the *Gürtel* and in the east from Transdanubia by the Danube River (Figure 1). The inner area was largely added to the historic city center by the 1850s, whereas most parts of the outer area (particularly the west) was added in the 1890s. Major parts in the southern outer area and Transdanubia were gradually integrated to the city over the course of the first half of the 20th century.

Despite Vienna’s consistently high rankings in global indicators (City of Vienna, 2024b), a growing body of research points to a gradual decline in foundational livability across the city. Studies highlight persistent socio-spatial inequalities, particularly in access to essential services (e.g., Fersterer et al., 2019; Riepl et al., 2025) and social infrastructures (e.g., Friesenecker et al., 2021; Neier, 2023) as well as disparities linked to socioeconomic status (e.g., Hatz et al., 2016; Kadi et al., 2022).

City planning can act as a vehicle or a barrier of foundational livability. International studies show that in the neoliberal era, urban development increasingly has become some “window dressing for traditional growth-machine backed urban public-private redevelopment projects that seek, as a key end, an increase in economic activity and property values – a revalorization of the “underutilized” urban space that brings both wealth and fiscal health to central places” (Immergluck & Balan, 2018, p. 549). Similarly, Gunder argues that urban development projects have been “deployed selectively by planners or politicians as a materialization of dominant institutional ideologies supportive of growth and capital accumulation that maintains the status quo of class inequalities” (Gunder, 2006, p. 209). As often key objectives have become of economic nature in city planning, there has been plenty of recent cases where urban development projects have led to gentrification fueling socio-spatial inequalities in terms of access to, for instance, housing or clean air (Immergluck & Balan, 2018; Nieuwenhuijsen, 2020; Wei & Chen, 2024).

In Vienna, city planning has resisted neoliberal pressures (e.g., of privatization, austerity) more than in other major European cities like London or Paris (Kadi et al., 2022; Novy et al., 2024). As a matter of a fact, Vienna’s top placements in global rankings (City of Vienna, 2024b) are ascribed to city’s long tradition of featuring urban planning that strongly focuses on the provisioning and accessibility of essential services and social infrastructures (Bärnthaler et al., 2020; Froud et al., 2018). For instance, the public takeover of utilities (gas, electricity, water), sanitation and tramways in the 1890s fundamentally improved the living conditions in the city (Bärnthaler et al., 2020), similar to the period of Red Vienna in 1920s where an extensive welfare regime was rolled out to cope with the catastrophic living conditions after World War I (Haderer, 2023; Schorske, 2012). Also today, the City of Vienna (2019, 2022b, 2024a) remains determined to focus on people’s wellbeing, enhancing the living conditions for everyone. In key policy documents, such as VIENNA 2030 Economy and Innovation, ensuring high livability is recognized as “the central core of the Viennese path” (City of Vienna, 2019, p. 5). Similarly, the more recent Smart Climate City Strategy emphasizes that that the key goal is “to ensure that the city we pass on to the younger generations is one that will still be among the most livable on the planet in 50 or 100 years” (City of Vienna, 2022a).

Accordingly, the City has been investing significantly in urban development projects designed to improve the living conditions across the city. Figure 1 provides a map of all publicly managed urban development projects listed by the City of Vienna (2024a), which we classified into a typology to represent current city planning efforts. With regard to status, the typology distinguishes between recently completed (N = 15) and currently implemented projects (N = 64) as well as projects still in the planning phase (N = 44). With regard to size, the typology differentiates between small, medium and large city planning projects. Small city planning projects (N = 67) are projects that mostly concern the development efforts of single buildings (e.g., construction of small residential housing, retrofitting of a hospital or public space). Projects concerned with developing neighborhoods and multiple buildings (e.g., residential housing blocks in combination with kindergartens or schools) represent medium-sized efforts (N = 45). Projects fall under the category “large” (N = 11) when they deal with the development of entirely new (e.g., aspern Seestsadt) or already existing city quarters (e.g., Sonnwendviertel, *Nordbahnviertel*) or with municipal districts (e.g., *Zielgebiet Floridsdorf*). As shown in Figure 1, out of all 123 projects, most and largest development efforts currently take place in the south and east of the city. More detailed information on the applied typology can be found in the supplementary material.

A map of a city with red dots

Description automatically generated

Figure : Map of City of Vienna split into four city regions (City center, Inner area, Outer area, Transdanubia). Municipal districts are numbered (1 - 23). Key geographical features included are the Ring, the Gürtel, the Danube Canal and the Danube River. White areas represent the 13 census districts excluded because of a lack of data or representativeness (e.g., uninhabited census districts like Schönbrunn Palace or areas of the Prater). Dots display city planning projects from the City of Vienna, with the size indicating the geographical coverage of the project (e.g., building, neighborhood, municipal district) while color the implementation status (currently implemented, recently completed, still planning).

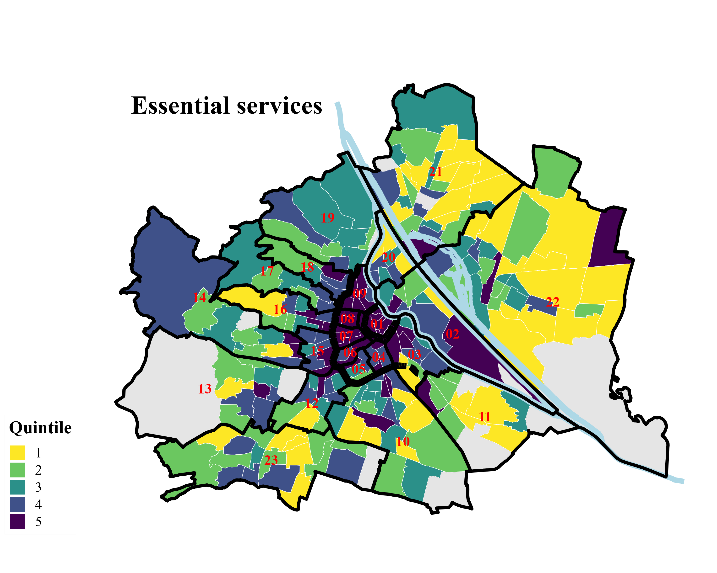
# Results

In the following, we present our findings on essential services and social infrastructures (measured via the FAI), residual income (measured via the FE4), and foundational livability (measured via the FLI). The results are displayed in quintiles, with the first quintile encompassing the lowest 20% values of the respective indicator and the 5th the highest 20%.

## Availability of essential services and social infrastructures in Vienna

The analysis shows that there are major spatial differences in essential services and social infrastructures. For essential services (Figure 2, left), census districts with highest availability can be found in the city center and inner area. In the outer area close to the *Gürtel*, census districts also feature high FAI values predominantly in the 4th (or even 5th) quintile, particularly in *Währing* (18th municipal district), *Ottakring* (16th), and *Rudolfsheim-Fünfhaus* (15th). The rest of the outer area in the north-west predominantly features census districts with mid-level FAI values, whereas the south and Transdanubia – the major development areas of the city (see Figure 1 in Section 3) – largely values below city average. Particularly to the east of the Danube River, in Transdanubia, there are a plethora of census districts with FAI values in the 1st quintile.

For social infrastructures (Figure 2, right), the concentration of census districts with high FAI values extends over a smaller area compared to the distribution of essential services. Only *Innere Stadt* (1st municipal district) features exclusively census districts with FAI values from the 5th quintile while there are even large parts of the inner area like *Landstraße* (3rd municipal district) or *Wieden* (4th) that have census districts with social infrastructures below the city average. Aside from the high FAI values in the city center driven by culture, it is also census districts in the outskirts (i.e. the areas of the outer area and Transdanubia) that feature high FAI values due to a relatively high availability of nature. In between the outskirts and the city center, the results show (almost symmetrically) a geographical circle parallel to the *Gürtel* and Danube canal with numerous census districts with low FAI values. Two major concentrations of census districts with low FAI values (mostly from the 1st quintile) can be found in the north-west of *Favoriten* (10th municipal district) and in the middle of *Floridsdorf* (21st).

 A map of a city

Description automatically generated

Figure : Availability of essential services and social infrastructures in Vienna in 2023 (measured with the Foundational Accessibility Indicator). Dark blue indicates highest availability and declining availability is indicated by the gradient to yellow. Excluded census districts are colored grey. Red numbers in the map indicate district numbers.

As such, the results show that the availability of both essential services and social infrastructures is best in the center of the city and starts to drop especially when leaving the inner area. This is more evident for social infrastructures (particularly culture) than for essential services because the latter can also be found in high numbers per capita partially in the outer area close to *Gürtel*. In fact, the distribution of essential services is additionally characterized by a north-west and south-east divide, with the north-west often featuring higher availability. This divide is better observable in sectors like healthcare, education or housing while less in others like public administration, transport or banking. Overall, the current city planning projects largely match the identified provisioning gaps with regard to the availability of essential services and social infrastructures since more and larger projects are located in the south and east than anywhere else in the city (see Figure 1).

## Residual income in Vienna

When looking at the distribution of residual income for average census district households (Figure 3), the results highlight that people in the outskirts of Vienna (outer area, Transdanubia) have the highest monthly disposable income left after paying for housing, utilities, food, and transport. In particular, in the north-west like *Penzing* (14th  municipal district) or *Hernals* *(17th)* but also partially in the south-east like in *Favoriten* (10th) or *Donaustadt* (22nd), a plethora of census districts features residual income levels from the 5th quintile. In contrast, there are three areas where rather low levels of residual income can be found, namely the city center represented by *Innere Stadt* (1st municipal district), areas close to *Gürtel* in the south like *Favoriten* (10th) and *Simmering* (11th), and the east of the city like *Brigittenau* (20th) or *Floridsdorf* (21st). In eleven cases, census districts even feature residual income levels below zero – which means that on average, people’s income levels in these parts of Vienna are currently insufficient to pay for the cost of housing, utilities, transport, and food. Despite two cases in the inner area, this is a phenomenon predominant in the outer area and Transdanubia. On average, in the inner area, medium levels of residual income can be found since census districts located close to the *Gürtel* feature low levels of residual income while those located close to the *Ring* are rather high. In that sense, current city planning projects are often located close to the provisioning gaps identified for residual income when it comes to the south and east of the city (see Figure 1). In the city center (and inner area close to *Gürtel*) where low levels of residual incomes are also detected, little city planning is seen.

A map of a city

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Figure : Residual income for average household in Vienna in 2023 (measured with the FE4 metric). Calculations are done for the average household in Vienna. Dark blue indicates highest residual income and declining residual income is indicated by the gradient to yellow. Excluded census districts are colored grey. Red numbers in the map indicate district numbers.

Not only do monthly residual income levels vary across Vienna, the differences can have – due to the nature of the FE4 metric – various reasons, such as disparities related to the average disposable income levels or the costs for the respective essential services. As Table 1 shows, households in *Innere Stadt* (1st municipal district), *Döbling* (19th), and *Hitzing* (13th) have the highest average disposable incomes, all of them reaching values above 3000 € per household. In contrast, households located in *Rudolfsheim-Fünfhaus* (15th municipal district) and *Meidling* (12th) and *Brigittenau* (20th) have the lowest disposable income in Vienna, close to 2000€ on average. The costs for essential services tend to be highest in the city center (1st municipal district) and some parts of the west like *Döbling* (19th) and *Hitzing* (13th), followed by a series of municipal districts located in the inner area like *Wieden* (4th) or *Josefstadt* (8th). In particular, the cost of housing drains income, in some cases eating up more than half of households’ disposable income.

Table : Overview of top 3 and bottom 3 municipal districts with regard to monthly residual income, disposable income, and costs for essential services (housing, utilities, transport, and food) for average households in Euro (€).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Top 1 | Top 2 | Top 3 | Bottom 3 | Bottom 2 | Bottom 1 |
| Disposable income | 1st municipal district  (4201.56€) | 19th municipal district  (3527.80€) | 13th municipal district  (3376.71€) | 15th municipal district  (2295.36€) | 12th municipal district  2293.45€) | 20th municipal district  (2214.54€) |
| Cost essentials | 1st municipal district  (3805.93€) | 19th municipal district  (2764.28€) | 13th municipal district  (2683.74€) | 10th municipal district  (1975.55€) | 16th municipal district  (1950.51€) | 15th municipal district  (1851.23€) |
| Cost for housing | 1st municipal district (2409.11€) | 19th municipal district (1548.63€) | 13th municipal district (1494.04€) | 12th municipal district (1071.25€) | 16th municipal district (1005.87€) | 15th municipal district (939.36€) |
| Residual income | 17th municipal district  (770.01€) | 18th municipal district  (763.52€) | 19th municipal district  (736.96€) | 2nd municipal district  (292.77€) | 6th municipal district  (215.40€) | 20th municipal district  (173.95€) |

## Foundational livability in Vienna

Figure 4 depicts the results for foundational livability in Vienna measured with the FLI, synthesizing results of the FAI and FE4. Foundational livability is high in the city center and some parts of the outskirts, particularly in the west. With most census districts in *Innere Stadt* (1st municipal district) featuring FLI values in the 5th quintile, people living in the city center mostly enjoy a high level of foundational livability because of the high availability of essential services and social infrastructures. In the outskirts like in *Penzing* (14th municipal district), *Währing* (18th), and Döbling (19th), in contrast, high levels of residual income appear to be the key driver of high FLI values.

The inner area is characterized by quite a heterogenous spatial distribution of foundational livability. Census districts close to *Ring* feature moderately high FLI values mostly in the 4th quintile. Similarly to the city center, high availability trumps relatively low levels of residual income. Despite some outliers, areas close to the *Gürtel* demonstrate medium, often below city average, FLI values. FAI and disposable income levels are not high enough to compensate for the high expenditures for essential services, particularly for housing, close to the city center.

In total, the analysis points to three major concentrations of census districts with low levels of foundational livability, all of them in the south-east of the city. The first is the outer area in the south, with numerous census districts featuring FLI values in the 1st quintile in areas like *Favoriten* (10th municipal district) or *Simmering* (11th). These census districts are characterized by low availability of essential services and social infrastructures paired with low levels of residual income. A second zone characterized by low foundational livability is the inner area in the east. Census districts in *Leopoldau* (2nd municipal district) and *Brigittenau* (20th) predominantly feature FLI values in the first or second quintile. In these cases, the low foundational livability comes about because despite being close to the city center, census districts only feature moderate levels of availability of essential services and social infrastructures. This, in combination with rather high costs for essential services leading to low levels of residual income, makes the area between the Danube Canal and Danube River a major concentration of low levels of foundational livability in Vienna. The third major agglomeration of low foundational livability is in Transdanubia, particularly in *Floridsdorf* (21st municipal district). There, the FLI values of census districts are low because despite low costs for essential services, they feature poor availability of essential services and social infrastructures as well as low levels of disposable income. With most urban development project located in the outer area in the south and in Transdanubia in the east (see Figure 1), the City of Vienna covers several major provisioning gaps with regard to foundational livability. However, despite several census districts with low foundational livability, only a handful development projects are found in the areas close to the *Gürtel* like in the west of the inner area or east of the outer area.

A map of a city

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Figure : Foundational livability for average household in Vienna 2023 (measured with the Foundational Livability Indicator). Dark blue indicates highest residual income and declining residual income is indicated by the gradient to yellow. Excluded census districts are colored grey. Red numbers in the map indicate district numbers.

# Discussion

The article emerged from a critique on global indicators that a more nuanced approach is needed to capture the livability of a place comprehensively. Through the analysis of foundational livability across Vienna’s census districts, the article demonstrates that considering local indicators informed by human need theory like the FLI can yield important insights for city planners that may be hidden behind global indicators. The discussion below reflects on the methodological merit of our research approach and links key findings our analysis to existing global urban trends and Vienna’s current city planning.

## Opening pandora’s box: Understanding the merit of local livability metrics informed by human need theory

*stronger focus on the methodological innovation would make the article more valuable to a general readership. +*

*section 5.1 should be strengthened to discuss the workflow, opportunities and limitations of the method. Statements such as "Vienna suffers from severe socio-economic inequalities" (p. 18) should be nuanced within a global context and expanded upon using the study's detailed insights. Findings such as negative residual income could be explored further, are these based on incomplete aspects of the method or data? Or are these people relying on other forms of financial support?*

Despite continuously being ranked top in global indicators, our research approach highlights that in Vienna there are socio-spatial inequalities in foundational livability. This shows that a stronger focus on the accessibility of essential services and social infrastructures can yield important insights.

Vienna

Workflow: how we did

Opportunities:

* Identifying socio-spatial inequalities hidden behind global indicators
  + Completing existing literature
  + Echoing global trends

Limitations:

* Replicability depends on data availability for residual income
* Some data loop holes: e.g., additional income streams
* Relative approach: e.g., more about fairness?
* Only point in time: e.g., adding temporal dimension
* Incommensurability: high fai can compensate for low fe4

## Hidden behind global indicators: Vienna’s socio-spatial inequalities unraveling

## Towards high foundational livability for all: Lessons learned from Vienna’s case for city planning

*review more closely what insights on Vienna the method has produced; generalising the findings to connect back to the discussion around the notion of affordability.*

Our analysis shows that Vienna’s capacity to provide the goods and services people require for need satisfaction strongly varies across the city. We find that foundational livability is high in the north-west and city center while low in the south-east, particularly along the *Gürtel* and in Transdanubia. In that sense, foundational livability follows recent local urban trends identified by the Viennese scholarship for the distribution of socioeconomic status and availability of essential services in the city (e.g., Kadi et al., 2022; Riepl et al., 2025), completing the picture that in Austria’s capital, people living in the center as well as in the north-west tend to be better off than people in the south-east. One explanation for this may be Vienna’s legacy of social welfare in the past that still strongly influences current livability. While all municipal districts in the center and north-west were part of Vienna when major policy interventions like the public takeover of material utilities or the massive welfare regime rollout during the period of Red Vienna took place, newer municipal districts in the east like *Donaustadt* (municipal district 22nd) or south like *Liesing* (23rd) featuring mostly low levels of foundational livability were not.

Our findings also resonate to global urban trends. Similar to cities like Melbourne or Singapore (e.g., Higgs et al., 2019; Mouratidis, 2018), in Vienna, too, a spatial divide exists between regions’ availability of essential services and social infrastructures and their affordability: While availability is high in the city center, it decreases as one moves outward. In turn, affordability is low in the center but increases the further you go to the outskirts. In that sense, the availability of essential services and social infrastructures stands in conflict with affordability of living in Vienna. This is a highly problematic global trend because it excludes people of low socio-economic status from living in areas of high availability of essential services and social infrastructures. While in Vienna, for instance, in the western outer area people may be able to cope with provisioning gaps when it comes to essential services and social infrastructures by using car-based transportation or mobile infrastructures (e.g., delivery services), people living in the south may have no choice but to accept poor availability due to low disposable income levels. Another global urban trend that is visible in our results is the cost-of-living crisis unfolding in Austria’s capital, too. Despite Vienna’s tradition in social welfare, making it a highly livable city in the past (City of Vienna, 2024b), the analysis showed that currently, many households are under substantial financial stress as a few census districts including some in the inner area feature average residual income levels below zero. With the lion’s share of costs for essential services coming from housing, the analysis provides potential points for intervention to cope with the cost-of-living crisis (e.g., implementing stricter rent regulations, promoting house sharing, penalizing housing vacancy). That being said, here it is important to bear in mind that the analysis did not consider alternative income streams (e.g., from capital via stocks or real estate, from informal employment) but only from taxed labor (e.g., wages) nor did it include alternative practices to reduce costs for essential services (e.g., switching to homeownership, alternative forms of energy, subsistence farming).

All these insights point to the fact that global indicators fall short in capturing living conditions of cities comprehensively. As we showed, despite being continuously ranked top in global indicators, Vienna suffers from severe socio-economic inequalities across the city. Policymakers must refrain from considering global indicators as valuable benchmark tools and consider the benefits of local indicators that are informed by human need theory like the FLI.

In what follows, we draw lessons from our case study on Vienna for city planning in general. Overall, we derive three key lessons from our analysis.

First, the geographical coverage of urban planning needs to extend over the entire area of a city including both less developed areas as well as already established regions. For instance, in Vienna (see Figure 1), there is a clear geographical focus on less developed areas like the south of the outer city as well as Transdanubia that have been rather recently added to the city in the first half of the 20th century. By this, the City manages to address major provisioning gaps with regard to the availability of essential services and social infrastructures. Although there are a few areas in less developed parts of the city that are still poorly targeted by urban development projects like the east of *Favoriten* (10th municipal district), the south of *Simmering* (11th), and the north-east of *Floridsdorf* (21st), major geographical blind spots can be found in parts of already established regions that have been integrated to the city in the 19th century. For instance, there are several parts in the outer area in the west of Vienna like *Penzing* (14th municipal district) or *Ottakring* (16th) that feature only a few urban development projects despite having several census districts with low levels of availability of essential services and social infrastructures. Similarly, but to a lesser extent, this is true for the inner city where some provisioning gaps in the south with regard to low availability of social infrastructures remain largely unaddressed by current urban planning.

Second, affordability must be a key concern of urban planning, particularly in times of the cost-of-living crisis. In Vienna, most development projects predominantly emphasize enhancing the availability of essential services (and social infrastructures). Despite some projects integrating social housing ratios, public schools or kindergartens (City of Vienna, 2024a), only a handful of projects target affordability comprehensively ensuring low costs for all different types of essential services by adding requirements to include, for instance, homeless shelters, social food banks or public medical practices or nursing homes. This is problematic because the cost of services might deny people access to essential services and social infrastructures even if they are close by. As a result, even in a city like Vienna, there are several census districts featuring low residual income levels leading to poor foundational livability because of high costs of essential services like in the east in *Brigittenau* (20th municipal district) and the west in *Ottakring* (16th).

# Conclusion

The article set out to investigate the living conditions in Vienna by measuring the foundational livability across the city. It commenced from the assumption that global indicators represent poor proxies to capture the current escalation of socio-spatial inequalities in cities and therefore, to ensure a good life for everyone. Instead, the article made a case for using concepts informed by human need theory like foundational livability to scrutinize urban socio-spatial inequalities. With the FLI, we provide the first comprehensive metric to assess the foundational livability of a place by synthesizing the FAI methodology by Riepl et al. (2025) with the FE4 metric by Bassens et al. (2023). This enabled us to show that even in a city like Vienna that is continuously being ranked top in global indicators, severe socio-spatial inequalities exist with regard to the availability of essential services, social infrastructures and residual income and hence, foundational livability. This means that Vienna’s capacity to provide the goods and services people require for satisfying their needs strongly varies across the city. In fact, our analysis suggests that in Vienna, too, global urban trends like the spatial divide between regions’ availability of essential services and their affordability and the cost-of-living crisis are currently unfolding and by this, denying many people the satisfaction of human needs.

Overall, this article demonstrates that the way livability is conceptualized and measured matters and has important implications for how livable a place is regarded by the public and policymakers. We show that there are great benefits for future research to continue integrating a human need perspective in the analysis of living conditions. It provides the normative guidance of a minimal goal that urban planners must achieve to enable everyone a good life throughout the city. Such an approach allows us to draw important lessons for city planning, particularly with regard to the importance of a complete geographical coverage, a strong focus on affordability and a particular policy attention towards (negative) spillover effects. That being said, it is worth mentioning that our research approach is not bound to the borders of Vienna and can be applied to any city and in fact, to any region – be it a village or a country – as human needs are universal and everyone needs them satisfied across the globe.

Most importantly, however, many more efforts are needed to accommodate for the multifaceted and complex nature of livability and need satisfaction. Besides the availability and affordability of essential services and social infrastructures, there is a broader range of factors influencing whether people can access the goods and services they need like physical ability or environmental safety. Integrating such elements into our understanding and metrics will be key to ensuring that improvements in livability benefit everyone and endure into the future.

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1. For further information on how livability relates to concepts like wellbeing, quality of life, standard of living, and sustainability, please see Ahmed et al. (2019), Capitanio et al. (2017) and Ruth & Franklin (2014) . [↑](#footnote-ref-2)
2. <https://foundationaleconomy.com/> [↑](#footnote-ref-3)
3. Statistics Austria uses the EU scale for household expenditures: First adult = 1, each additional person in the household aged 14 and over = 0.5, children under 14 = 0.3. under 14 years = 0.3. [↑](#footnote-ref-4)