Urban Living Data as a tool for transformative city planning

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Transformative Cities

1 Urban Living Data supporting planning and decision making

1.1 What do we mean by Urban Living Data?

A city is not only made up of buildings, parks, streets, and other infrastructure. It also consists of the everyday lives and experiences of all those people who live, work, or visit there. The city is a complex system in which the built environment and daily life interact constantly.

Urban Living Data is our way of describing and understanding this lived reality of the city. It deepens our understanding of how a city functions by providing, alongside static maps and plans, insights into how the city is used, how people move within it, how it is experienced, and what kinds of wishes and values its residents hold.

1.2 Geospatial Urban Living Data in planning

Monitoring urban life is not new. For decades, we have collected diverse information about traffic, service use, and housing. However, this type of data often provides only a narrow view of everyday life. It rarely shows where and why people choose a certain mode of travel, how they experience different areas, or how changes in infrastructure affect their daily routines.

A particularly useful type of Urban Living Data is geospatial "soft" data (Brown & Kyttä, 2014). The usefulness of this digital data lies in two aspects: (1) it provides planners with direct feedback on the success of a planning solution or the location of a new idea suggested by people and (2) it allows traditional "hard" data to be analyzed in relation to residents' experiences. This makes it possible to identify patterns, for example, between certain environmental features and the ways people use urban space (Fagerholm et al., 2021). Soft data can even be used to build predictive models, that can for example help to identify which features make green areas especially popular (Kajosaari et al., 2024).

Residents have long contributed knowledge, ideas, and feedback to planning through various participatory processes. Too often, however, this input has been treated as something separate from the core planning process—mainly as additional comments or opinions concerning future development. Yet lived life in the city should be seen as an equal source of knowledge alongside other datasets. In addition to visions and wishes for the future, it is equally important to understand how residents currently use and experience their living environment. From the perspective of sustainability transformation, this knowledge is at least as valuable as feedback or opinions.

Geospatial Urban Living Data makes it possible to observe the routines and rhythms of everyday life across different parts of the city. We can identify who drives and who cycles, as well as why, when, and where people travel, and how they experience their journeys. Experiential knowledge plays a crucial role, since factors such as perceived safety, comfort, or ease strongly shape which travel modes and places people prefer.

Urban Living Data also supports more equitable planning by providing information on diverse groups, including underrepresented or vulnerable populations. By better understanding residents' everyday lives, we can develop cities that meet their needs—while also respecting the conditions of sustainable development. In most cases, the success of sustainability measures is reflected in everyday life. By gaining a deeper understanding of people's motivations and the reasons behind their choices, we can better support sustainable urban living.

1.3 Collecting and utilizing geospatial Urban Living Data

Sometimes Urban Living Data is obtained through people's **active** participation, such as map-based and other surveys, interviews, or direct feedback. Urban Living Data is also generated by the **passive** traces left behind by everyday life in the city (see Figure 1). These include mobile phone signals, traffic counters, travel card swipes, and even social media activity. Often people do not even realize that they are producing this passive data.

Figure 1. *Actively and passively collected geospatial Urban Living Data complements traditional spatial datasets used in planning.*

Both passive and active sensing methods have been used for decades to support planning. Some methods are more recent and are still finding their place in both research and planning practice. In particular, digitalization has accelerated the development of new data collection methods (Grêt-Regamey et al., 2021).

Passive and active sensing methods each have their own strengths and limitations (see Table 1). Both can be used to collect Urban Living Data in spatial form, but the type of knowledge they produce varies greatly. Passive sensing can reveal the rhythms and large-scale patterns of urban life (e.g. Magyar et al., 2025), while active sensing provides a more detailed view of everyday life. Combined, the methods complement one another, creating a richer and more nuanced picture of lived urban reality (Rinne et al., 2025). Today, there is a wide range of methods, tools, and datasets available, which together offer the possibility for more comprehensive integration and use of Urban Living Data in planning. Despite this, only a small part of the potential knowledge currently makes its way into planning and decision-making.

Table 1. *Typical characteristics of active and passive soft geospatial information.*

	Active	Passive
Data sources	Map surveys, GPS tracking, etc.	Mobile phones, social media, sport apps, etc.
Questions it can answer	Where? Why? What? When? Who?	Where? Why? What? When?
Scale	Local	Large-scale
Accuracy of Urban Living Data	Individual	Population groups
Resources and costs	Depending on sample size and method	Costs vary, but scale well for large datasets
Analysis	Both quantitative and qualitative analyses require interpretation	Emphasis on quantitative analysis, big data

There are many reasons why Urban Living Data is not more widely used. Practical challenges are one key factor: the complexity of methods and the sheer volume of data raise questions about which method to use in each situation, how to analyze and interpret the data, and how resource-intensive the process will be.

Institutional factors also play a role. Planning and decision-making systems are often structured around certain types of data, which makes it difficult to integrate new types of knowledge. A cultural perspective is also important: traditional "hard" planning data is often valued more highly than the "soft" data that reflects lived urban life. As a result, soft data is frequently treated as secondary in planning and decision-making (Rossi, 2025).

In addition, data protection practices can create barriers to wider use. Privacy concerns restrict the collection and use of Urban Living Data because its handling is tightly regulated. Some types of data—such as mobile phone location data or social media datasets—can also be difficult to access due to their commercial nature or strict privacy rules. This can make organizations hesitant to use Urban Living Data, even when it has the potential to enrich planning and decision-making.

Although there is an abundance of methods and vast amounts of data available, systematic practices for capturing and incorporating lived urban reality are still lacking (Rossi, 2025). Alongside method development and data collection, it is equally important to create systems and practices that enable Urban Living Data to be genuinely integrated into planning and decision-making.

1.4 How have we collected and studied Urban Living Data in the Transformative Cities project?

In the Transformative Cities research project, we explored how Urban Living Data can be collected and applied in practice. To gain a comprehensive picture, we approached the topic through both active and passive sensing methods.

At the University of Oulu, researchers have used mobile phone tracking data from a passive sensing source. This dataset makes it possible to identify mobility flows in Finnish cities and to analyze the use of different transport modes between urban areas. Such knowledge helps us better understand the dynamics of population movements in cities. Read their full policy brief here: Mobile phone tracking data reveals the geographical structures of urban mobility.

At the University of Turku, the focus has been on active sensing, collecting data from city residents through participatory mapping. In this method, people actively contribute to the production of spatial data. From this dataset, different mobility lifestyle profiles have been identified. This kind of lifestyle knowledge offers ways to support the adoption of more sustainable travel modes. Read their full policy brief here: Promotion of sustainable mobility requires targeting specific mobility lifestyles.

At Aalto University, our work has concentrated on the use of Urban Living Data in planning. We have examined, for example, how active sensing data has influenced planning cases in Finnish municipalities (Nurminen et al., 2024). Our findings show that actively collected Urban Living Data can shape outcomes by providing information that traditional planning datasets do not capture. At the same time, we found that bringing this type of knowledge into planning still faces challenges, underlining the importance of systematic practices and systems.

We have also monitored how a new light rail line has impacted people's travel habits in the Helsinki capital region. By studying residents' daily mobility, we aim to understand how different groups respond to the introduction of light rail and how travel habits change. For example, we examined which transport modes the new line is replacing and who its new users are. This offers valuable knowledge to support planning, decision-making, and future investments.

In addition, we have studied the differences and advantages of actively and passively produced Urban Living Data. This provides important insights into how these methods complement traditional datasets that describe the physical features of the urban environment. By recognizing the strengths of different approaches, we can select the right methods and data for different situations—and gain a richer understanding of residents' everyday lives.

2 Recommendations for more effective use of Urban Living Data

Finnish cities are simultaneously facing several major challenges. These include sustainability and climate change, growing traffic and urbanization, social inequality and issues related to quality of life, population ageing, and the loss of biodiversity. Addressing these challenges requires high-quality Urban Living Data that is used in diverse and impactful ways. Urban Living Data provides valuable insights both when identifying the most feasible planning solutions and when monitoring how well these solutions work in everyday practice.

1 More systematic integration and data repositories

The first step toward a more effective and comprehensive use of Urban Living Data is to make it a permanent and equal part of planning and decision-making (Nurminen et al., 2024; Rossi, 2025). While such data is already being collected successfully and can be highly influential in individual planning cases, it is often not archived or made available for future use. Some Finnish cities, such as Lahti and Espoo, already store Urban Living Data in their spatial data systems (Rossi, 2025). This makes the information easy to find, combine with other datasets, and use again in the future.

However, effective integration also requires shared and consistent practices, such as unified data formats and system interoperability. Collaboration is needed both to maintain expertise and to develop the storage and management of data, so that Urban Living Data can serve sustainable city planning in the long term. Taken together, these measures would make it possible to use Urban Living Data even more effectively in planning.

2 Continuous monitoring

Systematic methods for collecting and integrating Urban Living Data open up opportunities for continuous monitoring of cities. By collecting data consistently and archiving it systematically, we can detect long-term changes and trends. For example, people's mobility habits can be analyzed across different seasons, as can changes in traffic flows or the evolution of experiences and lifestyles.

Continuous monitoring also makes it possible to evaluate how well plans are working and how different interventions affect everyday life. We can, for instance, assess how neighborhood development influences residents' experiences, how a new light rail line affects travel flows, or whether cycling rates increase following a targeted campaign. Ideally, such monitoring would also be carried out in a standardized way across different cities, enabling cities to easily compare their progress with one another.

For the sustainability transformation, continuous monitoring practices are especially valuable. They allow cities to track their progress toward sustainability goals in connection with residents' behavior and at a much more detailed level than before.

3 Towards more livable and sustainable cities

The systematic collection and integration of urban living data, together with continuous monitoring practices, creates opportunities for the reactive and proactive use of data (see Figure 2). This enables faster responsiveness in planning and provides tools for shaping the future.

Reactive use of Urban Living Data means that by observing trends, we can detect undesirable developments and respond at an early stage. For example, if negative experiences among residents start to increase in a certain area, or if the share of active travel modes begins to decline elsewhere, corrective action can be taken quickly. We can also identify if a sustainability action fails to produce the desired practical effects. In addition, Urban Living Data can reveal how broader societal changes—such as a pandemic, the rise of remote work, or inflation—affect people's ways of moving and using the city, allowing timely responses.

Urban Living Data can also be used proactively. Detailed understanding of lived urban life—its rhythms, experiences, user groups, motivations, and cause-and-effect relationships—provides valuable knowledge for shaping the future.

Our light rail study has shown that certain groups and lifestyle profiles are more sensitive than others to changing their mobility habits when faced with an intervention. What works for one group may not work for another. Our colleagues at the University of Turku have also demonstrated that promoting sustainable mobility effectively requires targeted actions. For example, we can explore how sustainable modes could be made more attractive from the perspective of different groups. The prioritization model we developed (Kyttä et al., 2023) helps identify, based on soft geospatial data provided by residents, which areas most urgently need improvement, and which can be maintained with lighter measures.

By understanding everyday life and different lifestyles, interventions and other actions can be tailored and targeted according to the goal at hand. In this way, Urban Living Data supports solutions that are not only more effective, but also more sustainable and equitable.

Figure 2. *Systematic data collection, effective integration, and continuous monitoring enable reactive and proactive planning that supports sustainability and equity goals.*

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