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Driving Equitable and Accessible 15 Minute Neighbourhood Transformations

WP6. Impact assessment and evaluation

T6.1. Impact assessment framework

Deliverable D 6.1

Impact Assessment Framework

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2.0	04/07/2025	Final draft	Charlotte van Vessem (VUB), Imre Keserű (VUB)	Finalisation of the Deliverable to be published on the project website

3.0	10/02/2026	Update of final version	Charlotte van Vessem (VUB), Imre Keserű (VUB), Linda Dörrzapf (TU Wien), Hannes Delaere (Mpact)	Update of the final version: changes made to the Brussels and Vienna sections

EXECUTIVE SUMMARY

This deliverable presents the Impact Assessment Framework (part of Task 6.1) developed for evaluating the Living Lab interventions implemented across the six Living Labs of the DREAMS-project: Brussels, Budapest, Munich, Paris, Utrecht and Vienna. As a starting point, this Deliverable reflects on the reasons to conduct evaluation, explaining the different types of evaluation that will be used in the DREAMS project and their most important concepts. We look into different timings of evaluation and what type of data needs to be collected, when and why, per evaluation type. The deliverable also explains the uses of stakeholder evaluation, Stakeholder-Based Impact Scoring (SIS), and what is needed to conduct such an analysis. Then, an overview is given of the establishment of the DREAMS Evaluation Framework, as well as how the data collection plans per Living Lab were created. These data collection plans detail each Living Lab's objectives, interventions, expected impacts, as well as indicators and target. This also includes an overview of what data needs to be collected, how, by whom and when. Furthermore, it includes a first overview of the stakeholder assessment (part of Task 6.2) to be conducted in each Living Lab. For this, the Deliverable includes an overview of each Living Lab's relevant stakeholders, their goals, and the interventions alternatives. This Deliverable serves as a both a guideline and a report for the Living Lab's interventions: it is expected to regularly receive updates as the interventions take place. These changes are reflected in the document change record.

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1 LIST OF ABBREVIATIONS

15mC: 15-minute city

BME: Budapesti Műszaki és Gazdaságtudományi Egyetem / Budapest University of Technology and Economics

BOKU: Universität für Bodenkultur Wien / University of Natural Resources and Life Sciences, Vienna

CBA: Cost-Benefit Analysis

DAT: DREAMS Accessibility Tool

DDST: DREAMS Decision Support Tool

DREAMS: Driving Equitable and Accessible 15 Minute Neighbourhood Transformations

DUT: Driving Urban Transitions

Dx.x: Deliverable number per Work Package

HU: Hogeschool Utrecht

IKP: Interactive Knowledge Platform

KPI: Key Performance Indicator

LL: Living Lab

MCA: Multi-Criteria Analysis

SIS: Stakeholder Impact Scoring

Tx.x: Task number per Work Package

TUM: Technische Universität München / Technical University of Munich

TUW: Technische Universität Wien / Vienna University of Technology

UGE: Université Gustave Eiffel

UT: Universiteit Twente / Twente University

VUB: Vrije Universiteit Brussel

WP: Work Package

2 INTRODUCTION

2.1 Purpose of the Deliverable and Work Package and interaction with other tasks

This report is Deliverable 6.1 (D6.1) of the DREAMS (Driving Equitable and Accessible 15 Minute Neighbourhood Transformations)[1] project, which aims to explore how co-created and user-centric mobility services, mobility and flexible activity hubs can actively contribute to creating accessible, sustainable, and inclusive 15-minute City (15mC) neighbourhoods in the urban outskirts[2] of European cities and regions. This deliverable is part of Work Package 6 (WP6), titled "Impact Assessment and Evaluation". Coordinated by the Vrije Universiteit Brussel (VUB), this WP assesses and synthesises the impacts of co-created scenarios and services in the Living Labs covering tangible (climate, accessibility, economic, health, liveability), non-tangible (governance, equity) and stakeholder-specific impacts.

Work Package 6 consists of the following three Tasks:

- Task 6.1: Impact assessment framework, led by Vrije Universiteit Brussel (VUB). This task is active in project months 14 until 18 (2025).
- Task 6.2: Impact assessment of 15mC interventions and scenarios, led by the University of Natural Resources and Life Sciences, Vienna (BOKU). Active in project months 18 until 32 (2025-2026).
- Task 6.3: Evaluation Synthesis, led by VUB. Active in months 32-34 of the project (2026).

This Deliverable is the result of the corresponding Task 6.1 (T6.1), "Impact Assessment Framework". The goal of this Task was to develop an impact assessment framework for the various Living Lab (LL) scenarios, part of WP5 that is concerned with the running of all LLs in the project, and interventions on the different layers of the Dreams Decision Support Tool (DDST). This tool (currently in development) will offer several 'layers' of best practices, methodologies and proximity calculations to help urban planners and other stakeholders design 15mC neighbourhoods. Work Package 6 is specifically linked to layers 3, 4 & 5 of the DDST (part of Work Package 3 and Deliverables 3.1, 3.2 and 3.3, all forthcoming).

Additionally, this Deliverable (D6.1) indexes the measurement methods and defines the data collection schedule and data quality requirements for each LL intervention, to function as a data collection guide throughout the interventions. It also includes explanations of the stakeholder assessment method Stakeholder Impact Scoring (SIS) that will be used as part of T6.2, "Impact assessment of 15mC interventions and scenarios", led by the University of Natural Resources and Life Sciences, Vienna (BOKU). Finally, it includes a first evaluation framework, which will be used in T6.3, the "Evaluation Synthesis" in which the implementation of all LL interventions will be evaluated.

WP6 is scheduled to produce two Deliverables, the first one being this current Impact Assessment Framework (D6.1). The second Deliverable will be the Synthetic evaluation report of all Living Labs, which is scheduled for month 34, at the end of the project in late 2026.

As the work of WP6 is closely related to the LL's interventions for all Tasks of WP6, it is important to ensure a good connection to WP5, which entails the Living Labs set-up and coordination, led by BME (Budapest University of Technology and Economics). For this reason, common monthly meetings for both WP5 and WP6 have been set-up since April 2025. Additionally, the Impact Assessment Framework and the Assessment of T6.2 will also connect to various layers of the WP3 Dreams Decision Support Tool, especially to T3.5, "Strategic objectives and societal impacts", led by UGE (Université Gustave

[1] A list of all abbreviations can be found at the beginning of this Deliverable.
[2] In the DREAMS-project, urban outskirts are understood as "Medium-sized areas or neighbourhoods in the near context of an urban area, where high car dependency is present and a strong economical and functional connection to the city is observed, primarily through daily work commutes" (Deliverable 2.1, DREAMS-project, 2024).

Eiffel), which will define overall strategic objectives such as air quality, health, carbon emissions, and placemaking, and set KPIs to estimate the impacts of 15mC accessibility scenarios. A section detailing this connection can be found in section 4.1.2.1.

2.2 Structure of the Deliverable

This deliverable contains 6 sections, plus a list of abbreviations, references, and appendices. It continues with an explanation of the DREAMS Evaluation Framework and methodologies in Section 3 and 4. Section 5 explains the creation of the impact assessment framework, which is part of the DREAMS Evaluation Framework. Section 6 then contains the data collection plans per Living Lab, detailing their interventions, timeline, and relevant stakeholder's and their objectives. Section 7 provides a conclusion to this Deliverable.

A last point of note is that this Deliverable is a 'living document': it will receive changes and updates as the Living Labs and their interventions take place, primarily in Section 6. As the stakeholder assessment will be part of T6.2, the sections outlining relevant stakeholders and their objectives included in this Deliverable are only a first draft. The document will be updated by VUB throughout the project; this will be reflected in the version record at the beginning.

3 EVALUATION TASKS IN THE DREAMS-PROJECT

This section gives an overview of the DREAMS evaluation framework and its objectives, methods, and indicators. This framework will be used to evaluate the outputs, outcomes of the DREAMS LLs, the process of their implementation and the preferences of and impact on stakeholders related to the LLs. The next sections explain the evaluation methodology in detail.

3.1 The goals and scopes of the DREAMS-evaluation

Why do we evaluate living labs and projects?

Evaluation plays a key role in assessing the projects' performance, impact, its strengths and its weaknesses and to what extent it fulfils predefined objectives. In order to determine these factors, it is also necessary to know *what* to evaluate, and *how* exactly to do that. In this section, the forms of evaluation used in the DREAMS project will be explained. These are: impact monitoring (of output and outcome indicators), process evaluation, and stakeholder-based assessments. It will also explain what will be needed to evaluate the living lab interventions, touching upon objectives, indicators, and methods for stakeholder assessment as well as explaining why and how these elements were chosen.

Within the DREAMS project, we are evaluating multiple levels: i.e. the interventions of each Living Lab, the Living Labs themselves, as well the project as a whole. We do this by looking at different aspects of evaluation: its output and outcome (together considered the impact), but also the process of the project as a whole. We also use stakeholder perspectives: these are present in the stakeholder-based assessment and in the process evaluation. In order to ensure a proper evaluation for all these elements, it is necessary to have defined key objectives and stakeholders beforehand. Connecting the macro-level (the whole project) to the micro-level (LL interventions), the main elements that will need to be known before conducting the research are the following:

1. For the project: what elements are important to us, what makes the project successful? What are our common goals and objectives, ensuring that we are not diverging by focusing on our own interventions?
2. For the Living Labs: we will need to know what makes our LLs successful, for which we will need to pre-define our idea of success.
3. For the Living Lab interventions: it is important to know what we want to measure, for which we will need know how and when to measure this.
4. For our stakeholders: What do they expect the LLs to achieve? How will they be impacted by the interventions?

Lastly, we also use evaluation (especially process evaluation) to learn from the experiences of the DREAMS-project for other future projects. By assessing what worked well, and what could potentially be improved, the DREAMS-evaluation framework also intends to provide valuable insights for future research. This will be part of T6.3 and D6.2.

How do we do evaluate?

Project evaluation is the process of assessing the merit and impact of a project's interventions, based on an established set of standards (Dziekan, et al., 2013). It helps to determine how well the project is meeting its goals and making a meaningful difference. Evaluation is not an isolated event in a project, but a part of the project management process that consists of planning, implementation and evaluation. Figure 1 illustrates the role of evaluation in a project with an overview of the common stages and key activities in the project's planning, monitoring and evaluation. However, next to project evaluation, there are other evaluation types that will be used in the DREAMS-project. Each of these has its own use and data needs. Below Figure 1, we will explain the different types of evaluation that will be used in the project.

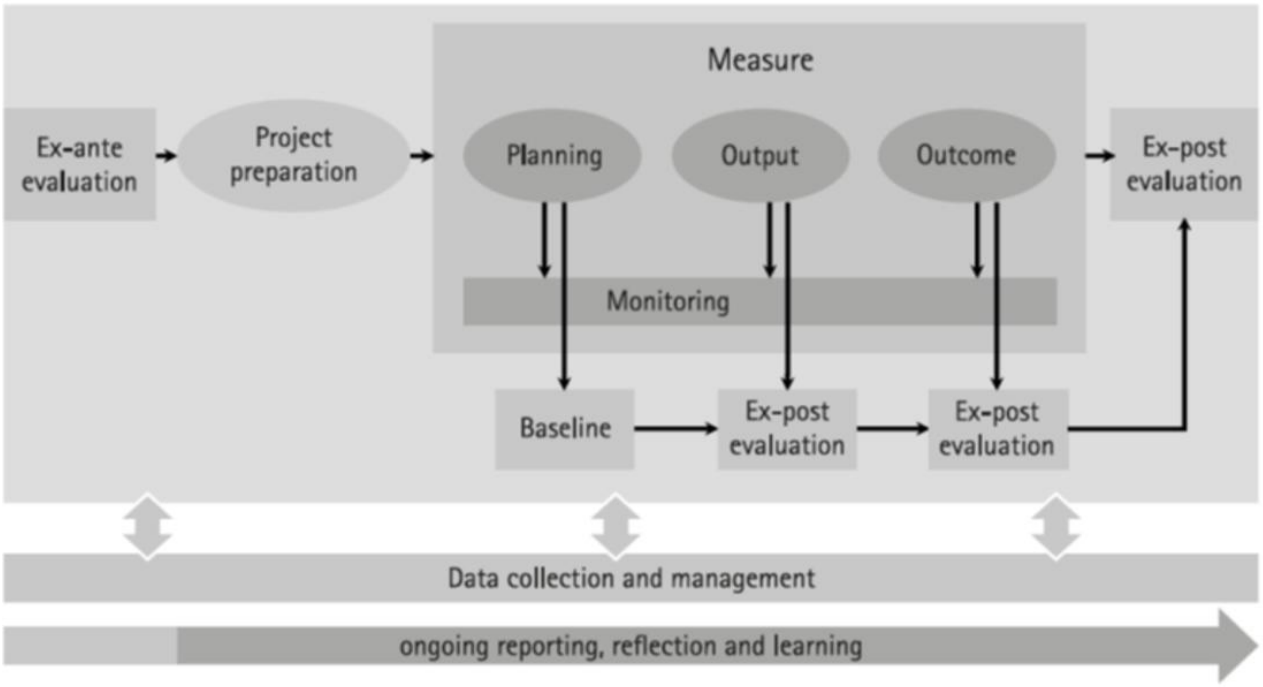

Figure 1: The different stages of the evaluation process and the intervention. (Source: Dziekan, K., Riedel, V., Müller, S., Abraham, M., Kettner, S., & Daubi, S. (2013). Evaluation matters: A practitioners' guide to sound evaluation for urban mobility measures.)

3.2 Impact evaluation

With this general understanding of evaluation in place, we now turn to the specific types of evaluation used in the DREAMS project, starting with impact evaluation. Impact evaluation (also called impact assessment) consists of the assessment of both the project's *outcomes* and its *outputs*. Outcomes are the direct products or deliverables of a project or activity. In the DREAMS project, *outcome* evaluation will refer to those elements that connect to the project as a whole, and to the overarching project objectives. On the other hand, *output* evaluation measures what has been produced or achieved in terms of immediate results, such as the number of workshops held, materials distributed, or people trained. Here, we refer to outputs as the elements connected to specific LL interventions. Outputs are typically easy to measure, as they often are measured by specific Key Performance Indicators (KPIs), and are often seen as indicators of task completion. Outcome assessment, on the other hand, looks at the longer-term effects or changes that result from those outputs. It focuses on whether the project or activity achieved

its intended goals or made a meaningful impact, such as changes in participants' knowledge, behaviour, or well-being. Outcomes are generally more complex to measure and evaluate because they involve assessing the broader impact of the outputs.

Within the framework of the DREAMS-project, these two elements will be studied together as 'Impact Assessment'. Impact assessment looks at the changes that can be linked to a specific project, policy, or action that was implemented to achieve a goal (Dziekan et al., 2013).

Unlike outcome *monitoring*, which checks whether targets were met and does not continue beyond that point, impact *evaluation* goes a step further. It focuses on the key question: how would things have changed if the intervention hadn't happened? In order to properly answer this question, it is crucial to collect and analyse data both before (baseline) and after (ex-post, more information on this in Section 2.4) implementation. This comparison helps to determine what the situation was before the measure was introduced and which changes can be directly attributed to it. Figure 2 shows the steps for collecting the appropriate data in a visual representation.

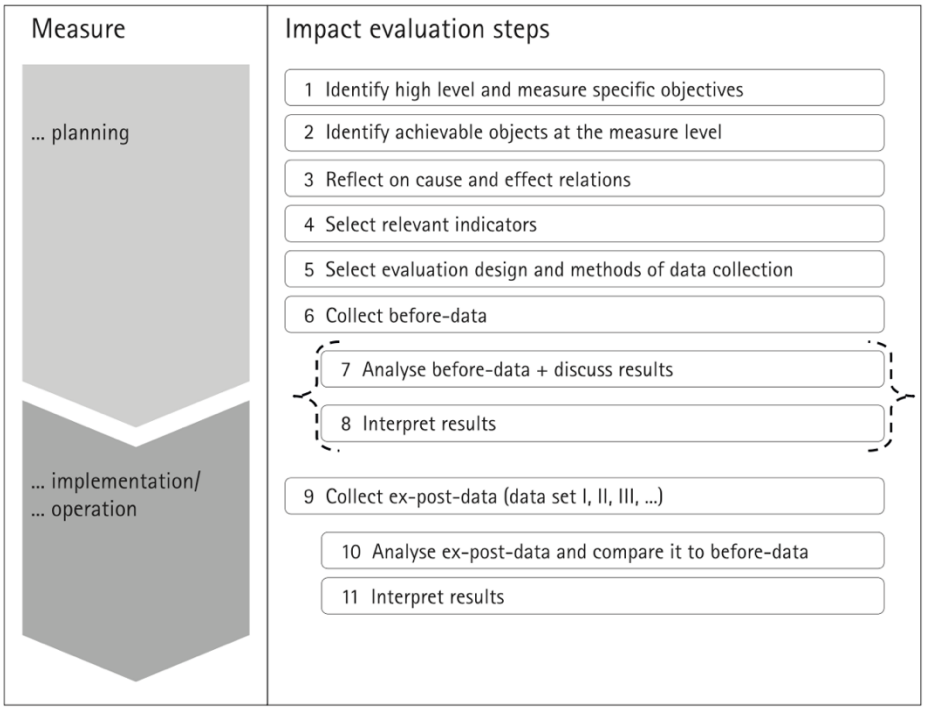

Figure 2: Steps in the impact evaluation process. (Source: Dziekan, K., Riedel, V., Müller, S., Abraham, M., Kettner, S., & Daubi, S. (2013). Evaluation matters: A practitioners' guide to sound evaluation for urban mobility measures. Waxmann Verlag.)

3.3 Stakeholder-based evaluation (T6.2)

A key aspect of the evaluation process is integrating the perspectives of the local stakeholders who contributed to the intervention(s). This will be done through Stakeholder Impact Scoring (SIS) as part of T6.2. In order to prepare for T6.2, which includes conducting stakeholder assessments in each of the LLs, this deliverable provides an overview of why and how to conduct a SIS analysis, as well as a section on the stakeholder perspectives that were gathered through the template described in section 3.2. These evaluations are often conducted ex-post but can in some cases also be used as an ex-ante evaluation (see Section 2.4). In the sections below, we explain this method, why it is used and what steps are needed to conduct it.

3.3.1 Stakeholder Impact Scoring (SIS)

SIS is a participatory assessment technique that quantifies stakeholder opinions on different impact dimensions, allowing for comparative analysis across interventions (te Boveldt et al., 2022). The process of a SIS analysis involves the selection of one or multiple scenarios to assess, compared to a baseline (or business-as-usual scenario). After the establishment of the baseline and alternative(s), the stakeholders will have to be selected. A stakeholder can be any person, group of people, or organisation that will be impacted by the scenario(s) or who plays a role in the implementation. For example, think of local residents, local or regional governments, transport providers or commuters as relevant stakeholders. These groups need to be contacted and invited to be a part of the SIS-analysis. One these elements have been chosen, the actual analysis procedure consists of the following elements:

- **Stakeholder surveys and workshops***:* participants (stakeholders) are asked to rate interventions based on their perceived impact across various thematic areas (e.g., accessibility, environmental sustainability, economic viability).
- **Scoring and normalisation**: responses are quantified and normalised to enable comparative analysis between different interventions and Living Labs.
- **Visualisation of result***s*: the aggregated scores are presented in a graph, showing which stakeholders benefit the most and the least per scenario.

A visual representation of these steps and their order can be seen in Figure 3:

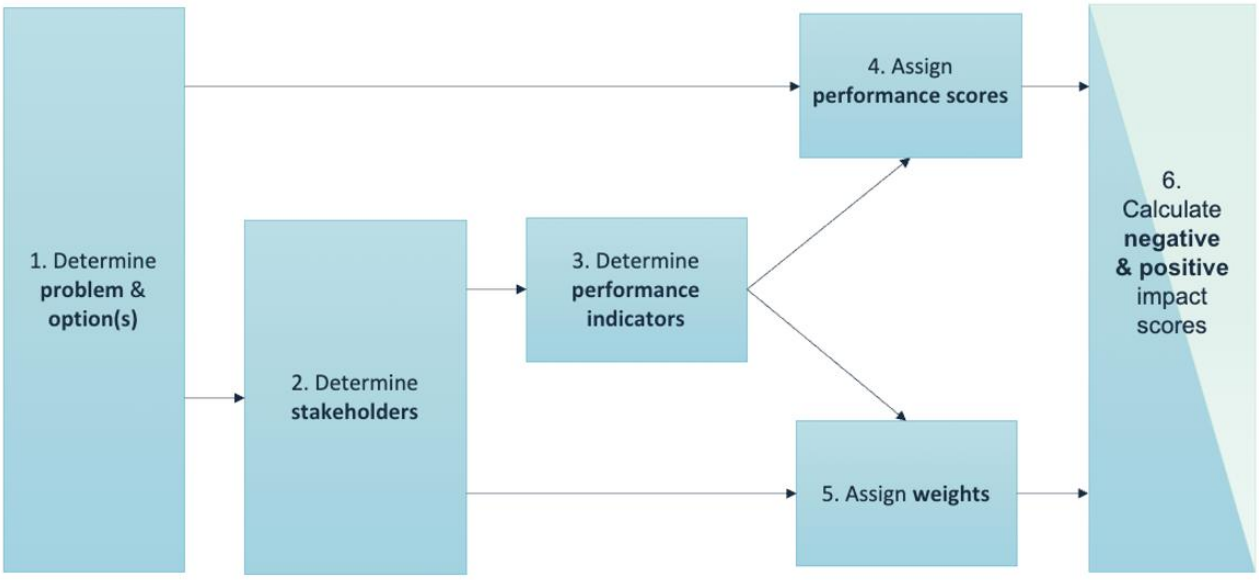

Figure 3. Visualisation of the different steps in a Stakeholder Impact Scoring (source: te Boveldt, G.)

A first step of T6.2 will be to make the LL leaders acquainted with the SIS methodology. In order to do so, we refer to the guide of Te Boveldt (2025), which has been added to this Deliverable as Appendix V. This guide explains the method in more detail, including the software used for the analysis. This software will be used as part of Task 6.2. Furthermore, a video on how to use the SIS-software can be found here. Additionally, the VUB has offered an online workshop on the method and the software, as these were both designed by Mobilise (VUB). This workshop took place online on June 24th, 2025. A

recording was made available to all consortium members after the session, so that they can use this as a guideline when conducting their own SIS analysis. The final SIS analyses will be a task for each LL, but the VUB team will remain available to offer assistance with the procedure and the software.

3.4 Process Evaluation (T6.3)

Unlike impact evaluation, process evaluation examines the implementation process of the intervention itself, identifying potential deviations or challenges encountered during data collection (Moore et al., 2015). This evaluation provides insights into the implementation of the Living Lab interventions, by considering elements such as participant engagement and contextual factors that may influence the intervention's success (Linnan & Steckler, 2002). By systematically monitoring and documenting these aspects, process evaluation enhances the transparency and reproducibility of the project's findings. An additional benefit of process evaluation is that building in moments of reflection and feedback on the project's implementation can create methodological refinements, which then can help future studies to address such limitations and improve their implementation strategies. These elements will be part of T6.3, which is concerned with the project's process evaluation. This task focuses on understanding how interventions are implemented, identifying enablers and barriers, and assessing their operational efficiency. This evaluation will:

- Examine the decision-making processes, governance structures, and stakeholder dynamics involved in intervention implementation.
- Analyse logistical and organisational challenges that arise during the intervention.
- Identify best practices and lessons learned that can improve the scalability and replicability of similar interventions in other urban contexts.

Process evaluation follows a structured but adaptable approach. It starts with defining clear objectives, i.e. understanding what aspects of the implementation need to be assessed. This could involve evaluating whether an intervention's implementation happened as planned, identifying obstacles that emerged, or assessing how participants engaged with the intervention. The next step is to establish a framework for evaluation. This means selecting appropriate methods for data collection, which typically rely on qualitative approaches such as interviews and focus groups. These methods help capture the perspectives of key stakeholders, from project implementers to end-users, offering valuable insights into the practical realities of the intervention. Once data is collected, analysis focuses on identifying patterns, inconsistencies, and unexpected influences. This is not just about confirming whether an initiative followed its intended path, but also about understanding the factors that shaped its trajectory. Were there administrative delays? Did user engagement differ from expectations? Were there contextual shifts, such as policy changes or funding adjustments, that impacted delivery? Process evaluation seeks to answer these questions. Finally, findings from the evaluation inform recommendations for future projects. Rather than simply identifying what worked and what didn't, process evaluation helps refine strategies for better implementation. It highlights lessons learned, offering practical guidance for improving mobility initiatives across different contexts.

3.5 Timing of data collection

In the DREAMS project, data collection will take place before, during and after the interventions. The three moments of evaluation included in our framework are ex-ante, ex-durante and ex-post. These terms are also used for the evaluation timings in project evaluation, so meaning evaluation before, during and after intervention. The next sections explain these stages of evaluation and data collection in more detail. In later overviews of evaluation types, we will also mention their timing.

3.5.1 Ex-Ante evaluation and data collection

Ex-ante evaluation is conducted before the implementation of interventions to establish a baseline against which changes can be measured. This phase involves the gathering of baseline data, so that the initial conditions of the LL intervention are known (e.g., knowing how many bikes exist at the local bike-

sharing station, or the local uptake rate of shared mobility). It can also involve identifying potential benefits and challenges of the interventions through stakeholder engagement and scenario analysis.

3.5.2 Ex-durante evaluation (monitoring) and data collection

Ex-durante evaluation is conducted during the implementation of interventions to monitor progress, assess immediate impacts, and ensure alignment with expected outcomes. This phase involves the continuous collecting and analysis of data on KPIs within the Living Lab areas. It also involves engaging stakeholders through surveys, interviews, and participatory methods to collect data on perceptions, emerging challenges, and unanticipated effects of the interventions.

3.5.3 Ex-Post evaluation and data collection

Ex-post evaluation is carried out after the intervention has been implemented to measure its actual impact. This includes comparing post-implementation data with baseline conditions to assess if the intervention led to improvements. Additionally, it involves conducting surveys, focus groups, and interviews with users and other local stakeholders to gain further insights and gather feedback on the interventions' strengths and weaknesses. Finally, in this step the comparative analysis of the data collected before, during, and after can show if there were discrepancies between expected and actual outcomes, identifying unforeseen consequences, and extracting lessons for future implementations – all important elements for T6.3.

Now that we have offered an explanation on the types of evaluation and the types of data as well as an explanation of what data will be collected at what time, we continue to the explanation of the DREAMS evaluation framework in Section 4.

4 THE DREAMS EVALUATION FRAMEWORK

4.1 Impact assessment and process evaluation

The sections below outline the necessary elements to conduct the types of assessment discussed above. Figure 4 shows the full DREAMS Evaluation Framework. Moving from left to right, the figure shows the evaluation type that corresponds to the different tasks in WP6, outlining their data needs as well as the methods for the data collection. Finally, the last element on the right indicates what party is responsible for the data collection. Here, we mean to say that 'Living Labs' are the individual Living Lab consortium partners that are responsible for the collection of the data. This can be the Living Lab leading partner, as outlined in the DREAMS-project proposal, or another local party (this is outlined in the data collection plans of each LL, which can be found in Section 6). This means that for these elements, it is the responsibility of those partners to decide which partner will collect the data, and to communicate this to VUB as the WP6 leader. VUB and BOKU (as leaders of T6.2) will keep track of the progress, but not on the day-to-day collection itself.

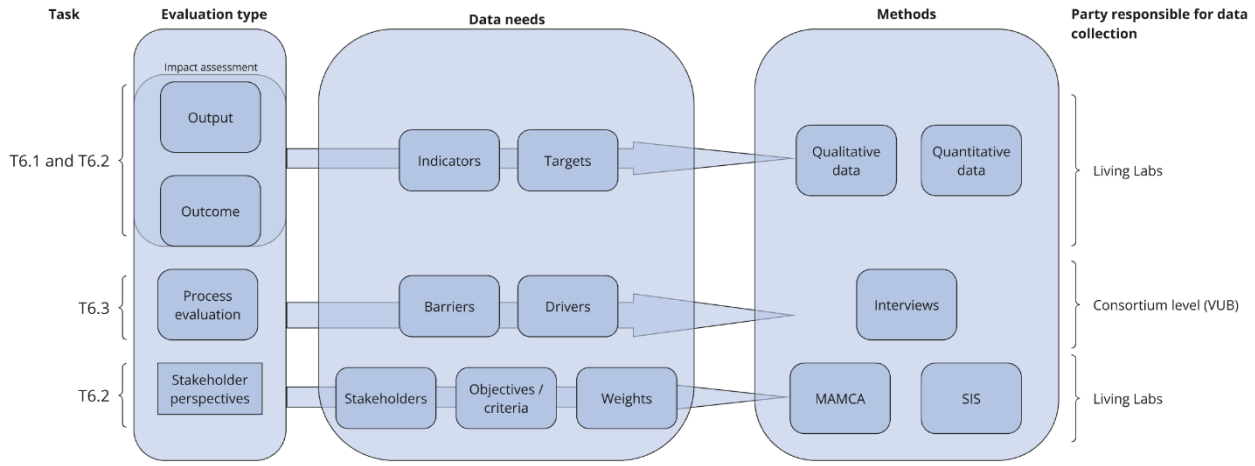

Figure 4: Visualisation of the DREAMS Evaluation Framework.

In order to make Figure 4 easier to understand, the next sections will outline the definition of objectives; indicators and specifically indicators; targets; possible data collection methods for these indicators and KPIs; and the principles for the data collection plans for the DREAMS LLs.

4.2 Key elements of the DREAMS Evaluation Framework

4.2.1 Objectives

In the DREAMS Evaluation Framework, objectives are the overarching goals of an intervention or project. As such, they can refer to either an output or an outcome, meaning that they either connect to a LL-specific goal (output), or a project-related one (outcome). To give an example of each: an outcome objective could be 'fostering 15-minute accessibility to key destinations in urban outskirts', or 'supporting modal shift to sustainable modes'. An example of an output objective could be 'increasing uptake of shared bikes' or 'better understanding of the area's business potential'. Objectives can be linked to one or several indicators (see next section) and they can also be linked to stakeholders in SIS evaluations.

4.2.2 Indicators

Once the objectives of the project and/or the intervention have been established, it is time to continue to set indicators. Indicators are measurable elements that are used to track the progress, performance or quality of a project, process, or system. They can be both qualitative and quantitative in nature. Within (transport) projects, indicators are used to gain insights in a project's current performance, and to take evidence-based decisions regarding the project's future directions.

Indicators can be categorised into two main types: descriptive indicators and performance indicators. Descriptive indicators assess the state of a system at a given point in time, allowing for cross-sectional evaluations. Performance indicators, on the other hand, facilitate comparisons of descriptive indicators over different periods, enabling the assessment of progress toward specific targets (Chakhtoura & Pojani, 2016).

In a top-down approach, a set of indicators is created based on literature research or interviews with experts, keeping in mind the main scope(s) of the project and its interventions. When choosing this approach, Doran asserts that indicators should adhere to the SMART criteria, meaning they must be (a) specific, (b) measurable, (c) achievable, (d) relevant, and (e) time-bound (Doran, 1981 in Bjerke & Renger, 2017, p. 125). Similarly, Gillis et al. (2015) argue that indicators should be (a) specific, (b) comprehensive, (c) precisely measurable, (d) sensitive, (e) technologically neutral, and (f) scalable.

When selecting indicators in a bottom-up manner, the project partner and relevant stakeholders create a set of indicators based on their planned interventions and what they would want to achieve and assess in their specific context.

The selection of indicators should consider the temporal and spatial dimension of the evaluation. Additionally, the choice of indicator sets should be guided by the scale of the evaluation, the contextual factors—including environmental, geographical, and socioeconomic considerations—the timing of the assessment, and the availability of relevant data (Gudmundsson, 2004).

4.2.3 Indicators for the 15-minute city in urban outskirts

The 15-minute City (15mC) is an urban planning concept that emphasises proximity-based accessibility, ensuring that neighbourhood residents can meet their daily needs—such as work, education, healthcare, shopping, and leisure—within a 15-minute walk or bicycle ride from their homes (Moreno et al., 2021). While much of the existing research and application of this model have focused on dense urban cores, its implementation in urban outskirts presents unique challenges, particularly regarding transport infrastructure, interconnectivity, and accessibility of amenities. As the goal of the DREAMS-project is to "explore how co-created and user-centric mobility services, mobility and flexible activity hubs can actively contribute to creating accessible, sustainable, and inclusive 15mC neighbourhoods in the urban outskirts of European cities and regions", this indicates a need for a specific set of indicators focused on these core elements of the project.

So far, no standard indicators dedicated to sustainable 15mC in urban outskirts have been identified. However, the DREAMS-project proposal did indicate six key impacts areas that are essential to assess the project's interventions. These key areas are : Accessibility, Carbon Emissions, Liveability, Health, Economic Impact, and Equity.

A more in-depth analysis and explanation of these themes and the KPIs that will be connected to these domains will be included in D3.3, which includes the results from T3.5, "Strategic Objectives and Societal Impacts". This task will define the overall strategic objectives of the project, which will as such not be discussed in detail in this Deliverable (6.1). However, as D3.3 is only scheduled to be published in late 2025, we give a short overview of the main themes down below.

Designing a coherent and context-sensitive indicator framework for 15mC evaluation in urban outskirts requires both theoretical grounding and practical consideration of what is measurable across diverse local contexts and conditions. T3.5 contributes to this effort by identifying a core set of accessibility indicators (to be integrated into the DREAMS Accessibility Tool (DAT)), and establishing a broader set of additional indicators (feeding into the Interactive Knowledge Platform (IKP)) that would allow a comprehensive project-level impact assessment. Together, these tools aim to support practitioners in selecting appropriate metrics based on their specific planning priorities.

The indicator selection process involved rigorous evaluation of each potential indicator's sensitivity to LL activities, relevance to individual LLs, and measurability across different contexts. This screening process, outlined in more detail in the forthcoming comprehensive indicator analysis in Deliverable 3.3, has led to the identification of a refined set of indicators that is designed to ensure both practical applicability in the project LL contexts and a strong alignment with the project's strategic objectives.

While research on the 15mC concept in connection to urban outskirts is scarce, D2.1 of the DREAMS-project, titled "*Exploring the 15-minute city concept for urban outskirts: a systematic literature review*", written by the Universiteit Twente (UT), has highlighted six key areas that need to be considered in this context. These key areas are: Density, Diversity, Design, Human perspectives, Governance, and Business. In the section below, these areas have been matched to indicators. We have also chosen to add a seventh area on Environment and Sustainability, as this is a key component of a 15mC strategy (Moreno et al., 2021). It is important to note that not all impact areas are equally represented in the final indicator set, as this reflects the reality that not all LLs are conducting activities to which certain indicators would be sensitive.

1. Density

First, a fundamental aspect of the 15mC concept is proximity to essential services, which refers to the accessibility of amenities such as healthcare, education, retail, and recreational areas within a 15-minute walking or cycling radius. For example, Chiaradia et al. (2024) propose measuring service intensity within a given area to assess spatial inequalities in accessibility. This approach helps identify gaps in service distribution and supports urban planning strategies aimed at reducing spatial disparities. This aspect of the 15mC also entails the presence of (essential) amenities.

The filtered indicator set in the DREAMS-project includes:

- **Travel times**: Average travel time to essential services
- **Service intensity index**: Number and distribution of essential services within a 15-minute radius
- **Proximity to daily needs**: Percentage of population within x-minute radius of amenities
- **PT catchment**: Percentage of population within x-minute radius of a transit stop
- **Availability of shared mobility options:** Number of shared bikes/scooters/cars available per resident or within x-minute radius
- **Resident satisfaction:** Scores regarding accessibility to different amenities

2. Land use diversity

Land use diversity is measured through indicators of mixed-use development. A balanced mix of residential, commercial, and institutional land uses can help foster local economic activity and reduce the need for long-distance travel (Zhang et al., 2022). This is particularly relevant for the DREAMS-project, as we specifically consider the effectiveness of mobility interventions in peri-urban areas, which depends on the availability of services within a short travel distance. The provision of public spaces, recreational and green areas is another key aspect of the 15mC model. Studies emphasise the importance of access to parks and recreational areas in promoting physical activity, social cohesion, and overall well-being (Chiaradia et al., 2024). Evaluating the proportion of residents with access to (high-quality) green spaces within a 15-minute radius can provide insight into the liveability of urban outskirts.

Although the filtering process revealed limited sensitivity to current LL activities and challenges related to measurability, the following indicators were retained in the final set because they can be reliably measured through the DREAMS Accessibility Tool (DAT):

- **Public spaces & recreation:** areas accessible within an x-min radius
- **Green space accessibility:** % of population within an x-min radius of parks and green space
- **Sport & recreation:** % of population within an x-min radius of fields, playgrounds, ana other recreational amenities

3. Design

The design dimension mainly focuses on the physical infrastructure that enables 15mC functionality through the monitoring of metrics such as the walkability index that helps assess the quality of pedestrian infrastructure, and considers factors such as sidewalk availability, pedestrian safety, and route directness (Chiaradia et al., 2024). However, traditional walkability and cyclability indicators showed limited sensitivity to the specific LL interventions being tested across the Living Labs. There's clearly a need for future research to develop design indicators that better capture the impact of interventions like the implementation of new innovative mobility services on the quality of infrastructure in urban outskirts.

4. Human perspectives

Social equity and inclusion are also central to the evaluation of 15mC initiatives. Equity indicators assess whether all demographic groups—including women, low-income households, older adults, and people with disabilities—have equal access to essential services and sustainable mobility options. By integrating these indicators into the evaluation framework, the project can ensure that 15mC principles benefit all segments of the population, rather than reinforcing existing spatial inequalities (Zhang et al., 2022).

Our current filtered indicator set includes:

- **Diversity:** Percentage of female and elderly service/activity users
- **Reported accessibility to amenities for target groups**
- **Accessibility of the service/activity for target groups**
- **Travel cost:** Estimated average travel cost per trip or period

5. Governance

Governance represents a critical yet often underexplored dimension of 15mC implementation, particularly in urban outskirts where traditional top-down planning approaches may prove insufficient. Effective governance in this context requires collaborative and participatory processes that engage a broad range of stakeholders, including public authorities, local businesses, residents, and especially underrepresented and underserved communities, in the co-creation of mobility solutions and urban services (Pozoukidou & Chatziyiannaki, 2021).

The governance framework for 15mC in urban outskirts must address several key challenges: coordinating across multiple administrative boundaries that often characterize peri-urban areas, ensuring inclusive participation in planning processes, and establishing mechanisms for adaptive management of various interventions.

However, governance frameworks enable long term strategies and are difficult to assess within the relatively short evaluation periods of most urban experimentation projects., Our indicator screening process reflected these difficulties: governance-related indicators often lack direct sensitivity to Living Lab (LL) activities or present measurement challenges. While indicators such as "Number of public events organized by public authorities" and "Resident satisfaction scores regarding communication, decision-making" were identified in the comprehensive analysis, only one key indicator is currently retained:

- **Percentage of target-area residents who attended workshops, gave feedback or participated in a survey**

6. Business

Economic vitality is an important factor in evaluating 15mC projects. Indicators such as local business activity, employment rates, and commercial diversity within a 15-minute radius can offer valuable insights into the economic sustainability of urban neighbourhoods (Chiaradia et al., 2024). However, these indicators showed limited alignment with current LL activities, with only one indicator retained in the filtered set:

- **Willingness to pay**

7. Environment and sustainability

Environmental impact assessments within the 15mC framework typically focus on reductions in carbon emissions due to increased accessibility and decreased reliance on private vehicles. Measuring transport-related emissions before and after interventions can provide insight into the environmental benefits of shifting towards localized mobility solutions (Zhang et al., 2022). By integrating these

indicators into the evaluation framework of the DREAMS project, we ensure that the assessment extends beyond conventional transport-focused KPIs to capture the broader socio-spatial impacts of 15mC interventions. This approach aligns with recent research emphasizing the need for multidimensional evaluation methods in 15mC planning (Chiaradia et al., 2024; Zhang et al., 2022). However, as of the current situation in the LLs, few environmental indicators got through the screening process because of the measurability challenges. the filtered indicator set only includes:

- **Reported number of car trips** (for specific target groups in the LL area)
- **Uptake of shared mobility:** Including shared mobility usage, number of trips, number of new users, and distance covered

It is important to note that, regardless of their current categorisation within the evaluation framework, certain indicators may demonstrate relevance across multiple thematic categories. This is due to the inherently overlapping nature of impacts across dimensions such as accessibility, sustainability, human experience, and economic viability. Moreover, the current set of indicators reflects the present state of Living Lab activities and should be considered a foundational layer, open to refinement and expansion as interventions evolve. This approach ensures that the evaluation framework remains grounded in measurable outcomes while maintaining alignment with the broader theoretical understanding of 15mC principles in urban outskirts contexts.

4.2.4 Targets

After deciding what indicators are relevant to measure outcome and output, it is be necessary to formulate what qualifies as a success for this indicator and objective. Setting targets plays a crucial role in evaluation, as they enable the ex-post assessment of how well the objectives have been achieved. Targets are directly tied to the project's main objectives and the indicators. In many cases, failing to meet key targets can result in the project being deemed unsuccessful, even if it performs well on other criteria or scores well overall based on the full evaluation framework (Keseru et al., 2016). Targets set a quantifiable threshold that indicates direction (i.e., an increase or a decrease) and a number or percentage (i.e., increased uptake of the service with 10%). Similarly to indicators, targets should also comply with the SMART criteria outlined above (Bjerke and Renger, 2017; Hyllenius et al., 2009). This entails the following elements:

Specific: targets should be clearly defined, preferably in quantifiable terms. For example, a target could be to reduce peak-hour car traffic in a suburban neighbourhood by 15%. This target assumes that baseline traffic data is available and that traffic can be measured both before and after the project. If quantification is not possible, a qualitative assessment can be used, with terms like 'improvement' or 'positive' impact.

Measurable: targets can only be monitored if both the baseline and post-project conditions are measurable. In our example, it should be possible to measure peak-hour traffic before the project begins and after its completion.

Ambitious and Accepted: ambitious targets motivate progress throughout the project. Additionally, targets should be supported by both decision-makers and the project team.

Realistic: while targets should be ambitious, they must also be achievable. For instance, if public transport usage declines by two percent annually, maintaining the same level of public transport use as the previous year may be a realistic target.

Time-bound: the timeframe within which targets should be achieved should be defined. In our example, the target to reduce peak-hour car traffic between 2025 and 2027 would be time-bound.

Of course, targets should be ambitious, but they should also feasible. This is why it is important to have access to baseline data regarding the target indicator, so that the target can be set at an appropriate level. It is also important to note that in the DREAMS-project, targets serve as an ambition, but failing to meet them will have no negative consequences on the LL partners (beyond the lack of success of their

intervention). These targets are strictly meant to provide an aim for the intervention. In the interviews planned for T6.3, we will then discuss if the targets were met, and the reasons for success or failure to meet them.

4.2.5 Data collection methods

Impact assessment is based on the systematic collection of quantitative and qualitative data. Data collection must ensure that the results are reliable and representative of the target population of the project. The choice of the data collection method depends on the budget available, availability of external data, expertise of the project management team and timescale of the project.

The following methods can be used to collect data depending on the type of the indicator:

Direct measurement of indicators: the most reliable way of collecting indicator data is the direct measurement of the indicators using impact measurement devices (e.g. NHx, PM2.5, noise), tracking equipment (GPS) or carrying out counts or surveys (traffic data, passenger numbers, etc.). At the same time, it is the most resource-intensive way of data collection as these measurements are expensive and require the involvement of experts.

Surveys: some indicators cannot be measured directly as they are qualitative (e.g. perception of safety, satisfaction with route planning services, quality of urban space, socio-political acceptance). Such indicators require a survey of citizens and/or transport users.

Estimation: in some cases, direct measurement of indicators may not be possible because of lack of resources or the complexity of such measurements. It is especially true for such cost-intensive activities as air quality monitoring, noise measurements and modelling. In these cases, it is possible to estimate the impacts through other proxy indicators. Air pollution and noise are, for example, directly related to the number of kilometres travelled by different transport modes. Monitoring the number of passenger or vehicle kilometres travelled and using average emission factors these indicators can be estimated.

Modelling: Indicators that should be collected from several locations are often modelled. Such indicators include noise, traffic and air pollution. Using a computer model to estimate them reduces the cost of data collection. It, however, requires expertise or the involvement of an external consultant.

Official statistics: some indicators may be available from official national, regional, local or operators' statistics. Typically, indicators like the number and severity of accidents, public transport passengers etc. can be derived from such statistics. Very often, however, the spatial extent and the time period covered by official statistics are different to the project's geographic and temporal scope.

The appropriate data collection method will be identified for each DREAMS LL intervention and indicator in the individual LL data collection plans (see below)

4.2.6 Data collection for stakeholder-based assessment

This section outlines the key elements of the stakeholder assessment method 'Stakeholder Impact Scoring' (SIS), which will be used in all LLs as part of T6.2. In order to conduct a SIS evaluation, the data needs per key step (described in Section 2.2) are as follows:

1. **Data collection**
    - Gathering structured and unstructured data from multiple sources. This can be from sources such as literature reviews, but can also come from expert consultations, and stakeholder inputs. Stakeholder inputs and consultations can be organised in different ways; for example, a workshop day can be held or a template can be made to be filled out by the expert or stakeholder (similar to the template that can be seen in Appendix II).
    - Data: the data used can also come from different sources. Reports, statistical datasets, expert opinions, and policy documents can all function as data for a SIS.

- The data collection will be done by each LL individually. The LL leader(s) will have to organise the data collection of their own relevant local stakeholders. As the LLs each have their own topic and scope, the decision on who are relevant stakeholders or experts will differ per LL. A first overview of the LLs local stakeholders can be seen in Section 6.

2. **Data processing and integration**
   - This entails standardising and integrating data to create a coherent dataset for analysis.
   - Data: in order to be ready to use, the data should be cleaned and compiled into formatted datasets.
3. **Analytical modelling and scenario development**
   - Employing qualitative and quantitative methods to analyse trends, relationships, and potential outcomes.
   - Data: Forecast models, scenario simulations, and comparative assessments.
4. **Visualisation and communication**
   - Presenting results in an accessible manner to inform decision-makers and stakeholders.
   - Data: Graphical representations, dashboards, and summary reports.

It is important to note that each LL will be responsible of conducting their own SIS. As the LLs vary in their scope, the final choices as to who are relevant experts or stakeholders, as well as what type of data will be used as input will vary between the various LLs. Each LL leader has the final say over their specific SIS analysis. As the creators of the method, the VUB will assist the LLs in performing their SIS analysis.

4.2.7 Stakeholder perspectives and identification of baselines and alternatives

Next to the objectives, potential impacts, indicators, targets, and measurement methods and frequencies, the stakeholder template described above also included questions regarding stakeholder preferences as well as the identification of scenarios and alternatives. These last two concepts are key elements of the SIS analysis used in T6.2.

The stakeholder templates were distributed by the VUB to the LL leaders in November 2024, who in turn distributed the template to their relevant local partners. The selection of local stakeholder was made autonomously by each LL leader. The distribution itself happened in multiple ways: some partners held a meeting with the local stakeholder(s) to discuss their objectives, filling out the template together, while others had the stakeholder fill out the template by themselves. The full template can be found in Appendix II. In any case, this template represents a first exploration of the various stakeholder perspectives present throughout the different LL and their interventions. It serves as a starting point for T6.2, but it will have to be enhanced with more data collection regarding the various stakeholder perspectives, objectives, and preferences.

Additionally, it was necessary to establish a baseline as well as alternatives for each intervention. These sections on scenarios and alternatives were part of the LL leader stakeholder templates that were distributed by VUB to the LL leaders in the same timeframe as the stakeholder templates. This template included a section in which the LL leaders were asked to identify a baseline and alternatives for each intervention. The *baseline* is a situation without any intervention and alternatives are different versions of the interventions' implementation. These may include different designs, locations, policies, or approaches. An example of this could be:

> *Baseline: there are no shared bikes in the Living Lab location [*current situation*].*
>
> *Alternative A: shared bikes are placed in a central location.*
> *Alternative B: shared bikes and cargo-bikes are placed in a central location.*
> *Alternative C: shared bikes are placed in a central location and throughout the neighbourhood.*

Alternatives can be very similar to each other, such as A-B-C above, but they can also be less similar:

Alternative D: shared cars are placed in a central location
Alternative E: we host a café for neighbours.

Section 6 provides the contacted local stakeholders as well as their goals and the baseline and alternatives drafted by each LL leader. Stakeholder involvement is often a long-term process, where often multiple meetings are necessary to clarify the goals and viewpoints of the stakeholders. Arranging such meetings can also prove difficult with certain stakeholder groups. As such, this is an ongoing process in most Living Labs, where changes or updates are expected throughout the course of the project and the specific interventions. Such changes will be reflected in this Deliverable, primarily in Section 6.

5 DEVELOPMENT OF INDICATORS FOR THE LIVING LAB INTERVENTIONS

After having established the overarching objectives of the project, it is time to consider each Living Lab's individual goals and interventions. This was a part of Task 6.1, which was carried out by the VUB. This process had several stages, which are explained in the following sections.

5.1 Identification of LL indicators for the DREAMS Evaluation Framework

5.1.1 Stage overview of framework creation

First, the LL locations and local intervention were selected by local partners (the university partners and their local stakeholders). This happened during the first months of the project, starting from March 2024 until November 2024. Each LL team could decide these for themselves, and these were partially predefined before the start of the project (during the proposal writing stage).

5.1.2 Vienna Symposium workshop (October 2024)

Once the plans for the LLs were known, the VUB organised a workshop during the DREAMS Vienna Symposium day on October 11th, 2024. The goal of this workshop was to have a first exploration of the possible goals and objectives of each LL. Together with partners from each city plus members of the local audience, the workshop created a first list of expected impacts for each LL location, as well as possible KPIs and their measurement method and frequency. the only exception to this process was the Paris LL, as there was no project partner present to represent their Living Lab.

The three research questions of this workshop session were:

- What impact would you expect from the intervention of the Living Lab (positive or negative)?
- What indicators would you use to measure these impacts?
- How would you measure these impacts?

Figure 5 shows an example of the Brussels poster mid-session, with answers for the first two questions stated here.

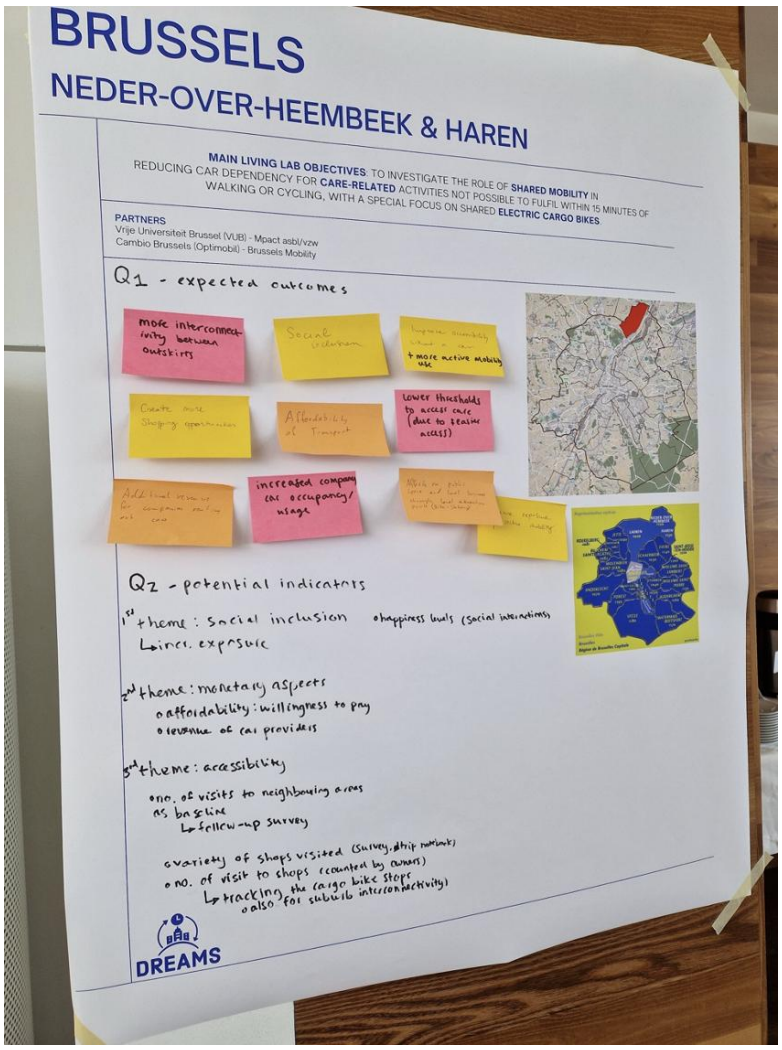

Figure 5: Example of the workshop posters, in this case the Brussels Living Lab (photo credits: VUB)

The other posters, as well as the templates that were used in this workshop can be found in Appendices III and IV.

5.2 Development of the LL Indicator template

Based on these first results from the Vienna workshop, the VUB created a first thematic overview of the reported impacts, indicators and measurement methods. These were then used to craft two templates: one for the Living Lab leading partner, and one to be filled out by local stakeholders (with the help of the LL leader(s)). These templates were used to indicate objectives, expected impacts, indicators and possible measurement methods of each individual LL location. These templates can be found in Appendix I. The creation of these templates was done in November 2024, and the period for filling out the templates initially took place during December 2024. However, as it proved difficult for some partners to organise a meeting with their local stakeholders, this timeline was extended into January and February of 2025.

5.2.1 Template collection and analysis

These individual templates were analysed by the VUB for viability and for common themes. As all LL's varied in their interventions and approaches, not many commonalities were found. These common themes were discussed in a WP6 partner meeting, as well as at the Paris Consortium meeting in March 2025. After this meeting it, was decided to follow up on the templates separately for each Living Lab and develop LL-specific indicators, with the more overarching set of indicators being part of Task 3.5

instead. It was decided that instead, each indicator in the data collection plan would be classified as either referring to an outcome (i.e., related to the project) or output (i.e., related to the intervention). A full list of output indicators is being developed as part of Task 3.5, which will be presented in a forthcoming deliverable.

5.2.2 Data collection plan finalisation

Based on the variety of interventions and their impacts, the decision was made to create a template that would be overarching but still allowed to tailor to each individual Living Lab and intervention.

Per Living Lab, this framework includes information on the interventions, as well as a description of the data needs for the output and the intervention outcome. Depending on the exact contents of the intervention per LL, this can entail a mix of data to be collect ex-ante, ex-post and continuous collection. These plans were 'finalised' as a first draft after Paris Consortium meeting in March 2025, after the VUB held meetings with all LL leaders separately in March and April 2025.

5.3 Measurement Approaches

The evaluation of interventions across the different Living Labs employs a combination of qualitative and quantitative methodologies. The measurement framework follows an ex-ante, ex-durante and ex-post evaluation structure. Considering the varying objectives and expected impacts of each LL and intervention, the measurement approaches are tailored to specific contexts while maintaining common elements across locations. These common elements include shared themes and methodologies, such as the use of surveys, tracking data from intervention-related vehicles, and a mix of qualitative and quantitative approaches.

As shown in Figure 6 below the measurement process is structured in four key stages:

1. Planning: defining objectives, selecting indicators (KPIs), and identifying appropriate data collection methods.
2. Baseline measurement: conducting ex-ante data collection to establish a reference point before intervention implementation. This step was part of the LL leader template (explained above).
3. Pilot/measure implementation: gathering ex-post data and comparing it to baseline measurements to assess impact.
4. Reflection: interpreting results and formulating recommendations based on findings.

The Reflection stage will be the topic of Deliverable 6.2, which will be the Evaluation Synthesis of the DREAMS-project, so it will not be discussed here yet. Deliverable 6.2 will be published at the end of the project (late 2026).

5.4 Measurement timeline and methods

This section outlines the specific data collection methods used in each stage of the measurement process, ensuring clarity in the alignment of the different qualitative and quantitative approaches used in the LLs with the overall DREAMS Evaluation Framework. As the interventions do not all have the same duration and are not scheduled to take place at the same moment across LLs, a general timeline in months cannot be given here. For this, we refer to the timeline per Living Lab in Section 6. The general stages that all LL interventions will go through in visualised in Figure 6 below.

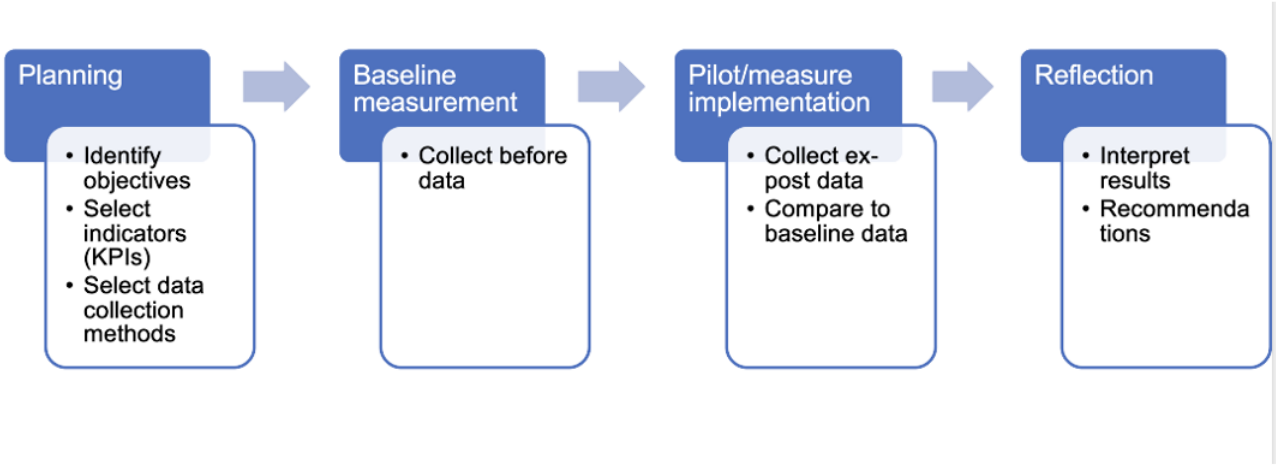

Figure 6: visualisation of the order of the DREAMS Impact Assessment, as presented by VUB at the Vienna Consortium Meeting on October 10th, 2024

5.4.1.1 Planning Stage

The planning phase of the evaluation builds on the concepts outlined in Section 3, where objectives, indicators, KPIs, and targets were defined. With the help of a data collection plan template, each Living Lab (LL) has created a plan that is aligned with their specific interventions. This stage took place between November 2024 and February 2025.

In this stage, LL partners:

- Defined the objectives for their intervention (output- or outcome-oriented, per Section 3).
- Selected relevant indicators and KPIs based on expected impacts and data availability.
- Determined feasible and context-appropriate data collection methods (outlined in Section 3.6).

These inputs formed the foundation for the data collection frameworks presented per LL in Section 6. The structure of the templates allows for consistency across sites while accommodating local variation in resources, timelines, and stakeholder contexts.

5.4.1.2 Baseline measurement (Ex-Ante Data Collection)

As introduced in Section 2.4, ex-ante evaluation refers to the collection of baseline data before an intervention is implemented. This provides a reference point for assessing impacts through ex-post comparison. Each Living Lab has identified relevant baseline metrics based on the nature of its intervention and objectives. This can either have been through the use of household survey data that as collected as part of T2.3 and D2.3, or through the forthcoming DREAMS Living Lab survey on perceived accessibility of amenities, that is currently under development as part of T3.3. Depending on the context of the interventions chosen per LL, other relevant baseline data can come from previous research, mobility providers or manual counting.

5.4.1.3 Pilot/Measure implementation (Ex-Post Data Collection)

This phase corresponds to ex-post evaluation as described in Section 2.4; assessing the impact of an intervention by comparing post-implementation data with the baseline established during the ex-ante phase. Depending on the intervention type, context, and available tools, LLs will use a combination of the following approaches:

- **Surveys and feedback**: administered after implementation to assess user satisfaction and perceived impact (e.g., Utrecht, Brussels, Vienna).

- **Qualitative engagement**: interviews or focus groups with target groups (e.g., workers, local businesses) to capture in-depth feedback (e.g., Utrecht, Brussels).
- **Mobility data tracking**: post-launch usage statistics from shared mobility services or local operators (e.g., Paris, Brussels, Utrecht).
- **Environmental and spatial observations**: manual counts or GIS-based analysis of usage patterns or infrastructure changes (e.g., Vienna, Munich).
- **Financial metrics**: post-project performance metrics, such as revenue per trip or reduced operational costs (e.g., Brussels, Budapest).

Full data plans by Living Lab, including assigned responsibilities, are presented in Section 6.

5.5 Evaluation and Data Collection Plan

Based on the templates and meeting held per Living lab, the VUB created data collection plans. These include the objectives for each intervention and what data needs to be collected in order to reach this objective as well as fitting collection methods. It also includes an overview of responsible partners for each type of data to be collected, as well as a timeline of when what data should be collected. For the stakeholder-based evaluation, this also involves contacting relevant local stakeholders, creating a baseline and alternatives per intervention, as well as organising the SIS workshop(s). Per each of these steps, the evaluation and data collection plan outlines who is responsible for it, and when it should be conducted.

5.6 Monitoring

Throughout the project, partners will monitor progress according to the data collection plan, and at key points or at the project's conclusion, we will conduct an analysis of the collected data to assess the project's impact and determine if any adjustments are needed.

In order to ensure that the project remains on track with the data collection of the interventions, there will be regular meetings with all WP6 partners throughout the remainder of the DREAMS-project. As WP6 is closely linked to WP5 (the implementation of the LLs), these meetings will be joint WP5 (led by BME) and WP6. These will at first be monthly, but this can be intensified whenever this proves necessary. Additionally, there will be one-on-one follow-up meetings to prepare for Tasks 6.2 and 6.3. These meetings will be led and organised by VUB as the WP leader.

5.7 Data collection responsibilities

The task of ensuring that all the data necessary for each intervention will be collected lies primarily with the project partner that is leading the LL. This does not mean that they will necessarily collect all the data: the frameworks in Section 4 present a collection task distribution per intervention, in which other (local) partners are also involved. As for the impact assessments that will be conducted with local stakeholders, it will be the responsibility of VUB and BOKU to provide the necessary information and explanation on these methods. The data collection, including the targeting and contacting the local stakeholder(s), is the task of the LL leaders.

5.8 Data storage

The data collected in the scope of the Living Lab interventions will be hosted on the project's protected Unishare folder, in accordance with the DREAMS data protection plan, developed by the Universiteit Twente. All data will be anonymised. The DREAMS Unishare server is protected by multi-factor authentication, and no data will be shared outside of the consortium partners. This data will be maintained after the end of the project for a period of 10 years. According to the consortium agreement, DMP and/or GDPR Registration, partners shall comply with all current and future applicable data protection laws of the applicable jurisdiction, including without limitation, national and subnational laws based on the Regulation (EU) 2016/679 (the "GDPR") and Directive 2002/58/EC concerning the

processing of personal data and the protection of privacy in electronic communications (ePrivacy Directive) and all data breach notification and information security laws and any other local regulations when processing any "personal data".

5.9 Key principles for quality data collection

Lastly, there is the concern of ensuring that data collected in the LLs is of sufficient quality. Regardless of the specific method used, ensuring high-quality data collection requires adherence to several fundamental principles:

- Clarity of purpose: clearly define what you want to measure and why.
- Consistency: standardised data collection procedures help maintain reliability across different samples and timeframes. This is particularly important when comparing data across different locations or user groups.
- Representative sampling: when using large-scale surveys, the data collected should accurately reflect the target population.
- Minimising bias: avoid leading questions in surveys and interviews. In observational methods, ensure that assumptions do not distort the interpretation of findings.
- Triangulation: (if possible) using multiple data sources, such as surveys combined with mobility tracking data, helps validate findings and reduce the risk of errors.

LL teams are responsible for collecting good quality data for their interventions, with VUB and BOKU (as leader of T6.2) as supervisors to support where necessary.

6 DATA COLLECTION PLAN PER LIVING LAB

6.1 Overview of the Living Labs

This section details the process described in sections 2, 3 and 4 above per Living Lab location of the DREAMS-project. These locations are urban outskirt neighbourhoods of Brussels (Belgium), Budapest (Hungary), Munich (Germany), Paris (France), Utrecht (the Netherlands) and Vienna (Austria). Per LL we have three sections. Section I is focused on the impact evaluation and its contents. In it, we describe the chosen intervention(s) and its location(s), what goals and expected outcomes of these interventions are and what impacts and targets are attached to them. We also provide a data collection framework per LL, which entails what data needs to be collected, when, how, by whom and for what specific indicator and whether this indicator relates to an output or an outcome. These tables look like Table 1 below:

Obj.	Expected impact	Indicator	Output or outcome?	Target	Measurement method	Measurement frequency	Data collection
1	*Improved accessibility*	*Reduced travelling time to local stores*	*Outcome*	*15% reduction rate in travel time*	*Data from mobility provider*	*Continuous*	*University X*

Table : Example of a Living Lab objectives, indicators and measurement information template with illustrative content

For the sake of space, the names of the columns are sometimes abbreviated. Here are their meanings in more detail:

- Obj.: refers to the objective that the indicator corresponds to. These are indicated above the table for each intervention and are numbered, so for example, a 1 refers to objective 1 of that specific intervention.

- Expected impact refers to the general impact that the indicator is supposed to achieve.
- The indicator refers specifically to the element that will be used to measure the expected impact.
- Output or outcome? indicates whether this indicator is connected to the project, or to the intervention.
- The target column sets a specific goal for the indicator, indicating a direction and a specific number or percentage.
- The frequency entails how often this data is supposed to be collected.
- The data collection column outlines what party will carry out the data collection.

Next to this table on the indicators, this section includes a first draft of a timeline per LL, in which crucial steps can be detailed. This timeline will be filled as the interventions take more shape.

Section II then provides a first overview for the stakeholder-based evaluation. Per LL, it consists of an overview of the contacted stakeholders (please note that this is not yet an exhaustive list of all relevant local stakeholders), their goals for each of the interventions that they are involved in, as well as a baseline and alternatives per intervention, which have been pre-identified by the LL leaders in their template (described in Section 4).

The introductory sections below shortly introduce each Living Lab, its goals, partners and interventions. For a full overview of each Living Lab, please see Deliverable 5.1 (forthcoming) or the overview on the DREAMS website .

6.2 Living Lab Brussels

6.2.1 Short overview

The Brussel's Living Lab is located in the communes of Haren and Neder-Over-Heembeek, located in the northeast periphery of the city. Administratively, they are a part of the City of Brussels proper but are situated outside the hyper centre in the northern part of the Region. The Brussels Living Lab investigates **the role of shared mobility in reducing car dependency and ownership in urban outskirts for activities that are not possible to fulfil within 15 minutes of walking or cycling.** The focus lies on trips within the urban periphery as well as trips to and/or from the case study locations by looking into three services: cargo bike sharing (provided by Cambio and Monkeydonkey), Mobitwin's volunteer-based demand responsive transport solution for less mobile citizens, and Cozywheels, a platform for sharing vehicles.

6.2.2 Impact assessment

6.2.2.1 Objectives:

Within the Brussels Living Lab, 3 interventions will be tested:

- Mobitwin pilot: to explore the potential and feasibility (both practical and financial) of organizing Mobitwin-trips for less mobile citizens through cambio shared cars.
- Cozywheels pilot: to explore the potential of a business case for sharing vehicles between neighbourhoods and residents in the LL locations.
- Cargobike pilot: to explore the market potential of and willingness-to-pay for electric cargo-bike sharing + getting customer feedback on the product and the ShareABike application.

6.2.2.2 Interventions

1. **Mobitwin Pilot**

Objective

The **Mobitwin pilot** aims to explore how shared mobility solutions can enhance transportation options for **less mobile citizens** in Brussels. Specifically, the pilot examines the **practical and financial feasibility** of using **Cambio shared cars** as a means of providing door-to-door transport for individuals with limited mobility. By integrating Mobitwin's volunteer-based ride service with shared vehicle schemes, the pilot seeks to:

1. Assess the **willingness of volunteers** to use shared cars for Mobitwin trips.
2. Understand **operational challenges** in terms of cost, availability, and ease of use.
3. Measure the **impact on mobility access** for users who would otherwise struggle with transport options.
4. Explore whether this model is **scalable and sustainable** in the long run.

These objectives are connected to the following KPIs and measurement methods:

Obj.	Expected impact	Indicator	Output or outcome?	Target	Measurement method	Measurement frequency	Data collection
3	Improved access to care-related amenities	Reported accessibility of amenities by users	Outcome	Majority of respondents indicated an improvement in accessibility	Qualitative methods (survey/interview/focus group) Comparison of travel time before and after use of Mobitwin	One-time, ex-post	Mpact, VUB
1	Increase in use of the service in the LL area	Number of rides to and from Neder-over-Heembeek	Output	Increase in number of rides during the pilot by 25%	Number of rides (through Mobitwin application)	Before-during-after	Mpact
1	Bigger pool of volunteers	Number of volunteers	Output	+ 5 volunteers	Number of volunteers (through Mobitwin application)	Before-during-after	Mpact
2,3	Reduced reliance on private vehicles	Number of trips taken with the service	Outcome	Increase in number of rides	Post-intervention survey	One-time, ex-post	VUB
4	Better understanding of the area's business case potential	Trip cost coverage	Output	Cost break-even	No. of trips and income + cost of trip	During-after	Mpact

Table 2: Mobitwin objectives, indicators and measurement information

2. **Cozywheels Pilot**

Objective

The **Cozywheels pilot** explores the potential of **neighbourhood-based vehicle sharing** as a **viable business model** in the Brussels Living Lab area. This intervention investigates whether **local organisations** are willing to participate in a structured car-sharing arrangement that allows them to **share privately owned vehicles** with neighbourhood residents in a community-driven system.

The objectives of this intervention are:

- **Understanding local demand** for vehicle sharing in the pilot areas.
- Evaluating the **interest of local businesses** in supporting or participating in such a system.
- Identifying potential **barriers to adoption**, including legal, financial, and behavioural challenges.
- Assessing the **long-term feasibility** of a **community-based vehicle-sharing economy**.

As this intervention is more explorative in nature and does not contain any actual tests, it will most likely be analysed during the process evaluation of the DREAMS-project, which is part of Task 6.3 and Deliverable 6.2 (forthcoming).

Obj.	Expected impact	Indicator	Output or outcome	Target	Measurement method	Measurement frequency	Data collection
1	Exploration of a possible future business case in the LL area	Interest in the service by local businesses	Outcome	Identifying the barriers for adoption	Interviews with local companies	One-time, ex-post	Mpact

Table 3: Cozywheels objectives, indicators and measurement information

3. Cargobike Pilot

Objectives

The **Cargobike pilot** seeks to evaluate the **market potential and willingness-to-pay** for an **electric cargo-bike sharing system** in the Living Lab areas. The initiative aims to understand how **residents, businesses, and other stakeholders** perceive the value of shared cargobikes, and whether they would be willing to **adopt them as a regular mobility solution**.

The pilot will focus on:

1. Analysing **user demand and trip patterns** using data from the MonkeyDonkey and Cargobike Brussels applications.
2. Collecting **customer feedback** to assess ease of use, convenience, and potential improvements.
3. Investigating **financial viability**, including revenue per trip and potential business models.
4. Evaluating the cargobikes' role in **reducing car dependency and CO2 emissions**.
5. Testing the **effectiveness of remote (un)locking systems** for seamless access.

Obj.	Expected impact	Indicator	Output or outcome	Target	Measurement method	Measurement frequency	Data collection
4	Decrease of car trips in LL area	Increased number of trips with the cargobikes	Outcome	Average 5 trips/week at the end of the test	Through the application (tracking of the bikes), survey	Before-during-after for tracking, ex-post for survey	Mpact
1,4	Improved access to amenities	Reported accessibility of amenities by users	Outcome	Majority of respondents indicated an improvement in accessibility	Qualitative methods (survey/interview/focus group)	One-time, ex-post OR during	Mpact, VUB
1,2,3	Better understanding of the area's business case potential	Number of trips taken with the cargobikes	Output	Average 1 trip/day at the end of the test	Revenue per trip calculation (includes bike tracking and time spent per trip)	Before-during-after	Mpact
1,2,3, 4	Improved service in the area	Finding a suitable location for a station	Outcome	1 station identified per bike	Qualitative methods (survey/interview/focus group)	One-time, ex-post	Mpact

1,2	Improved visibility	Increased recognition/interest by pilot users	Output	10 users registered per bike	Qualitative methods (survey/interview/focus group)	One-time, ex-post	Mpact

Table 4: Cargobike objectives, indicators and measurement information

6.2.3 Stakeholder-based assessment

Name (organisation)	**Stakeholder group**
Cambio	Project-supporting
Brussels Mobility / GC Nohva	Decision-maker

Table 5: Stakeholders overview Brussels

Objectives/local goals:

Stakeholder	**Goals for the intervention(s)**
Cambio	Provide feedback
	Share data where appropriate
	Provide material support
	Participate in workshops
	Provide material support (e.g. a cargo bike)
Brussels Mobility / GC Nohva	Study the potential of cargo bikes for modal shift
	Gain insights from the sharing of Cambio vehicles via Mobitwin for the work carried out by the PRM working group within the framework of the Green Deal Inclusive Carsharing
	Provide a more comprehensive documentation of carsharing between individuals or between individuals and organisations

Table 6: Stakeholder goals Brussels

Mobitwin

Baseline (please state):	**There is already a small number of rides (without a shared car) from the LL location + (assumption) there are already informally organised rides between neighbours**
Alternative A:	We enhance the local antenna in the LL locations by offering shared vehicles to the volunteers.
Alternative B:	Other transport options + other organisational options (TBD after survey)

Alternative C:	We do not develop the local antenna further or find local volunteers. Instead, we explore the local interest in the service.

Table 7: Baseline and alternatives Mobitwin

Cozywheels

Baseline (please state):	**There is no organization that is currently sharing its fleet with locals in the LL locations.**
Alternative A:	We explore the potential for companies in the LL locations to share their vehicles with locals outside of business hours.

Table 8: Baseline and alternatives Cozywheels

Cargobike

Baseline (please state):	**There is no presence of shared cargo-bikes in the LL locations**
Alternative A:	We set up cargo-bikes in private locations (station-based)
Alternative B:	We set up cargo-bikes in public locations (station-based)
Alternative C:	We set up free-floating cargo-bikes

Table 9: Baseline and alternatives Cargobike

6.2.4 Brussels timeline

The timeline of the interventions of the Brussels Living Lab is as follows:

Intervention name	Task	Scheduled timeframe	Project months	Partner responsible
Cozywheels	Carrying out interviews with potentially interested local businesses	November 2024-February 2025	11-14	Mpact
Mobitwin	Service pilot	December – January 2026	21-22	Mpact
Cargobike	Bike-sharing pilot	September– October 2025	20-21	Mpact

Table 10: Living Lab timeline Brussels

6.3 Living Lab Budapest

6.3.1 Short overview

The Budapest Living Lab aims to provide an effective alternative to the reliance on private car usage and low-frequency public transport in the Rákosmente district of Budapest. By encouraging more sustainable transport modes, the living lab seeks to **reduce the reliance on single-occupancy vehicles**, **thereby fostering a greener and more accessible urban environment.** The living lab's core focus is strengthening connections within the Rákosmente district. Enhancing these connections facilitates better movement across neighbourhoods and promotes a sense of community among residents. With improved accessibility, residents are more likely to engage with local services, boosting the local economy and encouraging a vibrant neighbourhood atmosphere.

6.3.2 Impact assessment

6.3.2.1 Interventions

MOL Bubi is Budapest's community bike-sharing system, which has only been available in the city centre until now. In the DREAMS pilot, we want to test the service in an "island operation" on the outskirts of Budapest (the planned service area is not connected to the Budapest downtown service area).

- **Objectives and Goals**

(1) Test bike sharing scheme in suburban circumstances

Obj.	Expected impact	Indicator	Output or outcome	Target	Measurement method	Measurement frequency	Data collection
1	New users for the bike-sharing system	nr. of new users	Output	50 new users	nr. of newly registered users	Continuous	BKK
1	Integration of the Mobi points into the urban space	nr. of micromobility tools in Mobi points	Output	2 tools / Mobi points	personal observation of the status of the tools	Ex-durante	Rákosmente, BME
1	Awareness-raising on the service in the LL area	nr. of local residents reached in any channels	Output	500 local residents	social media pages and groups, local media reports	Continuous	Rákosmente
1	Enhanced usage of bike-sharing in the LL area	nr. of trips with MOL BuBi within the district	Output	100 trips	data collection of bike-sharing service provider	Continuous	BKK
		duration of trips with MOL BuBi within the district	Output	5 min (average)	data collection of bike-sharing service provider	Continuous	BKK
		utilisation rate of the MOL BuBi bikes	Output	1 usage / day	data collection of bike-sharing service provider	Continuous	BKK
		bike availability within the district	Outcome	1 bike / Mobi point	data collection of bike-sharing service provider	Continuous	BKK
1	Financial viability of the service in the LL area	total cost per number of users	Outcome	Cost break-even	nr. of registered users compared to the total cost of the pilot and calculated cost of per trip in other areas	Ex-post	Rákosmente, BME

Table 11: Budapest objectives, indicators and measurement information

6.3.3 Stakeholder-based assessment

Primary stakeholders + stakeholder groups:

Name (organisation)	Stakeholder group
BKK Centre for Budapest Transport	Decision-maker
KTI Hungarian Institute of Transport Science and Logistics	Advisory role
Municipality of Rákosmente	Decision-maker
Bikeride association	Advisory role
Citizens	Advisory role

Table 12: Stakeholders overview Budapest

Stakeholder	Goals for the intervention(s)
BKK	Increase the modal share of sustainable transport modes
	Develop and test the current shared micromobility system in an outskirt district of Budapest
KTI	Provide better accessibility of local public transport
	Better capacity sharing between public transport and sustainable individual transport modes in the pilot area
Rákosmente	Offer alternative transport modes for citizens
	Increase the usage of local services
Bikeride association	Decrease the car dependency of the pilot area
	Change the transport choices of the inhabitants
Citizens	Have access to alternative transport modes
	Possibility to combine transport modes and reduce travel time

Table 13: Stakeholders goals Budapest

Scenarios and alternatives per intervention:

Baseline (please state):	**There is no micromobility hub infrastructure and bike-sharing service in Rákosmente.**
Alternative A:	Bike-sharing service in Rákosmente.
Alternative B:	Mobi micromobility points in Rákosmente.

Table 14: Baseline and alternatives Budapest intervention

6.3.4 Budapest timeline

Once provided, the timeline of the interventions of the Budapest Living Lab will be presented here.

Intervention name	Task	Scheduled timeframe	Project months	Partner responsible

Table 15: Living Lab timeline Budapest

6.4 Living Lab Munich

6.4.1 Short overview

Munich's Living Lab centers on the neighboring cities of Geretsried and Wolfratshausen in Upper Bavaria, situated approximately 43 km and 38 km south of Munich, respectively. Geretsried, the larger and more recently founded of the two, has a population of approximately 26,000 and was established after World War II as a planned settlement for displaced persons. It exhibits a dispersed urban form characterized by post-war residential developments and light industrial zones. In contrast, Wolfratshausen, with around 19,000 inhabitants, features a compact historical center with medieval street patterns positioned at the confluence of the Loisach and Isar rivers. According to the 2022 German Census, both cities exhibit relatively high proportions of older adult residents—29.31% in Geretsried and 28.64% in Wolfratshausen—as well as notable shares of migrants, comprising 19.23% and 16.54% of the population, respectively. Therefore, the Living Lab aims to develop strategies to reduce inequalities in access to essential services within 15-minute neighborhoods, focusing on supporting older adults and individuals with migration backgrounds. Consequently, it will assess the potential of emerging micro-mobility hubs and ride-sharing initiatives in collaboration with SIXT Share, E-Oberland, and MVV. As part of these efforts, it envisions developing a reward program that benefits users of local public transport and shared mobility services, enhancing the engagement and accessibility of residents.

6.4.2 Impact assessment

6.4.2.1 Interventions

Within Munich's Living Lab, two primary interventions are envisioned to be tested (it is still to be determined if they will be on-site investigations or theoretical):

1. Micro-Mobility Points: to explore the potential and feasibility of establishing local, decentralized mobility points with bus and bike/car-sharing offers to serve residents within walking and biking distance.
2. Rewards program for public transport and shared mobility: to explore the potential business of implementing a point-based system that rewards users of public transport and shared mobility services. These points collected could be redeemed for discounts on local goods or services, for example.

1. Micro-Mobility Points

Objectives:

As previously outlined, the Micro-Mobility Points initiative seeks to assess the potential and practical feasibility of establishing local-scale, decentralized mobility hubs offering bike and car-sharing services connected to local bus routes. This intervention investigates suitable site selection for these hubs based on demographic density and transport needs, the modalities of integration with existing public transport systems, and the necessary supporting infrastructure. The overarching objective is to reduce first- and last-mile mobility gaps and improve local accessibility (particularly for socially vulnerable groups, such as older adults and migrants, who often face compounded barriers due to limited digital literacy, physical mobility, and language skills). By integrating the public transport offers with shared mobility services and supporting infrastructure, this intervention aims to:

1. Identify **suitable locations** for the micro-mobility points based on demographic data, current infrastructure, and public transport offers.
2. Examine **integration models** between shared mobility services and the existing public transport network.
3. Assess **usability and accessibility** of micro mobility points' interfaces and infrastructure for older adults and migrants.
4. Evaluate **community uptake and satisfaction** among target user groups, focusing on frequency of use, ease of access, and perceived benefits.
5. Explore the potential for **replicability** and **scalability**.

The following KPIs and measurement methods are connected to the objectives:

Obj.	Expected impact	Indicator	Output or outcome	Target	Measurement method	Measurement frequency	Data collection
1, 3	Enhanced accessibility and coverage of mobility services for residents	% of the area with improved accessibility	Output	At least 20% of the area had its accessibility improved	GIS mapping and spatial accessibility analysis	One-time, to define the suitable location of the mobility points	TUM
2	Increase of shared mobility options' availability	Number of available shared mobility options integrated to public transport	Output	At least one shared-mobility service is available at the mobility point	Counting of the shared-mobility services incorporated	One-time, after the definition of the location of the mobility points	TUM, with the support of the local partners
2, 3, 4	Increase in the usage of shared mobility options in first/last-mile connectivity	Number of rides by different population groups	Outcome	At least 10 rides per day are done with shared mobility services	Number of rides	Weekly, during the intervention period	MVV, SIXT, and E-Oberland
4	The community is satisfied with the micro-mobility points and is willing to keep using them in the long term	Respondents' satisfaction and willingness to continue using the services	Outcome	Most respondents indicated being satisfied and willing to continue using the services	Qualitative method (e.g., survey or workshops with focus groups)	One-time, ex-post	TUM, with the support of the local partners
5	Deeper insight into the areas' potential for shared-mobility business models	Operational costs and revenues	Outcome	Cost break-even	Number of trips and revenue + operation costs	One-time, ex-post	MVV, SIXT, and E-Oberland, supported by TUM

Table 16: Micro-mobility points' objectives, indicators, and measurement information.

2. Rewards program for public transport and shared mobility

Objectives:

As previously outlined, the rewards program for public transport and shared mobility seeks to assess the feasibility and potential value of implementing a point-based incentive system that encourages sustainable transport modes. Under this scheme, users would accumulate points through regular use of public transport and shared mobility services (e.g., bike-sharing, car-sharing), which could then be redeemed for discounts on local goods and services, reinforcing sustainable travel behavior and support for the local economy. The overarching objective is to encourage modal shifts away from private car use, promote low-emission transport alternatives, and foster inclusive urban mobility systems that address environmental and social sustainability goals. By implementing the rewards program, this intervention aims to:

1. Assess the **attractiveness and user acceptance** of a points-based rewards system for public transport and shared mobility users.
2. Measure the **impact of incentives on travel behavior**, particularly regarding modal shifts away from private car use toward sustainable options.
3. Evaluate the **social inclusiveness** of the rewards scheme, with a focus on participation by older adults, migrants, and individuals with limited digital skills.

The following KPIs and measurement methods are connected to the objectives:

Obj.	Expected impact	Indicator	Output or outcome	Target	Measurement method	Measurement frequency	Data collection
1	User engagement and satisfaction with the rewards system	- % of users enrolled who actively use and redeem points - Satisfaction and willingness to continue using the services	Outcome	There are at least 50 active users in the first 3 months	- System usage data (e.g., logins and reward claims) - Small surveys to assess satisfaction levels	One-time, ex-post	Municipalities of Geretsried and Wolfratshausen
2	Increased use of public transport and shared mobility in place of private vehicles	% increase in public/shared mobility transport use	Outcome	20% increase in public/shared mobility transport use	Number of rides	Weekly, during the intervention period	MVV, SIXT, and E-Oberland
3	Increased involvement of migrants and older adults	% of migrants and older adults using the rewards program	Outcome	At least 20% of registered users are migrants or older adults	Demographic data from registration process of the rewards program	Weekly, during the intervention period	Local partners, supported by TUM

Table 17: Rewards program for public transport and shared mobility's objectives, indicators and measurement information.

6.4.3 Stakeholder-based assessment

Primary stakeholders + stakeholder groups:

Name (organization)	Stakeholder group
City of Wolfratshausen	Advisory role

City of Geretsried	Advisory role
MVV (public transport operator)	Project supporting
SIXT-Share (shared-mobility: cars)	Project supporting
E-Oberland (shared-mobility: cars)	Project supporting

Table 18: Stakeholders' overview Munich.

In the following table, hypothetical goals (not yet confirmed with the stakeholder) have been marked in *italics*.

Stakeholder	Goals for the intervention(s)
City of Wolfratshausen	Provide feedback
	Share data when appropriate
	Provide supporting material
	Participate in the workshops
	Mobility of the future that combines inclusion, sustainability, and participation
	Improving and simplifying accessibility and mobility
	Sustainable urban development
	Switching to public transport and shared mobility offers
	Public acceptance and effective information dissemination
City of Geretsried	Provide feedback
	Share data when appropriate
	Provide supporting material
	Participate in the workshops
	Promote mobility for all, including persons with reduced mobility, language barriers, and educational impairments
	Strengthening active forms of mobility
	Reduce private car usage
	Reduce parking spaces
	Actions/interventions should have high public acceptance
	Bring employers on board to finance better and sustainable commuting choices (instead of the use of private cars by their employees)
MVV	Provide feedback
	Share data when appropriate
	Provide supporting material
	Participate in the workshops
	Improve first and last-mile connection
	Testing new business models for shared mobility that can be rolled out in other similarly structured areas in the MVV area
	Reduction in travel time through new shared mobility offers
	Enabling more people to choose alternatives to private car usage
SIXT-Share	Provide feedback
	Share data when appropriate

	Provide supporting material
	Participate in the workshops
E-Oberland	Provide feedback
	Share data when appropriate
	Provide supporting material
	Participate in the workshops
	Leveraging potential in all business areas in the cross-network
	Creating a sensible, cost-effective alternative to a private second vehicle
	Reducing company car fleets in small to medium-sized companies through reliable car-sharing
	Increase user rate and profitability

Table 19: Stakeholders' goals Munich.

Scenarios and alternatives per intervention:

1. Micro-Mobility Points in Wolfratshausen:

Baseline (please state):	**One train station in Wolfratshausen (S7) connects to Munich, and 13 regional and 2 express bus routes connect within the city and the region (buses running every 20 minutes). The train station contains 482 bike parking spaces.**
Alternative A:	Bike sharing is part of the mobility hub at Wofratshausen train station.
Alternative B:	Car sharing is part of the mobility hub at Wofratshausen train station.
Alternative C:	Bike and car sharing are part of the mobility hub at Wofratshausen train station.
Alternative D:	Bike sharing is integrated along the express bus stops in Wofratshausen.
Alternative E:	Car sharing is integrated along the express bus stops in Wofratshausen.
Alternative F:	Bike and car sharing are integrated along the express bus stops in Wofratshausen.

Table 20: Baseline and alternatives for micro-mobility points in Wolfratshausen.

2. Micro-Mobility Points in Geretsried:

Baseline (please state):	**There are 8 regional and 1 express bus routes connecting the city and the region (buses running every 20 minutes during weekdays). There are also 122 bike parking spaces distributed throughout the urban form.**
Alternative A:	Bike sharing is integrated along the express bus stops in Geretsried.
Alternative B:	Car sharing is integrated along the express bus stops in Geretsried.
Alternative C:	Bike and car sharing are integrated along the express bus stops in Geretsried.

Table 21: Baseline and alternatives for micro-mobility points in Geretsried.

c. Rewards program for public transport and shared mobility:

Baseline (please state):	**No mobility rewards programs are running in Geretsried and Wolfratshausen. Operating next year: My-Radl (if you use public transport, you can ride MVV shared bikes for free)**
Alternative A:	If you walk XX kilometers, you get an incentive (TBD).
Alternative B:	If you ride XX kilometers by bike, you get an incentive (TBD).
Alternative C:	If you have XX car-sharing rides, you get an incentive.

Table 22: Baseline and alternatives for the rewards program for public transport and shared mobility .

6.4.4 Munich timeline

Once provided, the timeline of the interventions of the Munich Living Lab will be presented here.

Intervention name	Task	Scheduled timeframe	Project months	Partner responsible

Table 23: Living Lab timeline Munich

6.5 Living Lab Paris

6.5.1 Short overview

The primary aim of the Paris Living Lab is to study how 15-min accessibility within the **Tram 12 corridor** could be improved, through the implementation of innovative mobility solutions. This involves addressing **last-mile connectivity gaps** by deploying **new shared mobility stations** at strategic locations near key T12 stations. These stations will integrate bikes and scooters. The Living Lab also aims to improve wayfinding and user experience by upgrading signage at major stations at Évry-Courcouronnes. To analyse the adoption dynamics of shared mobility services, the project will introduce discounted memberships and free-trial offers. Discounts mainly target students, while free-trial programs will provide users with their first rides free of charge. These measures aim to reduce cost barriers and promote sustained adoption of shared mobility options. By leveraging the existing cycling infrastructure, the Living Lab will further encourage active mobility, reducing reliance on private vehicles and contributing to environmental sustainability. The Living Lab also seeks to foster collaboration among stakeholders to ensure the successful implementation and scalability of its interventions. Key partners include Pony as the shared mobility provider, the municipality of Évry-Courcouronnes, the Essonne Department, Ile-de-France Mobilités (PT authority), and community organisations.

6.5.2 Impact assessment

6.5.2.1 Objectives

Within the Paris Living Lab, 3 interventions will be tested:

- New & improved shared-mobility stations: to improve accessibility to T12 and to amenities and services, reduce last-mile travel time and car dependency.
- Discounts on Pony subscription & usage fees: to explore ways that can reduce the cost barriers and increase the shared mobility usage for commuting.
- Improved T12 signage at key stations: to improve wayfinding and promote intermodality.

6.5.2.2 Interventions

1. **Intervention 01: new shared mobility stations**

This intervention involves establishing new and improved shared mobility stations strategically located near select T12 tram stops and within their surrounding neighbourhoods in Évry-Courcouronnes.

Primary objectives of the intervention: The primary goals of this intervention are :

1- Enhancing accessibility to the T12 line
2- Improving overall access to various amenities and services.
3- Encourage intermodal trips (public transit + shared / active modes of transportation).

Obj.	Expected impact	Indicator	Output or outcome?	Target	Measurement method	Measurement frequency	Data collection
1,3	Reduce first/last-mile travel times.	Travel times	Output	20% reduction of travel times	GIS Mapping	One-time, ex-post	IPR
2	Improve accessibility to amenities and services	Reported accessibility	Output	Majority of respondents indicated an improvement in accessibility	Survey / interview / Focus group	One-time, During or ex-post	UGE
1	Improve accessibility to T12	Number of rides starting or ending at a T12 stations	Outcome	10% increase in trips to T12 stations	Trip data from Pony	Continuous	UGE
1, 3	Reduce car dependency for last-mile trips	Reported modal-shift	Outcome	Part of the respondents indicated a modal--shift	Survey / interview / Focus group	One-time, During or ex-post	UGE
3	Increase the uptake of shared mobility	Shared mobility ridership	Outcome	10% increased usage of Pony's bikes and scooters	Ridership data from Pony	Continuous	UGE / IPR

Table 24: New mobility systems objectives, indicators and measurement information

2. Intervention 02: discounts on shared mobility solutions

This intervention focuses on offering discounts on membership and usage fees for Pony shared mobility solutions, specifically targeting students and workers (of companies that may be interested in subsidizing sustainable commuting for their employees), to make these services more accessible. During the experiment, we will also offer free first rides / monthly subscription for a group of new users of Pony's shared mobility services in Évry-Courcouronnes.

Primary objectives of the intervention: this intervention aims to :

1- Provide fast, cost-effective access to T12 and essential services
2- Promote inclusivity and reduce transportation inequality among the target population.
3- Encourage trial usage by eliminating the initial cost barrier.
4- Incentivize new users, raise awareness of the benefits of shared mobility, and foster long-term use among hesitant residents.

Obj.	Expected impact	Indicator	Output or outcome?	Target	Measurement method	Measurement frequency	Data collection
2	Increase shared mobility use among students	Uptake rate of discounted memberships	Output	10% increase of subscriptions	Service provider data	One-time, ex-post	UGE
		Proportion of students using shared mobility services among all users	Outcome	10% of pony's users are students			
1, 4	Increase shared mobility usage for commuting	Average number of commuting trips made by users of the target groups	Output	Majority of respondents indicate having used pony's bikes/scooters for commuting	Surveys / focus groups	One-time, ex-post	UGE
3, 4	Encourage sustained adoption among hesitant users	Uptake rate of free rides among target groups	Output	Majority of users used the free trial trips	Service provider data	One-time, ex-post	UGE
		Conversion rate from free trials to paid memberships	Outcome	20% of users used the service at least one time after the free trial trips or are considering a subscription	Service provider data / Focus groups	One-time, ex-post	UGE

Table 25: Discounts on shared mobility objectives, indicators and measurement information

3. Intervention 03: improved T12 signage at the main stations

This intervention focuses on enhancing the T12 signage at the biggest public transport stations to improve wayfinding and accessibility for all users.

Primary objectives of the intervention:

1- Increase T12 usage by making T12 stations more accessible and user-friendly, improving signage and ensuring clearer directions.

Obj.	Expected impact	Indicator	Output or outcome?	Target	Measurement method	Measurement frequency	Data collection
1	Enhance wayfinding and usability of the T12	User satisfaction levels with station navigation	Outcome	Majority of respondents indicate that T12 is easy to find	User feedback surveys	One-time, ex-post	UGE
1	Increase T12 ridership	Change in ridership numbers at T12 stations.	Output	5% increase in T12 ridership	ÎDF-Mobilités data	One-time, ex-post	IPR

Table 26: T12 signage objectives, indicators and measurement information

6.5.3 Stakeholder-based assessment

Primary stakeholders + stakeholder groups:

Name (organisation)	Stakeholder group
Municipality of Évry-Courcouronnes	Local authority: Decision-maker
Île-de-France Region	Regional authority: Project-supporting
Pony	Private operator: Service provider
Île-de-France Mobilités	Transport authority: Decision-maker
Conseil Départemental de l'Essonne	Departmental authority: Project-supporting
Local population & associations	End-users & Civil society : Beneficiaries

Table 27: Stakeholders overview Paris

Stakeholder	Goals for the intervention(s)
Municipality of Évry-Courcouronnes	Improve accessibility and inclusivity in underserved areas
	Reduce car dependency
	Promote sustainable urban mobility
Île-de-France Region	Ensure alignment with regional mobility strategy
	Support innovative mobility experiments aligned with the regional climate plan
	Foster territorial cohesion and reduce mobility inequalities

Pony	Increase shared mobility usage
	Expand spatial coverage and inclusivity
	Improve customer satisfaction
	Enhance operational efficiency
Ile-de-France Mobilités	Ensure alignment with regional mobility strategy
	Integrate shared mobility with public transport networks
	Promote modal shift and innovation in urban mobility.
Conseil Départemental de l'Essonne	Ensure regional alignment with sustainable mobility policies,
	Promote cycling and micro-mobility in line with the Essonne Cycling Plan and the development of cycling infrastructure on the département's road network.
Local population & associations	Promote active mobility and shared mobility adoption,
	Advocate for equitable transport solutions.

Table 28: Stakeholders goals Paris

Scenarios and alternatives per intervention:

Baseline:	**Commuters in some sectors of Évry-Courcouronnes (mainly car-centric economic activity zones) suffer from last-mile connectivity gaps and are very car-dependent**
Intervention 01 **Alternative A:**	Shared bikes and scooters are deployed at selected areas in surrounding neighbourhoods of T12 stations, with feedback collected via a survey in the station area.
Intervention 01 **Alternative B:**	Shared bikes and scooters are deployed at at selected areas in surrounding neighbourhoods of T12 stations, accompanied by focus group discussions with locals to evaluate impact and user satisfaction.
Intervention 01 **Alternative C:**	Mobility hubs (Bus, bikes, scooters, shared cars) are introduced at key T12 station areas, with feedback collected via a survey in the station area.
Baseline:	**The cost of the service is quite high. Residents and commuters, particularly those in underserved neighbourhoods near T12 stations, are often unfamiliar with shared mobility services and may hesitate to try them due to the initial cost barrier.**

Intervention 02 **Alternative A:**	A discount on membership fees is offered to students (unlimited usage), with an evaluation of uptake and usage among this group.
Intervention 02 **Alternative B:**	A discount on unlocking and usage fees is offered to a group of new users, with an evaluation of uptake and usage among them.
Intervention 02 **Alternative C:**	New users receive three free rides, followed by targeted interviews or focus group discussions to assess their experience and understand the reasons behind adoption or non-adoption
Baseline:	**The current signage at some T12 stations is insufficiently clear and user-friendly, leading to difficulties in wayfinding for a lot of users.**
Intervention 04 **Alternative A:**	Basic signage is improved with larger, clearer fonts and more signs are installed in select stations, with user feedback collected via a survey.
Intervention 04 **Alternative B:**	Signage including T12 schedules and shared mobility options is introduced around station areas, with evaluations based on user interviews.

Table 29: Baseline and alternatives per intervention

6.5.4 Paris timeline

The timeline of the interventions of the Paris Living Lab is as follows:

Intervention name	Task	Scheduled timeframe	Project months	Partner responsible
New shared mobility stations	Identify possible locations for new stations	April – May 2025	M16-M17	UGE and IPR with Pony
	Identify the needs in terms of shared mobility	May – September 2025	M17-M21	UGE and IPR
	Design and prepare physical implementation	September – November 2025	M21-M23	UGE and IPR with Pony
	Implementation / Scenario evaluation	November 2025 – April 2026	M23-M27	UGE and IPR with Pony
Discounts on shared mobility solutions	Define target groups	May - July 2025	M17-M19	UGE and IPR
	Develop discount scenarios and technical integration plan	July – September 2025	M19-M21	UGE and IPR with Pony

	Coordinate with operators and test discount activation	September – November 2025	M21-M23	UGE and IPR with Pony
	Deploy campaign / monitor uptake	November 2025 – April 2026	M23-M27	UGE and IPR with Pony
Improved T12 signage at the main stations	Assess current signage and identify key locations for improvement	January – April 2025	M13-M16	UGE and IPR
	Co-design and validate new signage elements with stakeholders	June – September 2025	M18–M21	UGE and IPR with the municipality of Évry-Courcouronnes and Ile-de-France Mobilités
	Fabrication and installation	October – November 2025	M22–M23	UGE and IPR with Pony, the municipality of Évry-Courcouronnes and Ile-de-France Mobilités
	User feedback collection	November 2025 – April 2026	M23-M27	UGE and IPR

Table 30: Living Lab timeline Paris

6.6 Living Lab Utrecht

6.6.1 Short overview

The primary aim of the Utrecht Living Lab is to examine how social business models can increase the uptake of shared e-bikes very car-dependent population. In other words, to explore what's the role or contribution of shared e-bikes to promote a more sustainable mobility in the urban outskirts. The focus area of the living lab is the neighbourhood called Overvecht. The interventions to be conducted in the living lab are mainly two: 1. Discounts for DOTT shared e-bikes, 2. Designing and investigating implementation options for a pilot of a solar charging shared e-bike station. These two interventions aim to increase people's reachability to different services offering a more sustainable option besides the private car. Moreover, it aims to decrease internal logistic costs for providers in order for them to be able to reduce services' prices in this specific area. Key partners include DOTT shared mobility provider, Utrecht Municipality, Fietsersbond (cycling union), academic partners (UT-HU) and other local partners.

6.6.2 Impact assessment

6.6.2.1 Interventions

The Utrecht Living Lab hosts two interventions. These interventions will be implemented in the same single living lab neighbourhood (Overvecht).

1. Discounts for shared bikes, specifically targeting employees of companies in the neighbourhood.

- **Short Description**: offer 20% discounts (or similar) in DOTT bikes for worker commuting.
- **Primary objectives of the intervention**:
    1. Reduce car-dependency to commute to work.

Obj.	Expected impact	Indicator	Output or outcome?	Target	Measurement method	Measurement frequency	Data collection

1	New users for the bike-sharing system	Number of new users	Output	Increase the uptake of e-bikes by 10% for the workers commuting by private cars in six months.	DOTT app (quick question before worker starts trip) Companies disseminate small survey	Once after six months	UT and HU

Table 31: Discounts for shared bikes objectives, indicators and measurement information

2. Design and implementation options for a pilot solar charging shared e-bike station

- **Short Description**: design a pilot off-grid solar charging bike station that will help reduce the cost for DOTT bikes to be distributed as the company will save logistics costs (less battery swapping tasks to be conducted).
- **Primary objectives of the intervention**:
    1. decrease cost for mobility providers, leading to decreasing the cost for users and thus, increasing the uptake of shared bikes because they are offered at cheaper prices due to reduced logistics costs.
    2. Reducing energy dependence of the mobility provider.

Obj.	Expected impact	Indicator	Output or outcome?	Target	Measurement method	Measurement frequency	Data collection
1	Reduction of battery swapping tasks	Number of tasks reduced	Output	Reduce logistical cost by 20%	Interview DOTT	Once six months after intervention	UT and HU
2	Reduction in grid energy dependence.	Euros saved in energy cost	Output	Reduce energy consumption by 5%	Data from energy company	Once six months after intervention	UT and HU

Table 32: Solar station objectives, indicators and measurement information

6.6.3 Stakeholder-based assessment

Primary stakeholders + stakeholder groups:

Name (organisation)	Stakeholder group
Dott	Decision-maker
Utrecht Municipality	Decision-maker
Fietserbond	Local stakeholder
Community centre	Local residents/ employees of companies
Project O	NGO and owner of the location of solar charging station
Companies	Owners of the companies

Table 33: Stakeholders overview Utrecht

Stakeholder	Goals for the intervention(s)
Dott	Gain the mobility provider tender by reducing the cost in the outskirts and being a sustainable service.
Utrecht Municipality	Decrease mobility poverty
Fietserbond	Make cycling an inclusive option of transport
Community centre	Increase accessibility for different services
Project O	Improve opportunities for residents in the neighbourhood

Companies	Increase healthy wellbeing of workers and reduce parking space costs.

Table 34: Stakeholder goals Utrecht

Scenarios and alternatives per intervention:

Baseline:	**Current number of workers that commute by private car**
Intervention #1 **Alternative A:**	20% discount for DOTT shared e bikes for workers commuting trips
Intervention #1 **Alternative B:**	30% discount for DOTT shared e bikes for workers commuting trips
Intervention #1 **Alternative C:**	Free DOTT shared e bikes for workers commuting trips
Baseline:	**There is no off-grid solar charging shared e-bike station or knowledge about it**
Intervention #2 **Alternative A:**	Generate the knowledge about the possible implementation of the solar charging station.
Intervention #2 **Alternative B:**	Obtain a feasible design and showcase it to the municipality to raise awareness of this solution as a viable option.
Intervention #2 **alternative C:**	Implement the solar charging station.

Table 35: Baseline and alternatives per intervention

6.6.4 Utrecht timeline

The timeline of the interventions of the Utrecht Living Lab is as follows:

Intervention name	Task	Scheduled timeframe	Project months	Partner responsible
Solar charging docking system for Dott ebikes	Development & design of a solar charging docking system for Dott ebikes	February – July 2025	14-19	HU is leading, although TU is still the formal lead so responsible for final results of the deliverable
	Building & piloting the solar charging docking system	September 2025 – July 2026	21-31	idem
Reduction on trip price for employees of companies	Interviews with companies in Overvecht – to identify needs and desires	May – July 2025	17-19	idem
	One month campaign 'Everyone in Overvecht Cycles to work'	September 2025	21	idem
	Continuation of reduced fees for companies with that interest	October – April 2026	22-28	idem

Table 36: Living Lab timeline Utrecht

6.7 Living Lab Vienna

6.7.1 Short overview

The case study area of the Vienna Living Lab is **Wiener Flur and its surrounding neighbourhood**, situated in the 23rd District known as Liesing. Liesing is located in the southwest of Vienna and is the fifth largest district in terms of area, covering 32.29 km^2. The 23rd District has a relatively high average age, which is steadily increasing, and compared to the city as a whole, it has lower educational levels but a higher average income (Stadt Wien -Liesing in Zahlen)[1]. The Vienna Living Lab investigates how a **flexible activity hub can contribute the 15-minute city concept** and how the development of this flexible activity hub can be linked to **mobility services** like bike sharing.

Figure 7: Overview Vienna LL area

6.7.2 Impact assessment

6.7.2.1 Interventions

In the Vienna LL, there will be two interventions tested.:

1. **Flexible activity hub**: To transform underutilized spaces, we plan a flexible activity hub through a co-creative approach. By reactivating open areas in Wiener Flur, these spaces can serve as dynamic hubs for (community) events, cultural offers, groceries. A co-creative setup encourages community input in designing and programming the space, ensuring it meets local needs and fosters engagement.
2. **Bike Sharing Station:** To enhance accessibility, a light bike sharing station will be established near the flexible activity hub. This station will provide a designated area for bike sharing, accessible through the WienMobil App, eliminating the need for physical docking infrastructure. By positioning the station close to the flexible activity hub, we can facilitate easy bike pick-up and drop-off, promoting sustainable urban transportation options.

Figure 8: Raum_Wagen on location (left); temporary bike sharing station (right)

<u>1. Flexible activity hub</u>

With the intervention "flexible activity hub" we aim to:

1. Set up a flexible activity hub with different offers (e.g. open-air cinema, theatre, workshops) (time span July 1st until August 8th 2025)
2. Invite residents and local initiatives to get actively involved in the set-up of flexible activity hub (e.g. gardening, offers), also through the platform www.imgrätzl.at
3. Create ideas/ concepts for activating vacant/ underutilised spaces that involve local actors and stakeholders.
4. Assess the impact of flexible activity hubs on mobility patterns, emissions and satisfaction level in the neighborhood.
5. Discuss and explore business models for sustainable space use that can continue to exist after the research projects have been completed.

Obj.	Expected impact	Indicator	Output or outcome	Target	Measurement method	Measurement frequency	Data collection
1	Improved access to events and offers	Visitors during cultural events (cinema & theater)	Output	100 visitors per event	Manual visitor counting	Ex-durante	TU Wien/ BOKU/ Stadtland
2	Improved involvement and networking of local actors	Involved organisations/ initiatives in the preparations of flexible activity hub	Output	3 organisations/ iniatives involved	Manual counting/ qualitative assumption	One time, ex-post	TU Wien/ BOKU/ Stadtland
1	Improved offers in the LL area	Visitors at the flexible activity hub (e.g. during workshops)	Output	At least 10 visitors on days of activity	Manual visitor counting	Ex-durante	TU Wien/ BOKU/ Stadtland
4	Improved quality of events and offers in LL area	Reported feedback on quality new offers at flexible activity hub	Outcome	High satisfaction rate (rating 4 out of 5)	Interviews or feedback forms	Ex-durante. ex post	TU Wien/ BOKU/ Stadtland
1, 3	Improved number of offers in the LL area	Number of activities and events hosted at the hub	Output	2 events/ offers per week (= 24 in total)	Manual count	Ex-durante, ex-post	TU Wien/ BOKU/ Stadtland
1, 4	Improved access to events and offers	Proximity for inhabitants	Outcome	Travel time to (cultural) offers reduced by 20%	Questionnaire	Ex-post	TU Wien/ BOKU (with support by TUM)
4	Sustainable travel mode to the hub	Travel mode	Outcome	80% of vistors come by foot or bike	Questionnaire	Ex-post	TU Wien/ BOKU/ Stadtland
4	C02 reduction through sustainable travel modes	C02 emission	Outcome	20% reduction in C02 emossions	Questionnaire (proxy: usual used travel mode for cinema, theatre, etc)	Ex-post	TU Wien/ BOKU/ Stadtland

Table 37: Flexible activity hub objectives, indicators and measurement information

2. Bike Sharing Station

With the intervention "**Bike Sharing Station**" we aim to:

1. Understand local demand for decentral bike sharing stations
2. Explore the potential of new bike-sharing stations' in **reduction of CO_2 emissions**.

Obj.	Expected impact	Indicator	Output or outcome	Target	Measurement method	Measurement frequency	Data collection
1	Increase of bike sharing usage in the LL area	Number of bike drop-offs and pick-ups at new bike sharing station	Output	5 drop-offs a week	Data from the bike-sharing provider (only per month rental + drop-offs)	Ex-durante, ex-post	TU Wien/ BOKU
2	Better understanding of the need for and quality of new bike sharing station	Satisfaction with new station	Outcome	High satisfaction rate (4/5)	Interviews or feedback forms	Ex-durante, ex-post	TU Wien/ BOKU
3	C02 emission reduction through sustainable travel modes	C02 emission	Outcome	20% reduction in C02 emissions	Questionnaire (proxy: comparison to private car)	Ex-post	TU Wien/ BOKU / Stadtland

Table 38: Bike sharing station objectives, indicators and measurement information

6.7.3 Stakeholder-based assessment

Name (organisation)	Stakeholder group
Statdtland/ Lokale Agenda	Neighbourhood initiative
Morgenjungs/ imGrätzl	Social business

Table 39: Stakeholders overview Vienna

Stakeholder	Goals for the intervention(s)
Statdtland/ Lokale Agenda	Foster participation of local inhabitants
	Improve access to (outdoor) space in the neighbourhood
	Create (cultural) offers and activities
Morgenjungs/ imGrätzl	Create visibility of vacant space
	Promote local and cooperative (economic) activity in the neighbourhood

Table 40: Stakeholder goals Vienna

Flexible hub

Baseline (please state):	**There is usually no use of the public space (in terms of cultural events and similar offers) at the LL location.**
Alternative A:	We set up a flexible activity hub with cultural offers
Alternative B:	We set up a flexible activity hub with cultural offers and groceries/ food-related offers

Table 41: Baseline and alternatives flexible hub

Bike sharing station

Baseline (please state):	**There is no bike-sharing station at the LL location.**
Alternative A:	We set up one bike sharing station in the LL area
Alternative B:	We set up two bike sharing stations in the LL area

Table 42: Baseline and alternatives bike sharing station

6.7.4 Vienna timeline

Once provided, the timeline of the interventions of the Vienna Living Lab will be presented here.

Intervention name	Task	Scheduled timeframe	Project months	Partner responsible
Flexible hub	Set up flexible hub	July 1st until mid of August 2025	18-20	TU Wien / BOKU / Stadtland
Bike-sharing station	Set up temporary bike-sharing station	July 1st until mid of August 2025	18-20	TU Wien / BOKU / Stadtland

Table 43: Living Lab timeline Vienna

7 CONCLUSION AND NEXT STEPS

While the 15-minute city concept is becoming increasingly well-known and studied in transportation research, its application and viability in urban outskirts has received less attention so far. The DREAMS-project aims to study 15-minute cities in this context. This deliverable provides an overview of the Key Performance Indicators of the project, divided per Living Lab location (located in Austria, Belgium, France, Germany, Hungary and the Netherlands). Per location, the deliverable gives an overview of the interventions planned, their expected impacts and attached indicators. It also provides a first data collection framework and timeline per location, and for the project as a whole. As the nature of the interventions varies per location, the indicator selection was done using a bottom-up approach, by asking each Living Lab leader and relevant stakeholders to reflect on what their specific intervention(s) would need. A larger, overarching set of KPIs for the entire project, that will take into the topics of Accessibility, Carbon Emissions, Liveability, Health, Economic Impact, and Equity will be developed in Work Package 3, as part of Task 3.5 and Deliverable 3.2 (forthcoming), of which a first version has been included in this Deliverable. The KPIs defined in this current deliverable will be implemented and tested in the following years in the six Living Labs as part of Work Package 5 of the project. Additionally, the Deliverable also includes an explanation of the forthcoming Impact Assessment of Task 6.2. It also includes an overview of the local stakeholders, their objectives, and the scenarios and alternatives for each intervention and LL. As next steps, there will be the continuation of the bi-monthly meetings to ensure proper data collection, as well as continuing T6.2 in the coming months. Where T6.1 only entailed the setup of the DREAMS Impact Assessment Framework, T6.2 will also allow for a cross-LL comparison through the SIS analyses that will be performed in 2025-2026. Starting in the latter half of 2025, the first steps in the process evaluation will be conducted to examine how interventions are being implemented across the six Living Labs, as part of Task 6.3. This evaluation will focus on identifying enablers and barriers to implementation, understanding contextual differences, and assessing the replicability of interventions in different urban outskirts. Data will be collected through interviews, surveys, and observational methods, ensuring a robust analysis of the Living Lab dynamics.

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10 APPENDICES

10.1 Appendix I. Template for LL leaders

Task 6.1: Living Lab objectives and KPIs template for LL leaders

1. General Information

- **Living Lab: (Budapest, Brussels, Munich, Paris, Utrecht, Vienna**
- **Intervention ID/Name**: *(Unique name or code for the intervention, i.e. 'Neder-Over-Heembeek MobiTwin pilot, to identify the separate interventions per LL. It can also be the address.Whatever you think works the best, but not or 'Paris A, Paris B' etc as this is too general.)*
- **Short Description**: *(Briefly describe the intervention)*
- ***Primary objectives of the intervention**:*

2. Local Context and Objectives

Please identify the project alternatives or options you are aware of.

List all possible options for the project or indicate if only one option exists. These may include different designs, locations, policies, or approaches.
This can for example be:
Alternative A: shared bikes are placed in a central location.
Alternative B: shared bikes and cargo-bikes are placed in a central location.
Alternative C: shared bikes are placed in a central location and throughout the neighbourhood.

Alternatives can also be less similar to each other:
Alternative D: shared cars are placed in a central location
Alternative E: we host a café for neighbours.

These are always connected to a *baseline*: the situation without any intervention.
Please fill out any alternative per baseline scenario. If you are involved in multiple interventions, you can copy + paste the table per intervention.

Baseline (please state):	
Alternative A:	

Alternative B:	
Etc.	

3. ***Impacts, KPIs and measurements***

- **Baseline data collection:** ***(Explain what type of baseline data is necessary, what it will be about, and how it will be collected)***
- **Expected Impacts**: *(List 4 to 5 specific impacts, e.g., improved air quality, increased walkability, economic growth)*

Then fill out the rest per expected impacts in the table below:

Intervention ID	Impact	KPI	Measurement method(s)	Measurement frequency	Remarks

4. **Identification of local stakeholders and objectives**

   - **Please share the names of the main local stakeholders as a group (i.e., 'neighbours, 'local government', 'shared-mobility provider'). Also give their representatives.**

     For example: 'local government', representative: 'Municipality X'

     1.

     2.

     3.

(…)

It is important to know the objectives and criteria of each group. As a short overview:

- **Objectives:** These are broad goals that reflect what your organisation hopes to achieve or protect through this project (e.g., environmental preservation, economic development, social equity). List one or more objectives below.
- **Criteria**: Criteria are specific, measurable factors that can be used to assess each alternative. Please list the criteria that matter most to your group and briefly explain why each one is important. Some examples include "cost-effectiveness," "reduced emissions," "public acceptance," or "job creation."

The **'6.1 template for local stakeholders'** has sections to be filled out on these two concepts. If necessary, LL leaders can provide some preliminary ideas or a baseline for the local stakeholders to work with.

5. **Elaboration on remarks (if necessary):**

Thank you for filling out the template!

10.2 Appendix II. Template for local stakeholders

Task 6.1: Living Lab objectives and KPIs template for stakeholders

1. **Local stakeholder details**

- **Living Lab:** *(Budapest, Brussels, Munich, Paris, Utrecht, Vienna)*
- **Intervention ID:** *(the specific intervention that your organisation is part of, i.e., 'bike-sharing in Utrecht', or 'pop-up store in Munich'. If you are collaborating in more than one intervention or have an overarching role, please state so)*
- **Stakeholder Organisation Name**:
- **Primary Contact Person**:
- **Role/Responsibility in the intervention**:

  (Select one or more that apply)

  ☐ Decision-maker
  ☐ Key influencer
  ☐ Advisory role
  ☐ Affected by outcome only
  ☐ Other (please specify):
- **Contact Information**:

2. **Objectives**
   These are broad goals that reflect what your organisation hopes to achieve or protect through this project (e.g., environmental preservation, economic development, social equity). List one or more objectives below.

Primary Objectives of Your Stakeholder Group:

- **Local Goals for Intervention**: (Briefly describe 2-3 goals for this intervention in the local context, e.g., "Improve community access to outdoor spaces.")

  1.

  2.

  3.

3. **Criteria**

Criteria are specific, measurable factors that can be used to assess each alternative. Please list the criteria that matter most to your group and briefly explain why each one is important. Some examples include "cost-effectiveness," "reduced emissions," "public acceptance," or "job creation."

In the table below, you can define your most important criteria for the intervention. This can for example be environmental criteria (e.g., air quality, emissions), social criteria (e.g., employment, health impacts), or economic criteria (e.g., costs, benefits). In the second column, provide a brief explanation of why these matter to you and your organisation.

Criterion name	Description (Why is this	What could be an indicator for this objective?	Measurement method (how	Can your organisation provide this data?

	important to you?)		could this be measured?)	
I.e., 'example: new business area for mobility provider'	*'because my company is not active yet in this area'*	*'no. of trips in the area'*	*'with trip data from the business'*	☐ ~~*Yes*~~ ☐ *No* *Please elaborate:* *We can provide this trip data to the project.*
				☐ Yes ☐ No Please elaborate:
				☐ Yes ☐ No Please elaborate:
				☐ Yes ☐ No Please elaborate:
				☐ Yes ☐ No Please elaborate:

Additional comments on criteria

- If there are any thresholds, benchmarks, or specific requirements related to these criteria, please provide details below. *(i.e.: "Must achieve at least 50% emission reduction")*:

4. Additional comments and feedback

- In case there is anything else you want to comment on or share, please do so here:

Thank you for filling out the template!

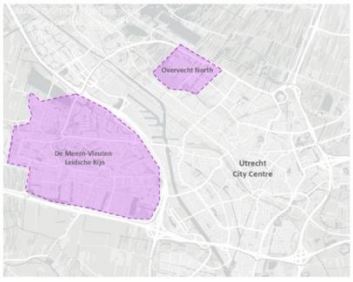
10.3 Appendix III. Poster templates for the Vienna Symposium Day

UTRECHT

DE MEERN-VLEUTEN LEIDSCHE RIJN & OVERVECHT

MAIN LIVING LAB OBJECTIVES: TO EXAMINE AND TEST DIFFERENT BUSINESS AND GOVERNANCE FRAMEWORKS MODELS TO DEVELOP NEW MOBILITY HUBS WITH **SHARED E-BIKES**. THE LL WILL CONTRIBUTE TO THE DEVELOPMENT OF A **NEW REGULATORY FRAMEWORK** FOR MICROMOBILITY SERVICES.

PARTNERS
Universiteit Twente (UT) - Hogeschool Utrecht (HU) -
TIER Netherlands BV - Gemeente Utrecht - Fietsersbond Nederland



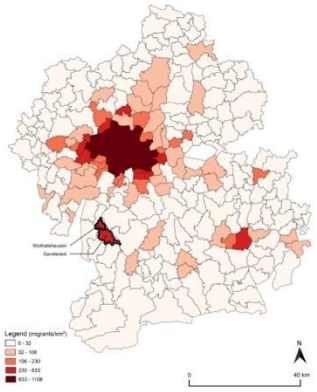
DREAMS

MUNICH

WOLFRATSHAUSEN & GERETSRIED

MAIN LIVING LAB OBJECTIVES: TO EXPLORE STRATEGIES TO MITIGATE **INEQUALITIES IN ACCESS TO BASIC NEEDS** WITHIN 15-MINUTE NEIGHBOURHOODS, WITH A FOCUS ON PEOPLE WITH **MIGRATION BACKGROUNDS**. WE WILL ALSO EVALUATE THE POTENTIAL OF EMERGING MICROMOBILITY HUBS AND **RIDE-SHARING/CARPOOLING SCHEMES** IN URBAN OUTSKIRTS WITH SIXT SHARE AND MVV.

PARTNERS
Technische Universität München (TUM) - EIT Urban Mobility Innovation Hub Central (EIT UM) - MVV (Munich Public Transport Association) - SIXT Share



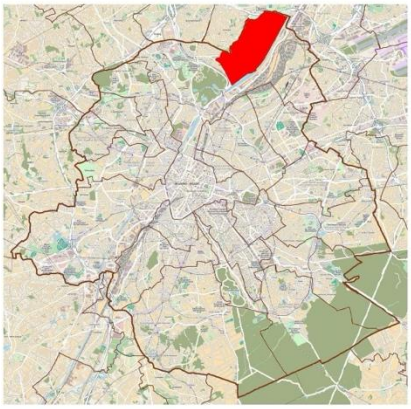
DREAMS

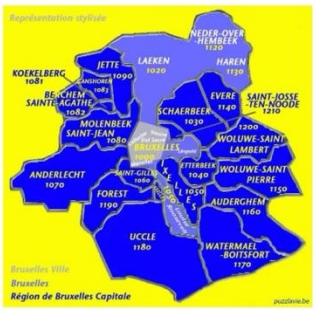
BRUSSELS

NEDER-OVER-HEEMBEEK & HAREN

MAIN LIVING LAB OBJECTIVES: TO INVESTIGATE THE ROLE OF **SHARED MOBILITY** IN REDUCING CAR DEPENDENCY FOR **CARE-RELATED** ACTIVITIES NOT POSSIBLE TO FULFIL WITHIN 15 MINUTES OF WALKING OR CYCLING, WITH A SPECIAL FOCUS ON SHARED **ELECTRIC CARGO BIKES**.

PARTNERS
Vrije Universiteit Brussel (VUB) - Mpact asbl/vzw
Cambio Brussels (Optimobil) - Brussels Mobility





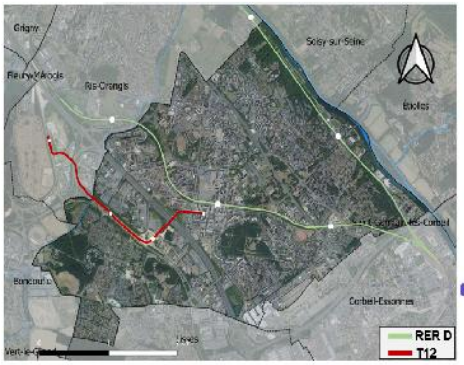
DREAMS

PARIS

EVRY-COURCOURONNES - T12 Corridor

MAIN LIVING LAB OBJECTIVES: TO EXAMINE THE POTENTIAL OF **MOBILITY HUBS** ON ACCESSIBILITY, MOBILITY BEHAVIOURS, AND URBAN DEVELOPMENT OF THIS REGION AND ENVISAGE **FURTHER DEVELOPMENT** OF THESE HUBS ALONG THE T12 TRAMLINE.

PARTNERS
Université Gustave Eiffel (UGE) - L'Institut Paris Région (IPR)
Conseil départemental de l'Essonne (CD91) - Région Ile-de-France



DREAMS

BUDAPEST

RÁKOSMENTE

MAIN LIVING LAB OBJECTIVES: TO TEST SHARED **MICROMOBILITY SERVICES** TO ASSESS THEIR IMPACT ON IMPROVING ACCESSIBILITY, SUPPORTING **BEHAVIOURAL CHANGE** OF LOCAL RESIDENTS, AND ANALYSING **TECHNOLOGICAL AND FINANCIAL BARRIERS** TO MAINTAINING THE SERVICES.

PARTNERS
Budapest University of Technology and Economics (BME) - Hungarian Institute for Transport Sciences and Logistics (KTI) - Municipality of Rákosmente - BKK Centre for Budapest Transport

DREAMS

VIENNA

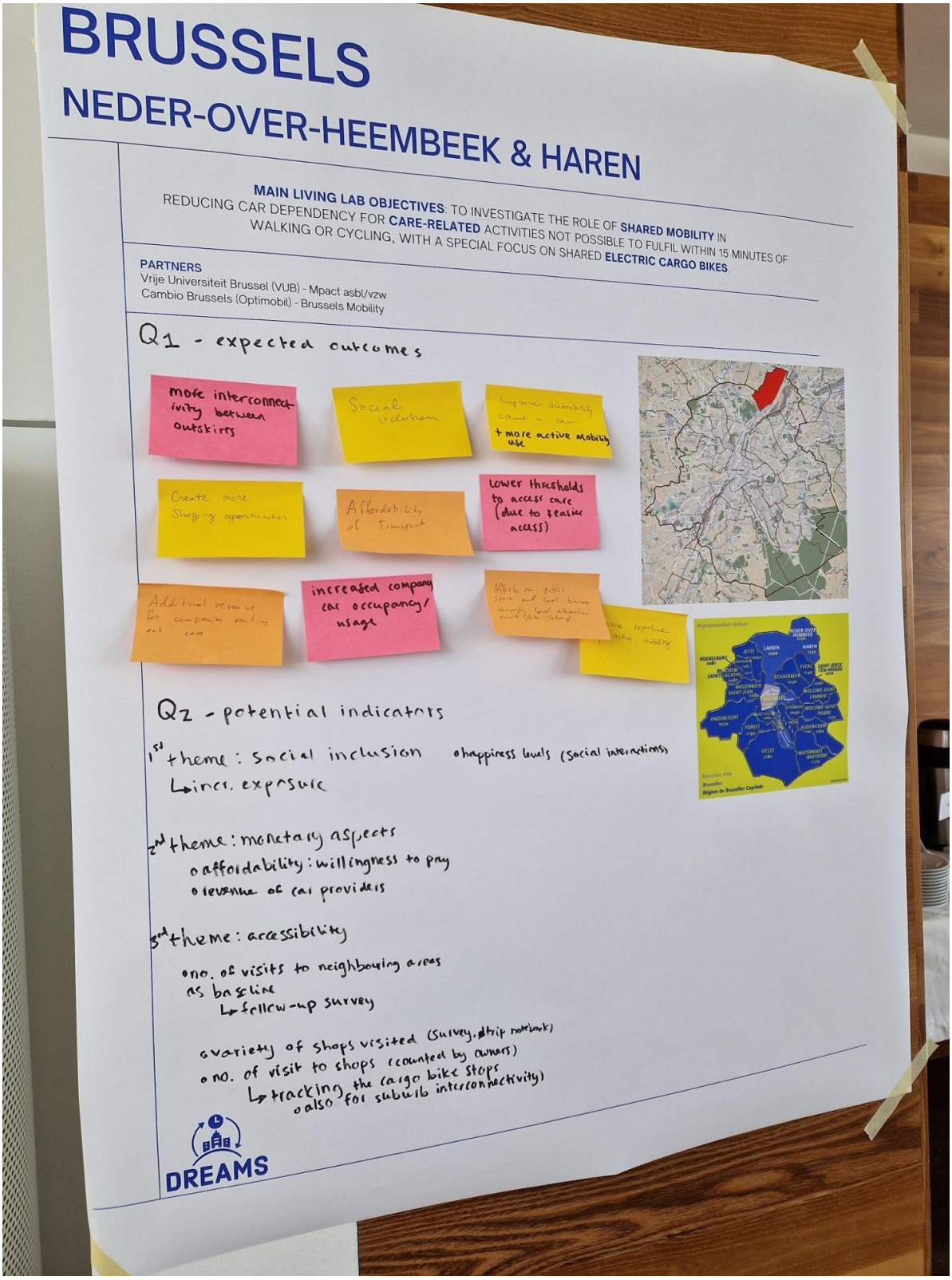
WIENER FLUR

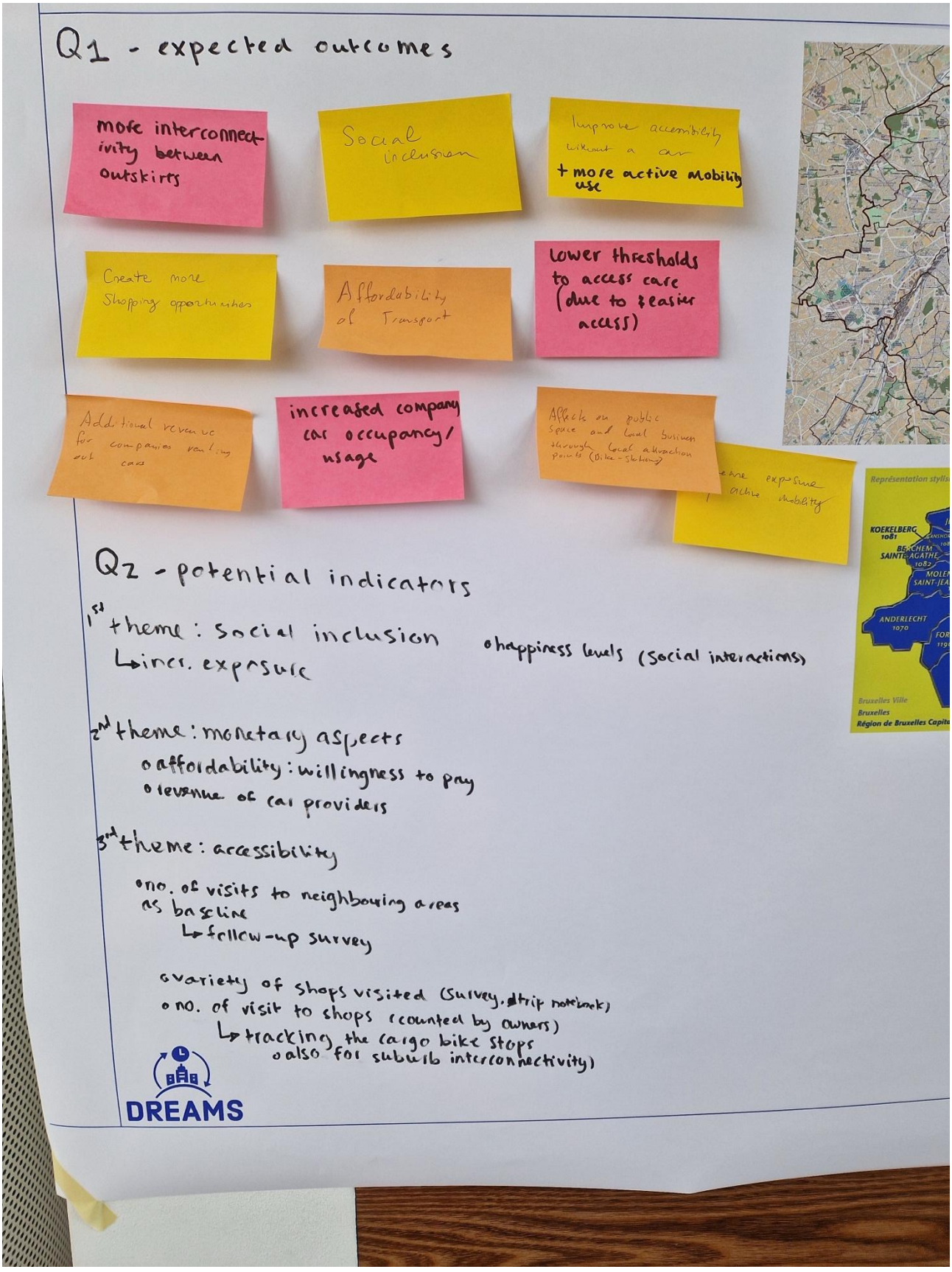
MAIN LIVING LAB OBJECTIVES: TO EXAMINE THE EFFECTS OF **FLEXIBLE ACTIVITY HUBS** AND MOBILITY SERVICES ON ENCOURAGING RESIDENTS TO DO SELECT ACTIVITIES LOCALLY AND TO TRAVEL SUSTAINABLY AND TO ASSESS THE POTENTIAL
OF THE **DEMAND-RESPONSIVE PUBLIC TRANSPORT** AND MOBILITY HUBS (AND THEIR MIX) TO REDUCE MOBILITY ISSUES.

PARTNERS
The University of Natural Resources and Applied Life Sciences (BOKU) -
Vienna University of Technology, Research Unit MOVE (TUW) -
Mobyome - stadtland - MO.Point - Morgenjungs - Wirtschaftsagentur Wien (WAW)

DREAMS

10.4 Appendix IV. Poster templates Vienna – pictures of the workshop session




Q1 - expected outcomes
more interconnectivity between outskirts
Social inclusion
Improve accessibility without a car
+ more active mobility use
Create more shopping opportunities
Affordability of Transport
lower thresholds to access care (due to easier access)
Additional revenue for companies renting out cars
increased company car occupancy/ usage
Affects on public space and local business through local attraction points (Bike-sharing)
Q2 - potential indicators
1st theme: social inclusion
Lincr. exposure
o happiness levels (social interactions)
2nd theme: monetary aspects
o affordability: willingness to pay
o revenue of car providers
3rd theme: accessibility
o no. of visits to neighbouring areas as baseline
Lfollow-up survey
o variety of shops visited (survey, trip notebook)
o no. of visit to shops (counted by owners)
Ltracking the cargo bike stops
o also for suburb interconnectivity)
DREAMS
KOEKELBERG 1081
ANDERLECHT 1070
Bruxelles Ville
Bruxelles
Région de Bruxelles Capita

UDAPEST

ÁKOSMENTE

interventions in the
negative)?

Q2 What indicators
these impacts?

Q3 How would you

MAIN LIVING LAB OBJECTIVES: TO TEST SHARED **MICROMOBILITY SERVICES** TO ASSESS THEIR IMPACT ON IMPROVING ACCESSIBILITY, SUPPORTING **BEHAVIOURAL CHANGE** OF LOCAL RESIDENTS, AND ANALYSING **TECHNOLOGICAL AND FINANCIAL BARRIERS** TO MAINTAINING THE SERVICES.

PARTNERS
Budapest University of Technology and Economics (BME) - Hungarian Institute for Transport Sciences and Logistics (KTI) - Municipality of Rákosmente - BKK Centre for Budapest Transport

reduce car dependency
focus on leisure activities
by younger generation in the area

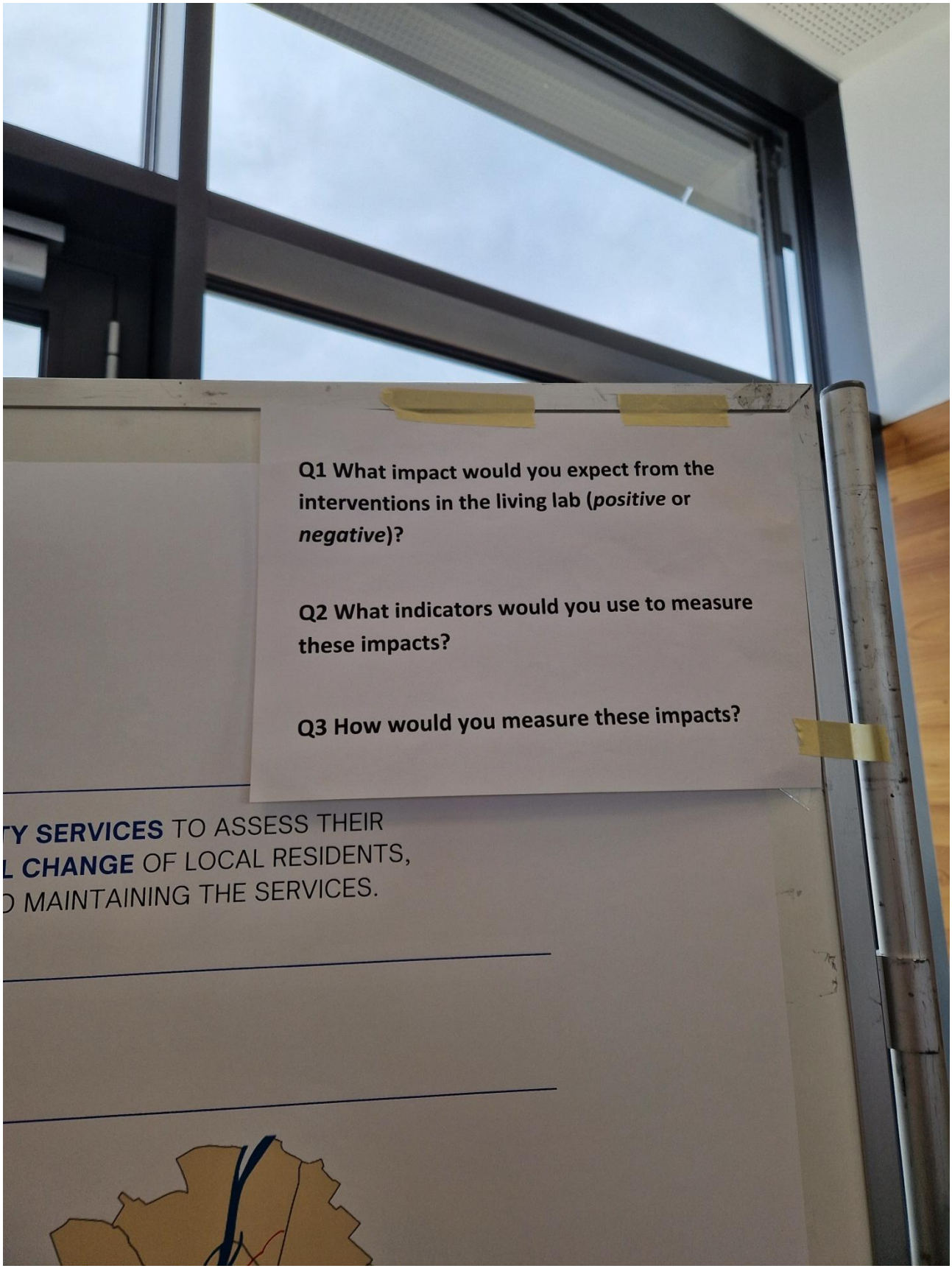
CO2 emission saving
calculated by the trips made by bike-sharing

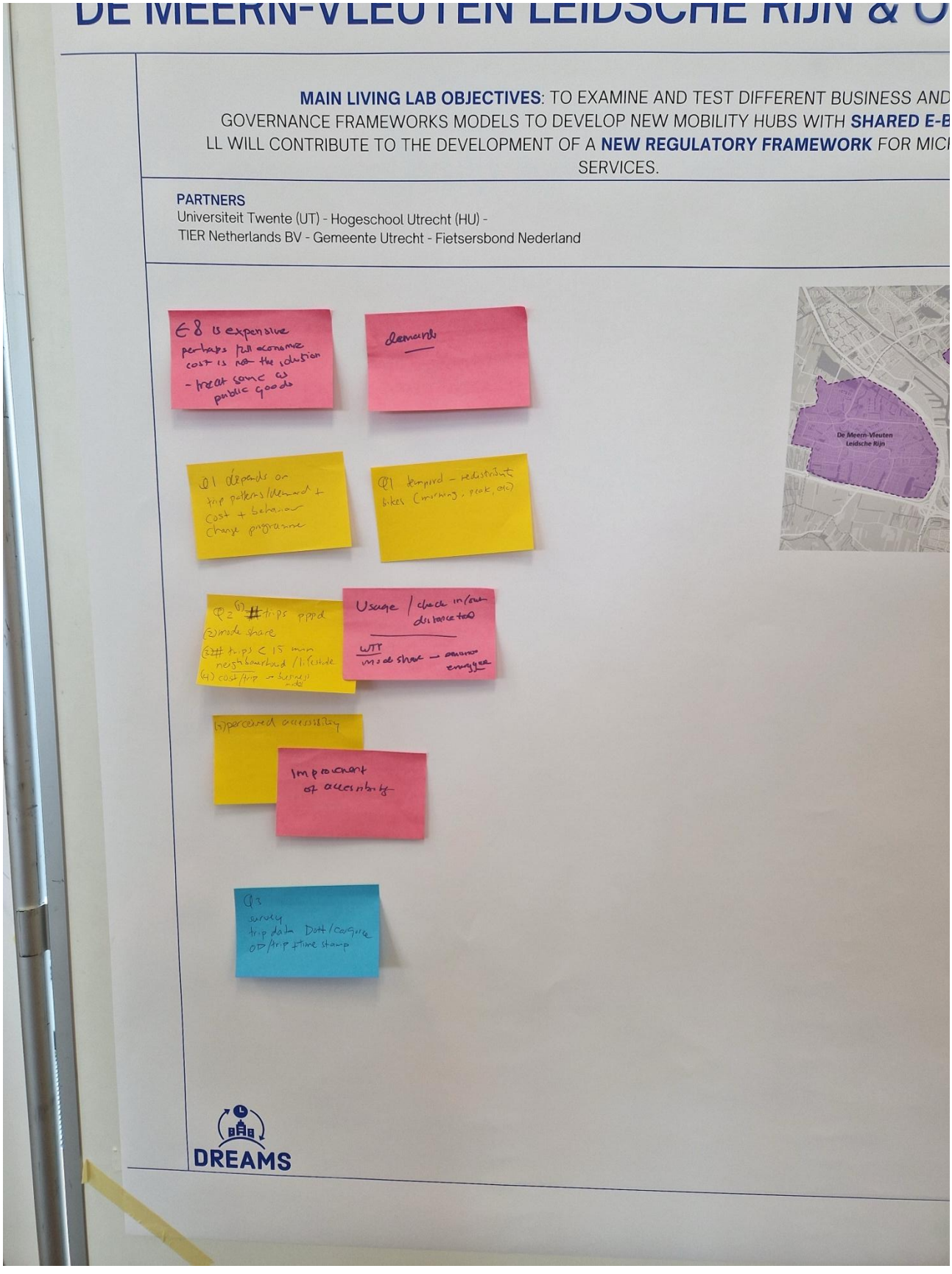
km travelled

trips substituted considering max potential

destination, age group, activity type → which trips
could be realized by bike-sharing

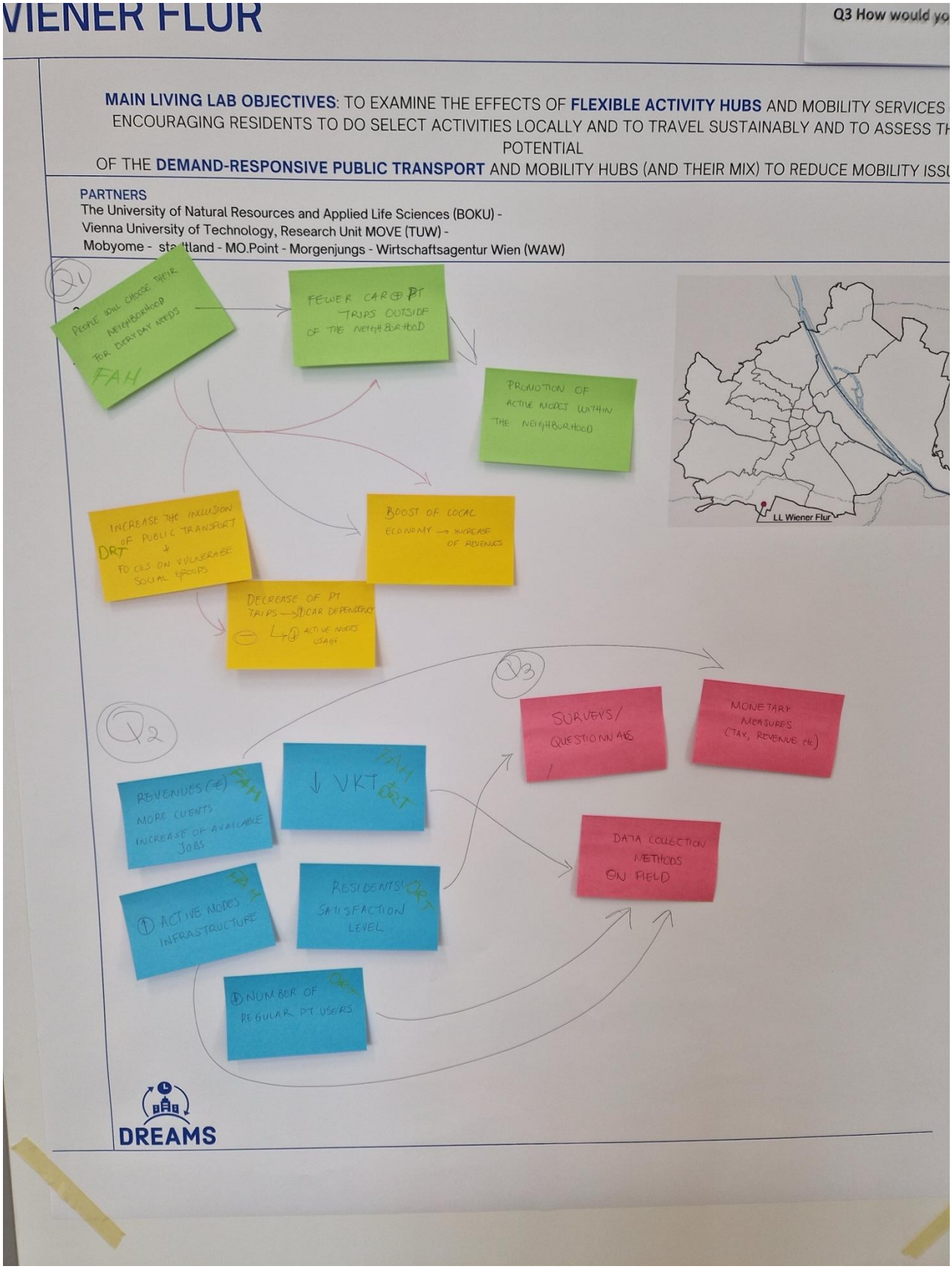
neg: less walking, safety aspects, infrastructure


Q1 What impact would you expect from the interventions in the living lab (*positive* or *negative*)?
Q2 What indicators would you use to measure these impacts?
Q3 How would you measure these impacts?
TY SERVICES TO ASSESS THEIR
L CHANGE OF LOCAL RESIDENTS,
O MAINTAINING THE SERVICES.


DE MEERN-VLEUTEN LEIDSCHE RIJN &
MAIN LIVING LAB OBJECTIVES: TO EXAMINE AND TEST DIFFERENT BUSINESS AND
GOVERNANCE FRAMEWORKS MODELS TO DEVELOP NEW MOBILITY HUBS WITH SHARED E-B
LL WILL CONTRIBUTE TO THE DEVELOPMENT OF A NEW REGULATORY FRAMEWORK FOR MIC
SERVICES.
PARTNERS
Universiteit Twente (UT) - Hogeschool Utrecht (HU) -
TIER Netherlands BV - Gemeente Utrecht - Fietsersbond Nederland
€8 is expensive
perhaps full economic
cost is not the solution
- treat some as
public goods
demands
Q1 depends on
trip patterns/demand +
cost + behaviour
change programme
Q1 targeted – redistribute
bikes (morning, peak, etc)
Q2 # trips ppp/d
(2) mode share
(3) # trips < 15 min
neighbourhood / district
(4) cost/trip → survey
Usage / check in/out
distance etc
WTT
mode share – economic
evaluation
(5) perceived accessibility
Improvement
of accessibility
Q3
survey
trip data Dott / Cargroe
OD / trip time stamp
De Meern-Vleuten
Leidsche Rijn
DREAMS


MAIN LIVING LAB OBJECTIVES: TO EXPLORE STRATEGIES TO MITIGATE INEQUALITIES IN ACCESS TO BASIC NEEDS WITHIN 15-MINUTE NEIGHBOURHOODS, WITH A
CUS ON PEOPLE WITH MIGRATION BACKGROUNDS. WE WILL ALSO EVALUATE THE POTENTIAL OF EMERGING MICROMOBILIT
HUBS AND RIDE-SHARING/CARPOOLING SCHEMES IN URBAN OUTSKIRTS WITH SIXT SHARE AND MVV.
ARTNERS
echnische Universität München (TUM) -
EIT Urban Mobility Innovation Hub Central (EIT UM) - MVV (Munich Public
ransport Association) - SIXT Share
Subjective
User - Citizen
Supply
Mobility choice increase
affordability
Independency
Improve affordable transport conditions
Mobility system awareness increase
Improve quality of public space
Satisfaction distribution among population groups
Service business before/after intervention
Budget spent for travelling (change)
User numbers of shared offers
Amenities by Type
Unserved travel needs
- types
- frequency
Surveys
Interviews
Satisfaction
Barriers
Needs
Awareness
Demographic statistics
Travel diary (GPS)
Number of Amenities (BASIC Needs)
DREAMS


TNERS
nische Universität München (TUM) -
Urban Mobility Innovation Hub Central (EIT UM) - MVV (Munich Public
sport Association) - SIXT Share
IN URBAN OUTSKIRTS WITH SIXT SHARE AND M
t - objective accessibility
Subjective
User - Citizen
Mobility choice increase
affordability
Independency
Reduction of travel burden
either in terms of travel cost
or/and travel time
Supply
Mobility system
awareness increase
Improve
affordable
transport conditions
Amenities reallocation within
walking distance
Improve
quality of
public space
Satisfaction
distribution
among population
groups
Q2
Service
Awareness before/after
intervention
Budget spent for
travelling
(change)
(: time
- km
- €
User
numbers
of shared offers
Amenities
by Type
(Before - after)
Mobility gap
- spatial level
- population groups
eg migrant / not migrant
Unserved travel needs
- types
- frequency
Q3
Surveys
Interviews
Barriers
Needs
Satisfaction
Awareness
Travel diary
(GPS)
Demographic
Statistics
Number
of
Amenities
(Basic Needs)
DREAMS


VIENER FLUR
Q3 How would yo
MAIN LIVING LAB OBJECTIVES: TO EXAMINE THE EFFECTS OF FLEXIBLE ACTIVITY HUBS AND MOBILITY SERVICES
ENCOURAGING RESIDENTS TO DO SELECT ACTIVITIES LOCALLY AND TO TRAVEL SUSTAINABLY AND TO ASSESS TH
POTENTIAL
OF THE DEMAND-RESPONSIVE PUBLIC TRANSPORT AND MOBILITY HUBS (AND THEIR MIX) TO REDUCE MOBILITY ISSU
PARTNERS
The University of Natural Resources and Applied Life Sciences (BOKU) -
Vienna University of Technology, Research Unit MOVE (TUW) -
Mobyome - stadtland - MO.Point - Morgenjungs - Wirtschaftsagentur Wien (WAW)
Q1
PEOPLE WILL CHOOSE THEIR NEIGHBORHOOD FOR EVERYDAY NEEDS
FAH
FEWER CAR & PT TRIPS OUTSIDE OF THE NEIGHBORHOOD
PROMOTION OF ACTIVE MODES WITHIN THE NEIGHBORHOOD
INCREASE THE INCLUSION OF PUBLIC TRANSPORT
DRT
TO CUS ON VULNERABLE SOCIAL GROUPS
BOOST OF LOCAL ECONOMY → INCREASE OF REVENUES
DECREASE OF PT TRIPS → CAR DEPENDENCE
ACTIVE MODES USAGE
LL Wiener Flur
Q2
Q3
REVENUES (€)
FAH
MORE CLIENTS
INCREASE OF AVAILABLE JOBS
↓ VKT
FAH
DRT
SURVEYS / QUESTIONNAIRES
MONETARY MEASURES (TAX, REVENUE etc)
DATA COLLECTION METHODS ON FIELD
ACTIVE NODES INFRASTRUCTURE
FAH
RESIDENTS' SATISFACTION LEVEL
DRT
NUMBER OF REGULAR PT USERS
DRT
DREAMS

10.5 Appendix V. Stakeholder-based Impact Scoring guide by Te Boveldt, G.

Stakeholder-based Impact Scoring (SIS) – manual

General overview

SIS is a method for quantifying and visualising the advantages and disadvantages of interventions on various stakeholders in a way as simple as possible. The principle behind the method is that performances of one or several project options, on several factors, are compared to a baseline. First, this is done 'objectively' with a performance score based on data or expert input. Secondly, stakeholders assign weights to each impact factor, reflecting their 'subjective' importance. By multiplying them, we can calculate, aggregate and visualise the negative and positive effects on different stakeholders, in order to compare different project options or to analyse the pros and cons of a single option.

It is important to note that SIS consists of both objective and subjective components, and therefore does not aim to identify a single objectively 'best' solution. SIS can thus be used as a dynamic dashboard that provides a quantified overview of the impacts of your project on different stakeholders, which you can adjust at any time based on new information and insights. For more information about the method and calculations, see the article by te Boveldt et al. (2022).

Practically, SIS can be done with dedicated software or with an Excel template. The software is faster and easier but the Excel template provides more possibilities to customise visuals and calculations. This manual contains instructions for both options.

In short, SIS consists of the following steps:

1. Formulate the problem and the intervention(s). In this first step, describe the interventions you want to evaluate as precisely as possible. Compared to other MCA methods, SIS is quite flexible: you can have one or multiple interventions, they may but do no have to be mutually exclusive. Still, it is important that you also think of a baseline, reference, or do-nothing scenario that you want to evaluate the options against. The interventions may be formulated top-down, i.e., by the governmental institutions or other decision makers, or be the result of a co-creative process with the stakeholders. Enter the names of the interventions in the software or template.

2. Identify the stakeholders. Here, identify the individuals or groups that you find important to include in the evaluation. Who is likely to benefit or suffer as a result of the interventions? You may want to involve stakeholders for pragmatic reasons in the sense that you need their support for the project to succeed, or for moral reasons in the sense that you care about the fair distribution of benefits and burdens.

In SIS, the main role of stakeholders is to assign weights to indicators (step 5). You can organise workshops, organise interviews or distribute a survey. For stakeholder groups that are too large to take everyone's individual opinion into account, for example when involving all residents of a neighbourhood, the software and the Excel template provide the option to aggregate the weights of the members of a specific group and compute the average.

If you want a higher degree of participation, you also might want to consult them for the other steps. You can do this through interviews or workshops but there exists no official procedure for that. Enter the stakeholders in the software or templated.

3. Define indicators. The decision maker or the facilitator makes a list of the indicators on which the advantages or disadvantages of the interventions can be described and compared. In an urban renewal project, for example, indicators could include safety, noise, costs, visual appearance, air quality, etc. Enter the indicators in the software or template under the tab 'impact factors'. The following points are important:

Relevance, clarity and non-ambiguity. Do the interventions have impact with respect the indicators and are they likely to be considered important by the stakeholders? Do the indicators help in comparing the interventions with each other or with the current situation?

Measurability or possibility to estimate impacts. Will it be possible to make a sensible estimation of the impact of the interventions with respect to the indicators? It can help to think of measurement units, although for very qualitative indicators this might be difficult.

Completeness. Cover all major aspects and be sure to address the elephants in the room, both the positive and the negative aspects. Be sure to include each stakeholder's perspective. For example, when using 'costs', indicate who would bear them (e.g. local or national government or private parties). Some indicators might not be relevant for all stakeholders but this is not a problem as stakeholders can give them zero importance in step 5.

But not too many. (Max. 10-12 factors) so the decision maker and stakeholder can keep the overview and the discussion focused. With If the list gets too long, you can combine multiple indicators in one 'higher level' indicators (e.g., 'air quality' instead of NOx, SO2, etc.)..

Avoid overlap because this lead to certain aspects being counted double. This could happen, for example, when you include 'environmental impact', and 'CO2 emissions' as well as climate impact.

4. Rate the performance of each intervention on each indicator. In this step each intervention is rated on each indicator as objectively and neutrally as possible.

In the software or template, first, use existing data, modelling outputs, or expert input to describe the effects. For example, on the indicator 'climate impact' an intervention is estimated to lead to X amount of CO2 emissions/year. These descriptions do not affect the eventual result but are useful as a justification. Then, in the same tab in the software or template, do the normalisation, i.e. the translation of the effects into a comparable scale. The standard is a 7-point scale from -1 (most negative) to +1 (most positive), which indicates the intervention's performance on the indicator in comparison to the baseline scenario (doing nothing or business as usual). It is easiest to base the normalisation on the judgements of experts.

Normalisation is never fully objective, so you might want to consider to consult stakeholders for this, but it might be quite difficult for them to provide input. Note that this score indicates only the positivity or negativity of performance of the intervention on the indicator, but not the importance, which the stakeholders will indicate in the next step.

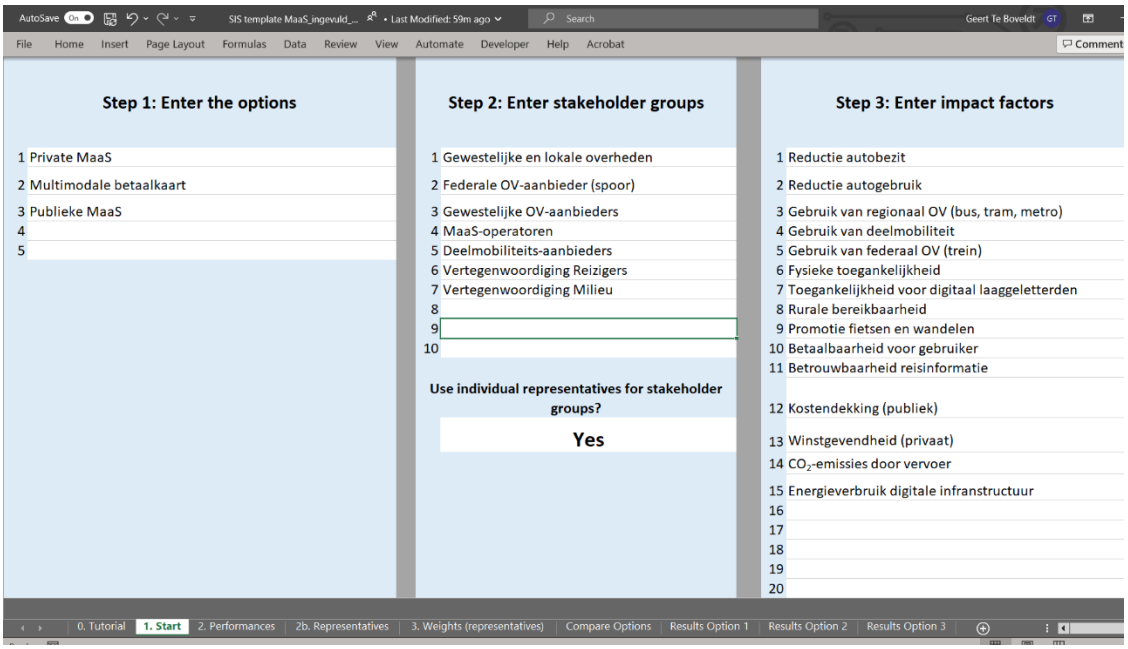
5. Stakeholders give weights to each indicator. In the software or template, the stakeholders assign weights to each indicator reflecting how important they find them. Each stakeholder has the possibility to a weight between 10 (maximum importance) and 0 (not important). A common approach is to start by identifying the most important factor and then rating the other factors relative to that one. It is possible for multiple factors to have the same weight. It is also possible that no factor receives the maximum weight. There are multiple possible ways to collect the weights from the stakeholders: through surveys, through interviews or through workshops. When sending a survey, make sure that you include all relevant information about your project. The SIS software has an option for sending survey emails directly to the stakeholders.

6. Calculate and analyse results. The SIS formula then computes impact scores by multiplying the performance scores (4) with the weights given by the stakeholders (5). Specific scores can be calculated for positive and negative effects, for each stakeholder individually or combined for multiple stakeholders. These impact scores show the negative and positive impacts. You can use these scores to compare different interventions or to analyse one intervention in detail. It can be important to know if there are any stakeholders disproportionately negatively affected, so to that these effects can be mitigated or compensated.

SIS Excel template

The Excel template guides you tab-by-tab through the SIS process. Tab 0 provides a brief tutorial. To ensure the interface functions correctly in Excel, enable macros and set your trust settings to the maximum level.

Tab 1: Start

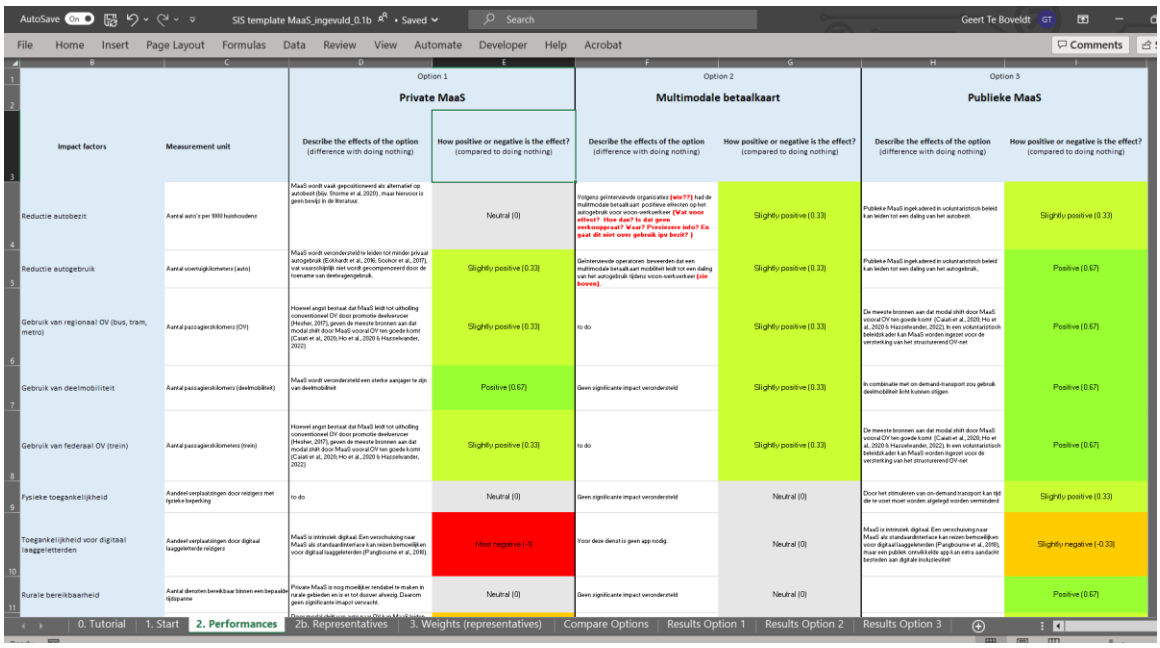


Options: Enter the names of the options (interventions). Only enter the options that are not business-as-usual scenarios (minimum 1, maximum 5). Unlike in multi-criteria analysis, SIS results are still meaningful even if you have only one option.

Stakeholders: Enter the names of the stakeholders or stakeholder groups (minimum 1, maximum 10). You will see the option “Use individual representatives for stakeholder groups?” This becomes relevant later when assigning weights. If you select “No,” the stakeholders or stakeholder groups will not be further subdivided when entering weights. If you select “Yes,” you will be able to specify the individual members of each stakeholder group in tab ‘2b Representatives’.

Impact Factors (indicators): Enter all factors (maximum 20) that can make an intervention either beneficial or detrimental to one or more stakeholders. Aim for minimal ambiguity and overlap between factors.

Tab 2: Performances



Impact factors	Measurement unit	Option 1 – Private MaaS: Describe the effects of the option (difference with doing nothing)	Option 1 – Private MaaS: How positive or negative is the effect? (compared to doing nothing)	Option 2 – Multimodale betaalkaart: Describe the effects of the option (difference with doing nothing)	Option 2 – Multimodale betaalkaart: How positive or negative is the effect? (compared to doing nothing)	Option 3 – Publieke MaaS: Describe the effects of the option (difference with doing nothing)	Option 3 – Publieke MaaS: How positive or negative is the effect? (compared to doing nothing)
Reductie autobezit	Aantal auto's per 1000 huishoudens	MaaS wordt vaak gepositioneerd als alternatief op autobezit (bijv. Storme et al, 2020), maar Nervoort is geen bewijs in de literatuur.	Neutral (0)	Volgens geïnterviewde organisaties (**wie??**) had de multimodale betaalkaart positieve effecten op het autogebruik voor woon-werkverkeer (**Wat voor effect? Hoe dan? Is dat geen verkoopspraat? Waar? Previnvers info? En gaat dit niet over gebruik ipv bezit?**)	Slightly positive (0.33)	Publieke MaaS ingekaderd in volontaristisch beleid kan leiden tot een daling van het autobezit.	Slightly positive (0.33)
Reductie autogebruik	Aantal voertuigkilometers (auto)	MaaS wordt verondersteld te leiden tot minder privaat autogebruik (Eckhardt et al., 2018; Sookor et al., 2017), wat waarschijnlijk niet wordt gecompenseerd door de toename van deelvoertuiggebruik.	Slightly positive (0.33)	Geïnterviewde operatoren beweerden dat een multimodale betaalkaart mobiliteit leidt tot een daling van het autogebruik tijdens woon-werkverkeer (**zie boven**).	Slightly positive (0.33)	Publieke MaaS ingekaderd in volontaristisch beleid kan leiden tot een daling van het autogebruik.	Positive (0.67)
Gebruik van regionaal OV (bus, tram, metro)	Aantal passagierskilometers (OV)	Hoewel angst bestaat dat MaaS leidt tot uitholling conventioneel OV door promotie deelvervoer (Hesher, 2017), geven de meeste bronnen aan dat modal shift door MaaS vooral OV ten goede komt (Calafi et al., 2020; Ho et al., 2020 & Hazzelwander, 2022)	to do	to do	Slightly positive (0.33)	De meeste bronnen aan dat modal shift door MaaS vooral OV ten goede komt (Calafi et al., 2020; Ho et al., 2020 & Hazzelwander, 2022). In een volontaristisch beleidskader kan MaaS worden ingezet voor de versterking van het structurerend OV-net	Positive (0.67)
Gebruik van deelmobiliteit	Aantal passagierskilometers (deelmobiliteit)	MaaS wordt verondersteld een sterke aanjager te zijn van deelmobiliteit	Positive (0.67)	Geen significante impact verondersteld	Slightly positive (0.33)	In combinatie met on-demand-transport zou gebruik deelmobiliteit licht kunnen stijgen	Positive (0.67)
Gebruik van federaal OV (trein)	Aantal passagierskilometers (trein)	Hoewel angst bestaat dat MaaS leidt tot uitholling conventioneel OV door promotie deelvervoer (Hesher, 2017), geven de meeste bronnen aan dat modal shift door MaaS vooral OV ten goede komt (Calafi et al., 2020; Ho et al., 2020 & Hazzelwander, 2022)	Slightly positive (0.33)	to do	Slightly positive (0.33)	De meeste bronnen aan dat modal shift door MaaS vooral OV ten goede komt (Calafi et al., 2020; Ho et al., 2020 & Hazzelwander, 2022). In een volontaristisch beleidskader kan MaaS worden ingezet voor de versterking van het structurerend OV-net	Positive (0.67)
Fysieke toegankelijkheid	Aandeel verplaatstingen door reizigers met fysieke beperking	to do	Neutral (0)	Geen significante impact verondersteld	Neutral (0)	Door het stimuleren van on-demand transport kan tijd die te voet moet worden afgelegd worden verminderd	Slightly positive (0.33)
Toegankelijkheid voor digitaal laaggeletterden	Aandeel verplaatstingen door digitaal laaggeletterde reizigers	MaaS is intrinsiek digitaal. Een verschuiving naar MaaS als standaardinterface kan reizen bemoeilijken voor digitaal laaggeletterden (Pangbourne et al., 2018).	Most negative (-1)	Voor deze dienst is geen app nodig.	Neutral (0)	MaaS is intrinsiek digitaal. Een verschuiving naar MaaS als standaardinterface kan reizen bemoeilijken voor digitaal laaggeletterden (Pangbourne et al., 2018), maar een publiek ontwikkelde app kan extra aandacht besteden aan digitale inclusiviteit	Slightly negative (-0.33)
Rurale bereikbaarheid	Aantal diensten bereikbaar binnen een bepaalde tijdsspanne	Private MaaS is nog moeilijker rendabel te maken in rurale gebieden en is er tot dusver afwezig. Daarom geen significante impact verwacht.	Neutral (0)	Geen significante impact verondersteld	Neutral (0)		Positive (0.67)

The options and impact factors you entered in tab 1 'Start' are automatically filled in. You still need to provide the following inputs:

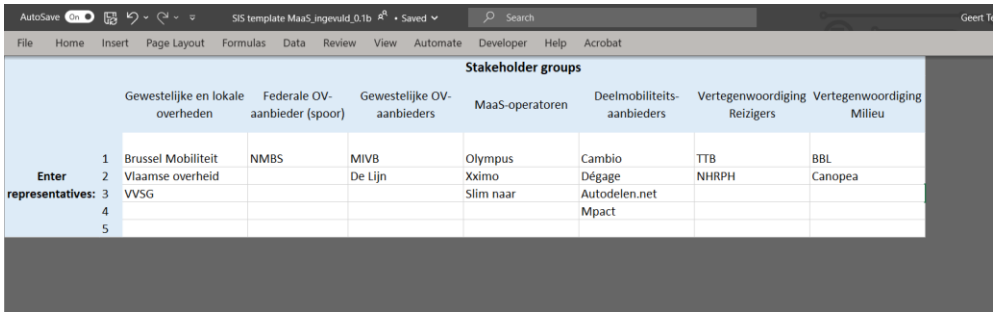
Measurement unit: Indicate how each impact factor can be measured. Even if no actual measurements are taken, this helps define the factor and avoid ambiguity but it is not compulsory.

Describe the effects of the option: In the designated cells, describe the effects of each option for each factor. How does the intervention differ from doing nothing? Be as factual as possible—use quantitative data if available, or qualitative descriptions otherwise.

How positive or negative is the effect?: Indicate the degree to which the described effects are negative, positive, or neutral (compared to the do-nothing scenario), by selecting from the dropdown menus. For the calculation of impact scores, these qualitative labels (negative–positive) are converted into numerical values ranging from -1 to +1.

Tab 2b: Representatives

This tab only appears if you selected "Yes" in tab 1 'Start' under "Use individual representatives for stakeholder groups?" The stakeholder groups you entered in tab 1 will appear automatically. For each stakeholder group, you can specify the individual actors who will represent the group when assigning weights.

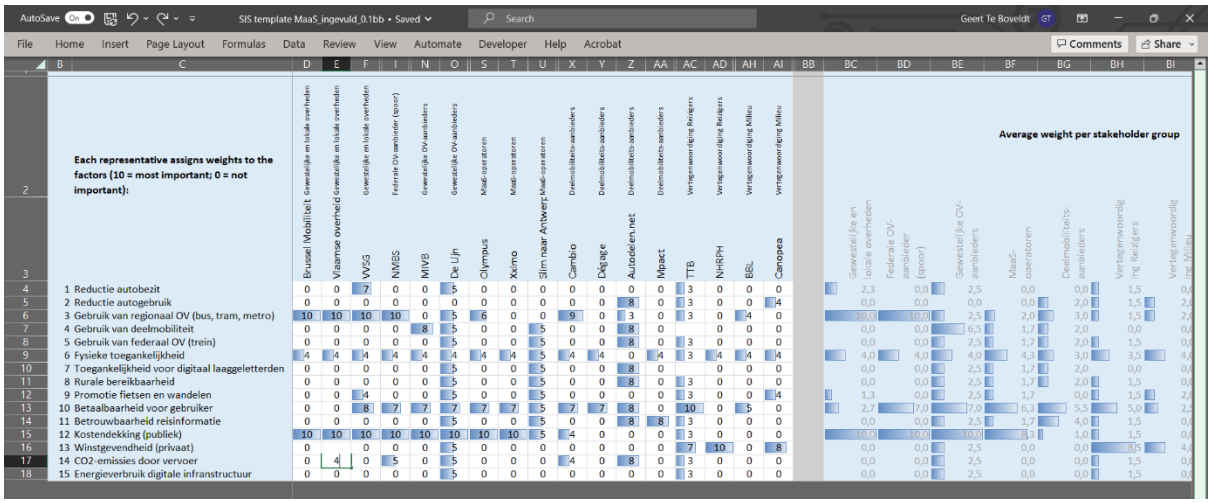


		Stakeholder groups: Gewestelijke en lokale overheden	Federale OV-aanbieder (spoor)	Gewestelijke OV-aanbieders	MaaS-operatoren	Deelmobiliteits-aanbieders	Vertegenwoordiging Reizigers	Vertegenwoordiging Milieu
	1	Brussel Mobiliteit	NMBS	MIVB	Olympus	Cambio	TTB	BBL
Enter representatives:	2	Vlaamse overheid		De Lijn	Xximo	Dégage	NHRPH	Canopea
	3	VVSG			Slim naar	Autodelen.net		
	4					Mpact		
	5							

Tab 3: Weights

Here you enter the weights that indicate the importance of each factor for each stakeholder. This is usually based on input from the stakeholders themselves. Assign a score between 10 (maximum importance) and 0 (not important). A common approach is to start by identifying the most important factor and then rating the other factors relative to that one. It is possible for multiple factors to have the same weight. It is also possible that no factor receives the maximum weight.

Depending on whether you selected “Yes” or “No” under “Use individual representatives for stakeholder groups?” (tab 1 ‘Start’), you will assign weights either for the stakeholder group as a whole or for each individual representative of the group.



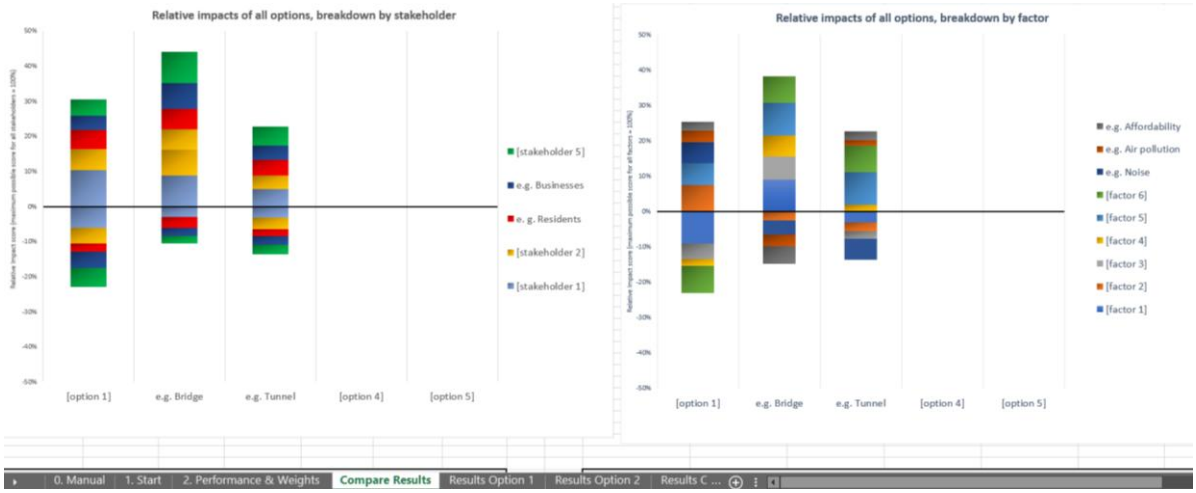
Tab: Compare Results

Based on your input, this tab displays two graphs for comparing the options:

Total relative impact score, breakdown per stakeholder: This shows the extent to which stakeholders are positively or negatively affected by each option.

Total relative impact score, breakdown per factor: This shows the extent to which each factor contributes positively or negatively to the total effect.

In both graphs, 100% represents the maximum possible (positive or negative) effect an option could have across all factors and all stakeholders. The layout of the charts can be customised. For clarity, it is advisable to use one consistent colour per stakeholder, regardless of whether the impact is positive or negative.

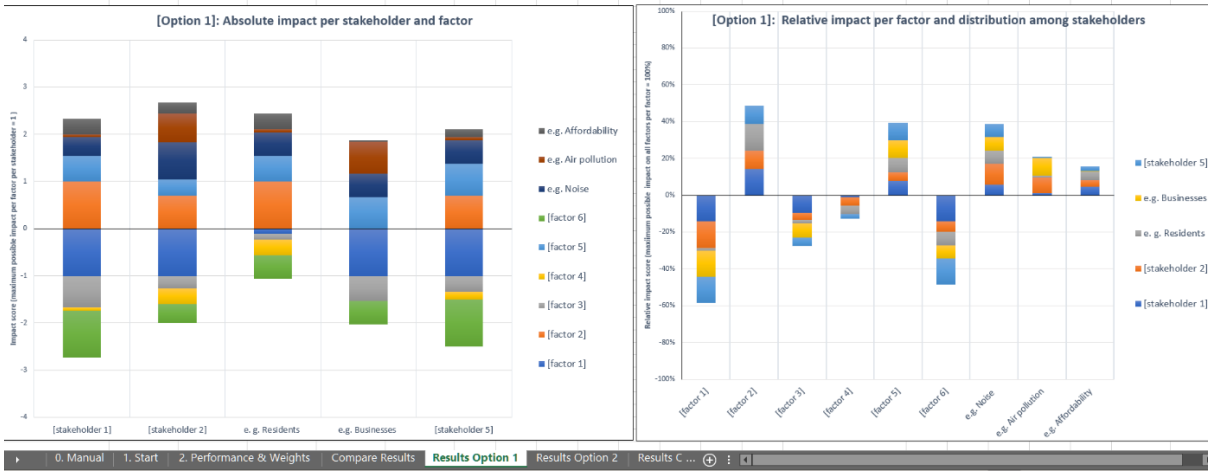


Tabs: Results Option 1, 2, 3, …

Each of these tabs provides a more detailed analysis of the individual options (interventions) using two graphs that show how a specific intervention could be adjusted to address the needs or concerns of stakeholders:

Absolute impact per stakeholder: This shows the impact of the option on each factor and displays the stakeholders for whom the impact is relevant. Stakeholders are shown on the horizontal axis. On the vertical axis, a score of 1 corresponds to the maximum (positive or negative) impact for one stakeholder on one factor. Therefore, the more relevant factors there are per stakeholder, the higher the potential impact score.

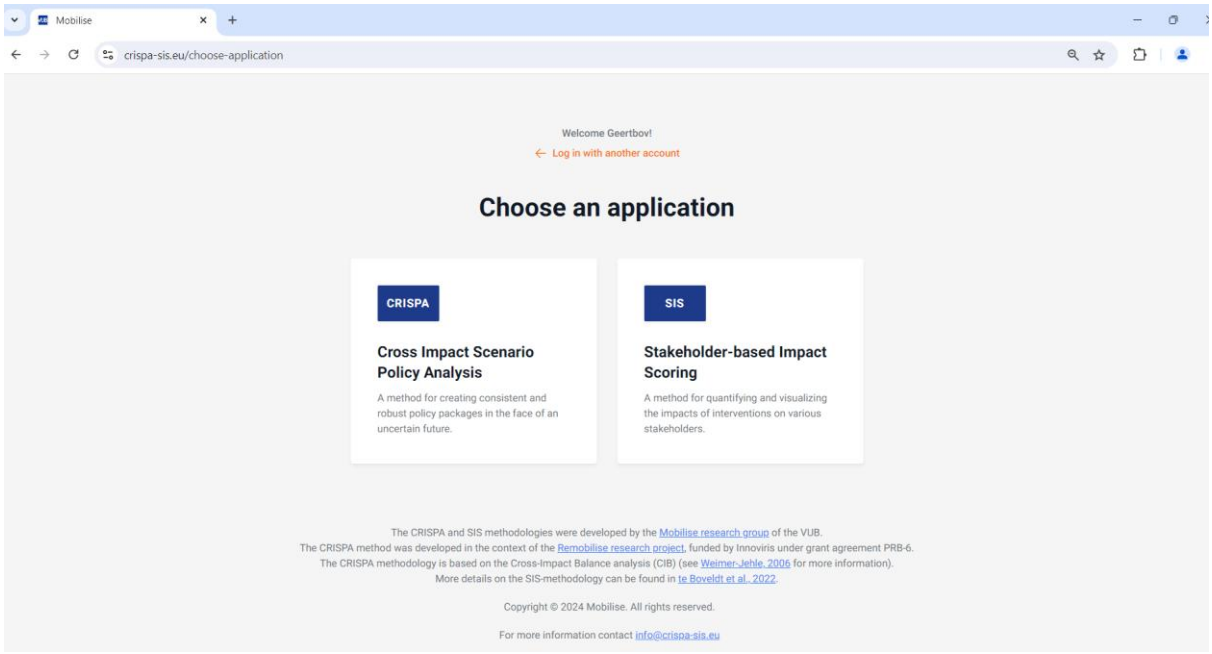
Relative impact per factor: This shows the impact of the option on each factor and the stakeholders for whom that impact is relevant. 100% represents the maximum possible impact per factor.



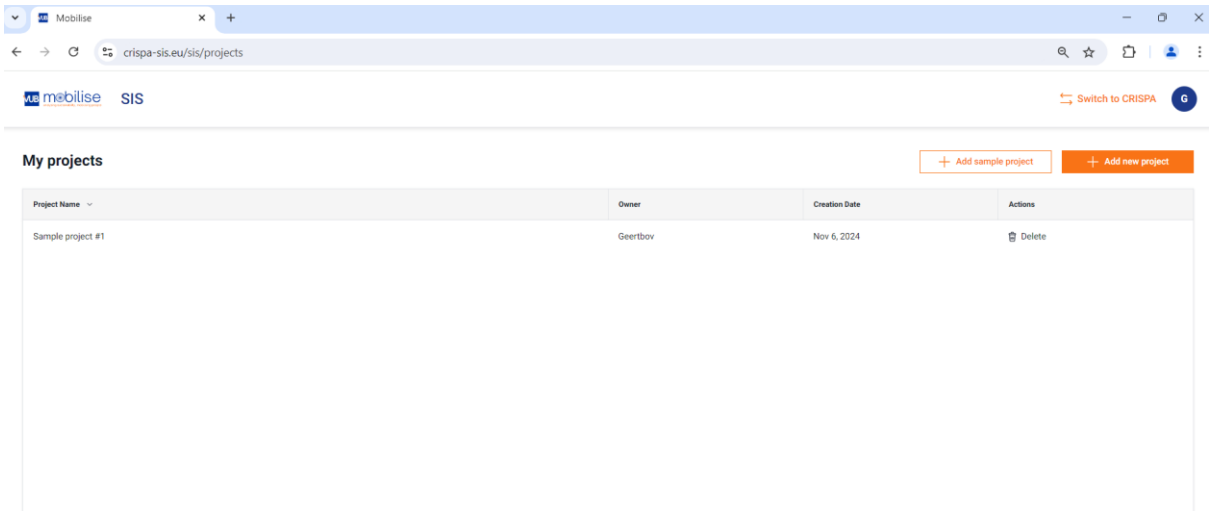
SIS software

Start

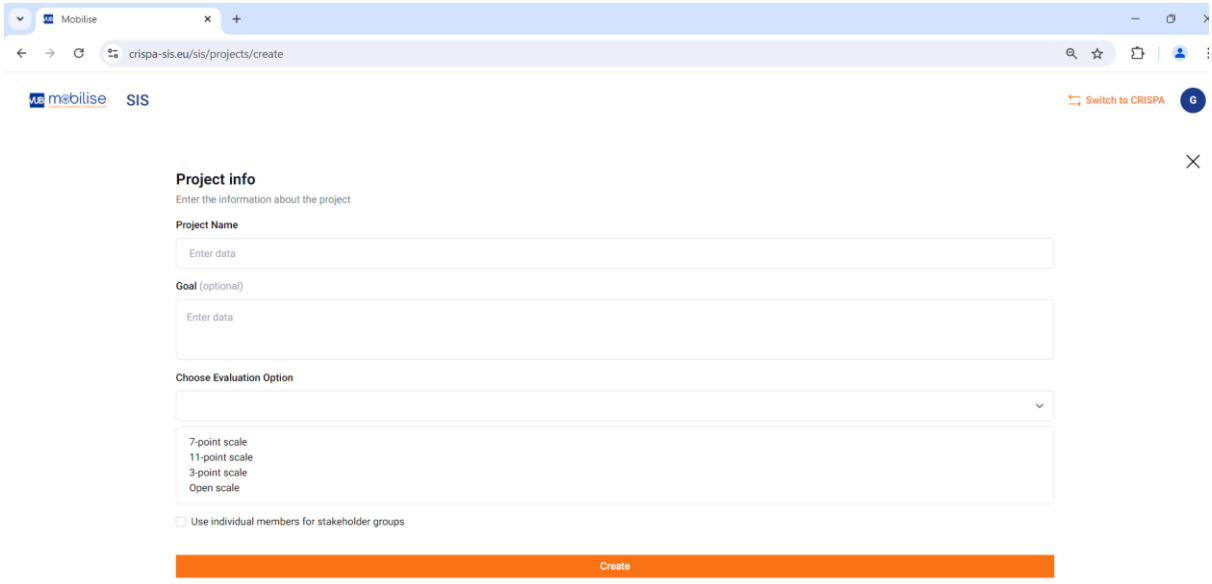
Go to www.crispa-sis.eu. After signing up, choose the option 'SIS' at the intro screen.



In the next screen (My projects), choose '+ Add new project'



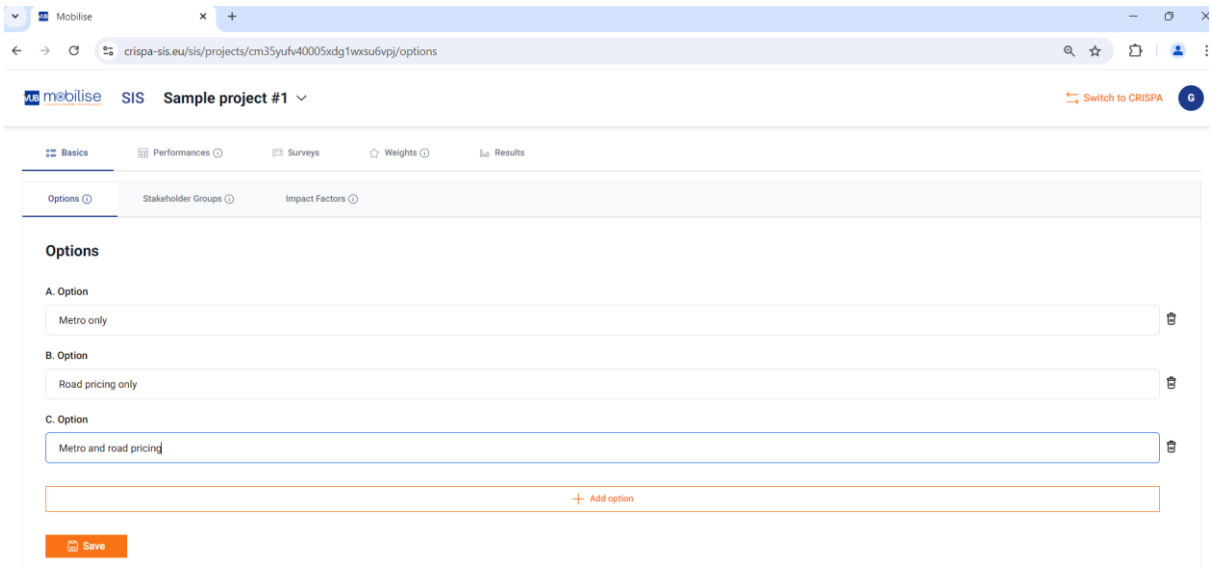
Give your project a name, goal (optional) and choose an evaluation option, i.e., the granularity of the scale of the performance rating (step 4).



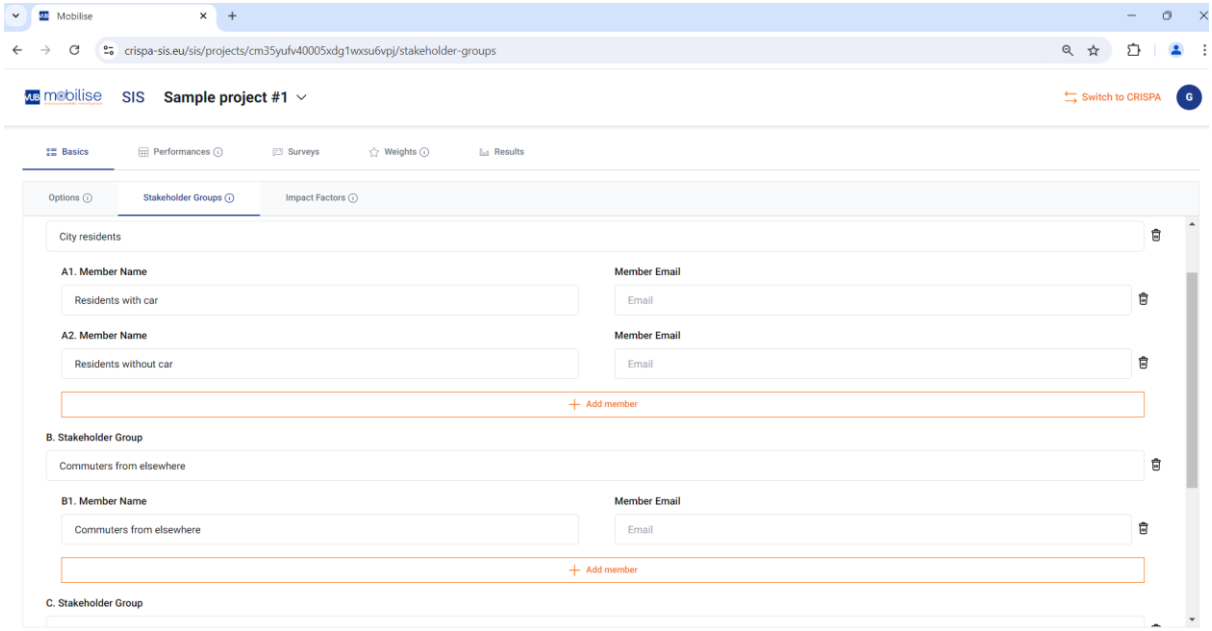
You then arrive in the actual SIS process. The tabs and subtabs represent the different steps of SIS.

Tab: Basics

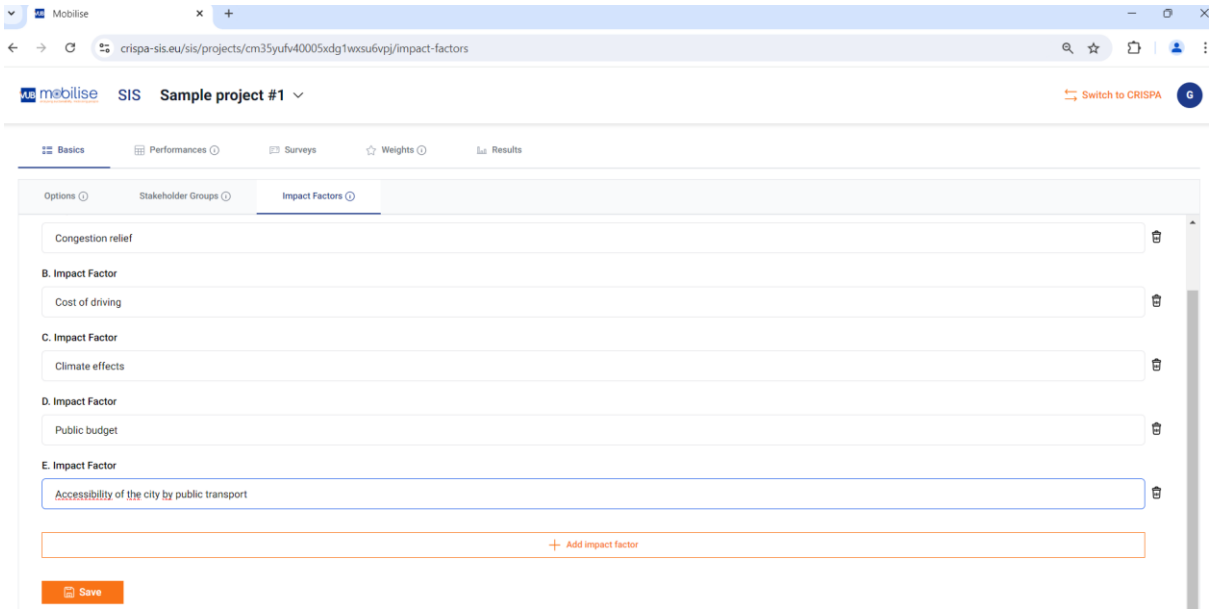
Options: Enter the names of the options (interventions). Only enter the options that are not business-as-usual scenarios (minimum 1). Unlike in multi-criteria analysis, SIS results are still meaningful even if you have only one option.

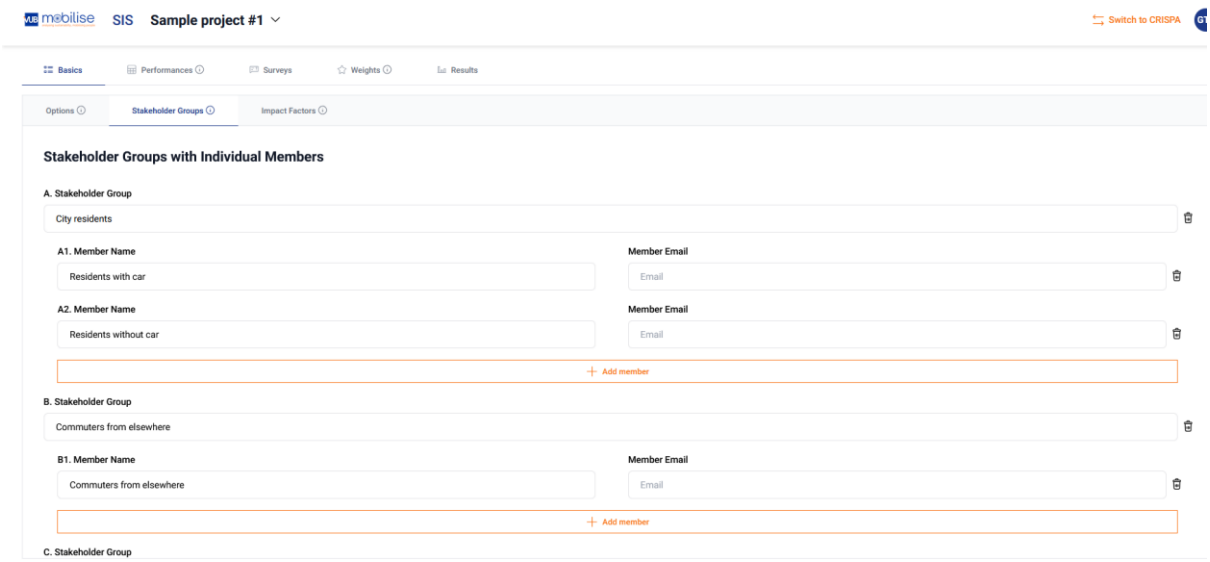


Stakeholder groups: Enter the names of the stakeholder groups and their members. If you only have stakeholders that are not groups with members, leave the 'member name' box blank. By entering the email addresses, you enable them to provide their input from their own computer.



Impact Factors (indicators): Enter the factors that can make an intervention beneficial or detrimental to one or more stakeholders. Aim for minimal ambiguity and overlap between factors.



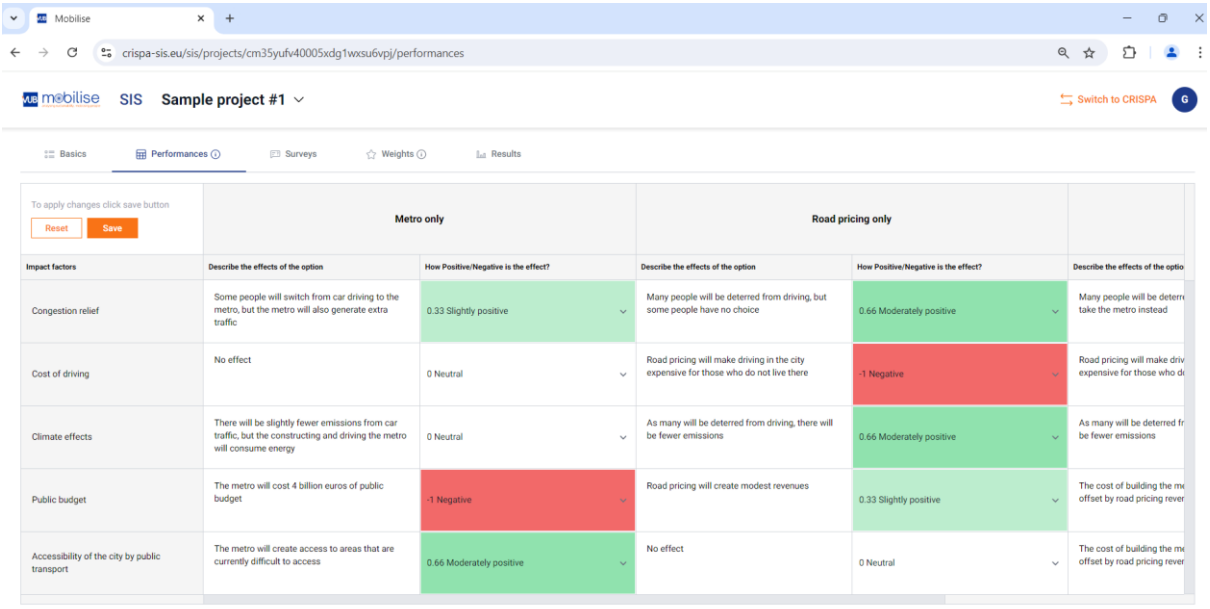


Tab: Performances

The options and impact factors you entered earlier are automatically filled in. You still need to provide the following inputs:

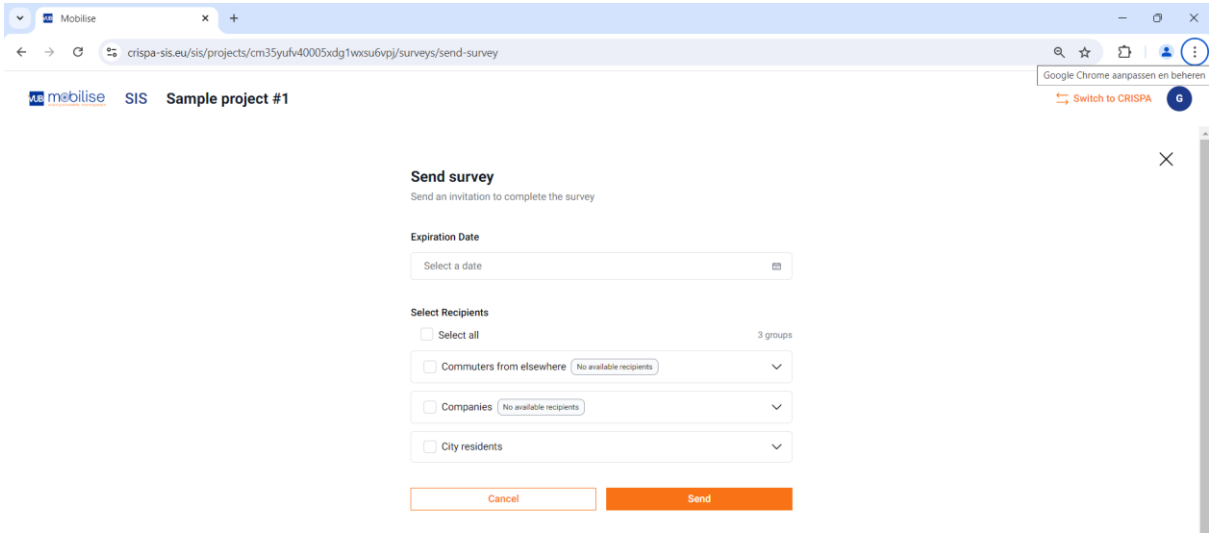
Describe the effects of the option: In the designated cells, describe the effects of each option for each factor. How does the intervention differ from doing nothing? Be as factual as possible—use quantitative data if available, or qualitative descriptions otherwise. The description has no effect on the calculation, but you can show this screen for the sake of transparency.

How positive or negative is the effect?: Indicate the degree to which the described effects are negative, positive, or neutral (compared to the do-nothing scenario), by selecting from the dropdown menus. For the calculation of impact scores, these qualitative labels (negative–positive) are converted into numerical values ranging from -1 to +1.



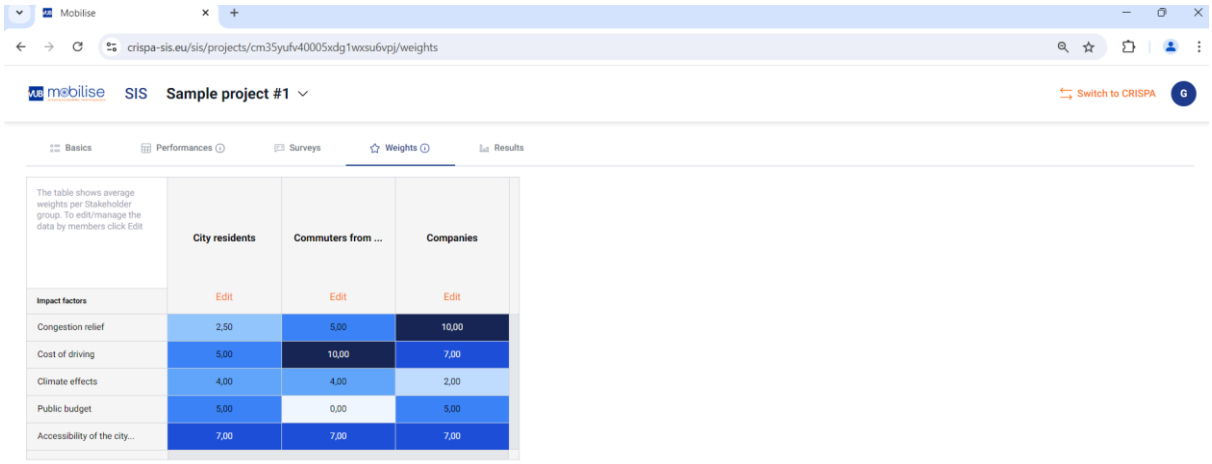
Tab: Surveys

This tab is optional. Here you can request individual members of stakeholder groups to participate in the process by email. The module allows you to select individual recipients and set expiration dates.



Tab: Weights

Here you or the stakeholders themselves can assign weights to each of the impact factors reflecting their relative importance. Assign a score between 10 (maximum importance) and 0 (not important). A common approach is to start by identifying the most important factor and then rating the other factors relative to that one. It is possible for multiple factors to have the same weight. It is also possible that no factor receives the maximum weight.



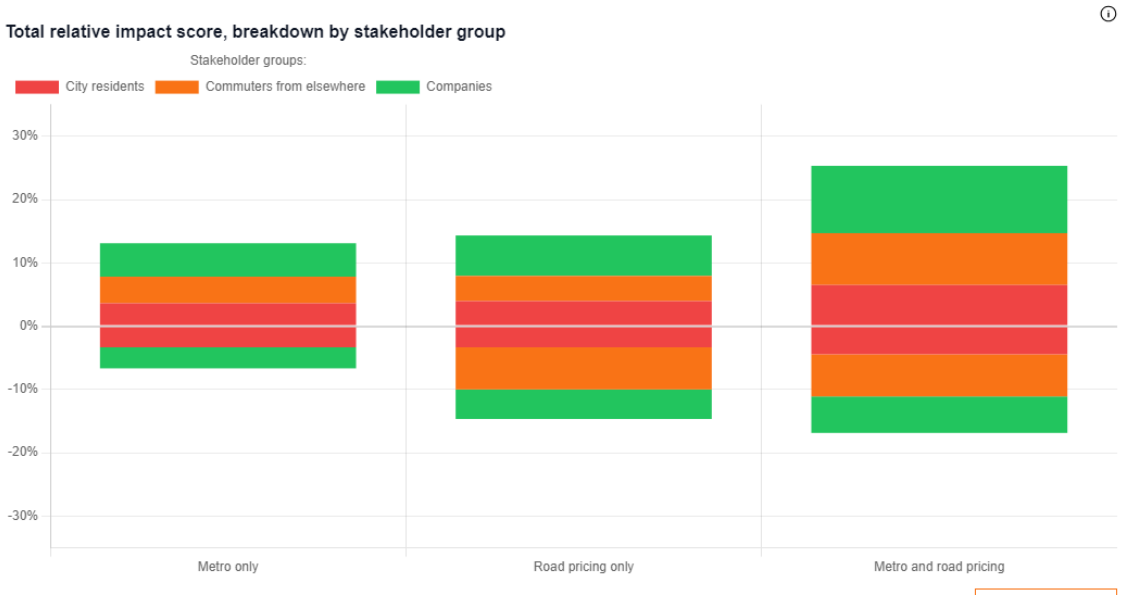
Tab: Results

Under this tab you find the impact scores and various visualisations of these results. There is a subtab ‘Compare options’ and one subtab for one option each for more detail.

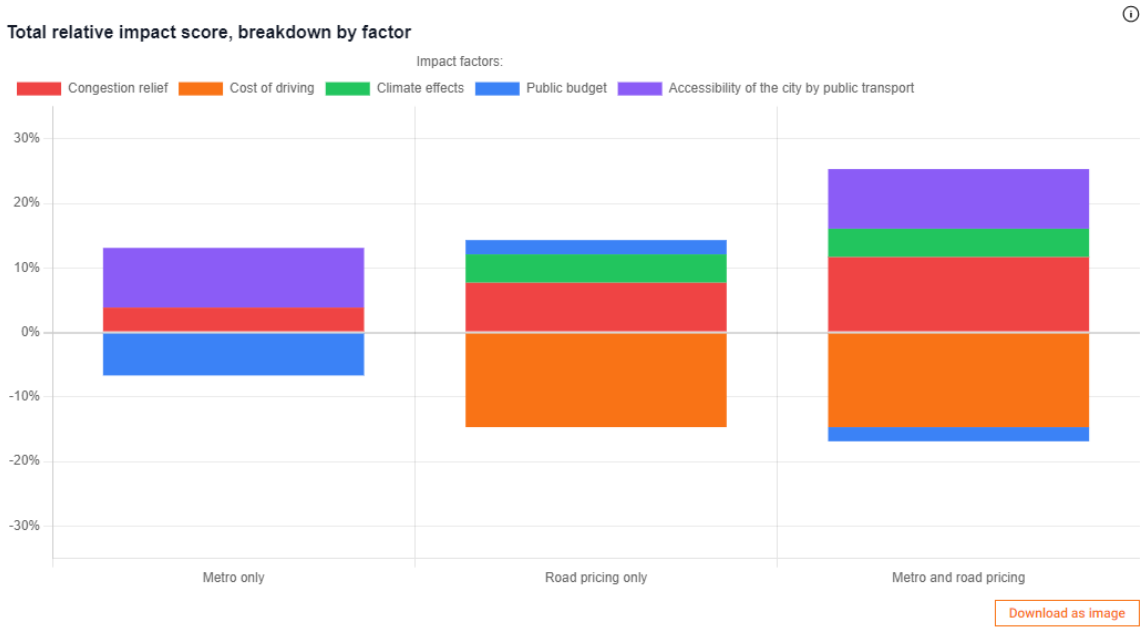
Subtab: Compare options

Based on your input, this tab displays two graphs for comparing the options:

Total relative impact score, breakdown per stakeholder: This shows the extent to which stakeholders are positively or negatively affected by each option.



Total relative impact score, breakdown per factor: This shows the extent to which each factor contributes positively or negatively to the total effect.



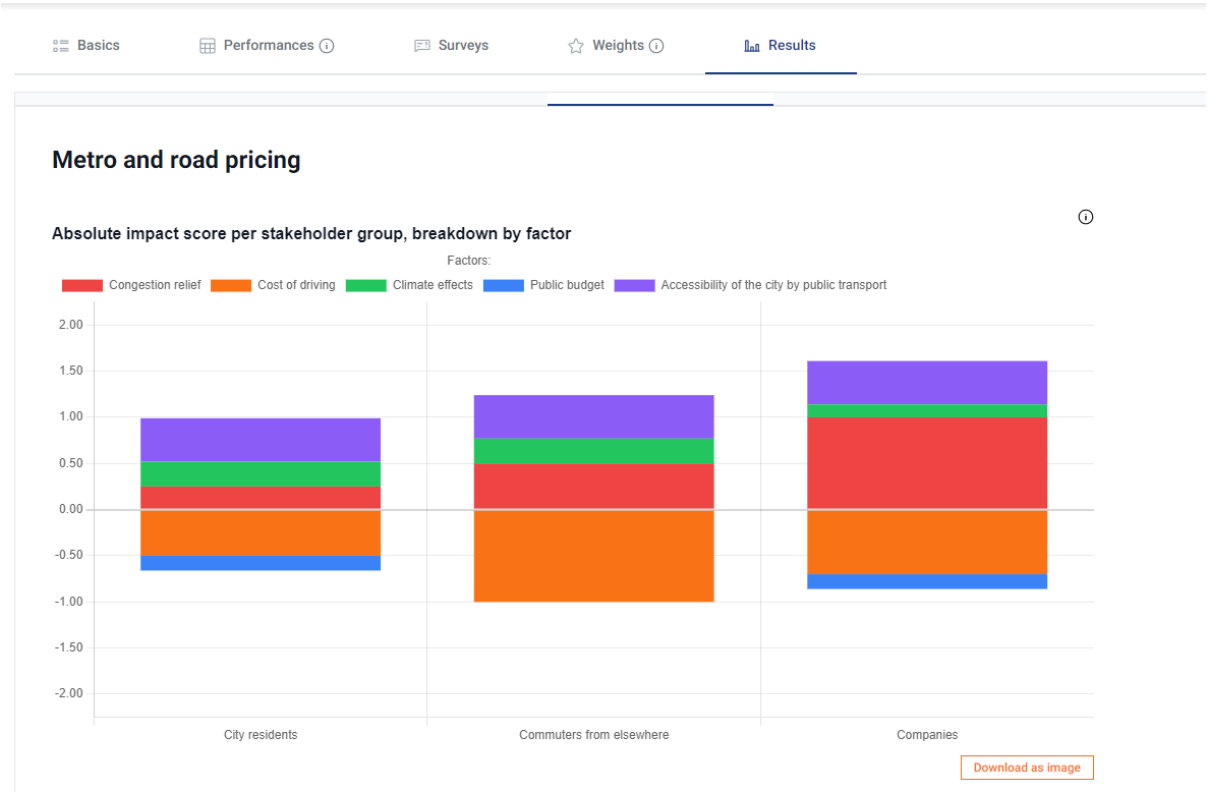
In both graphs, 100% represents the maximum possible (positive or negative) effect an option could have across all factors and all stakeholders. The layout of the charts can be customised. For clarity, it is advisable to use one consistent colour per stakeholder, regardless of whether the impact is positive or negative.

Option-specific subtabs

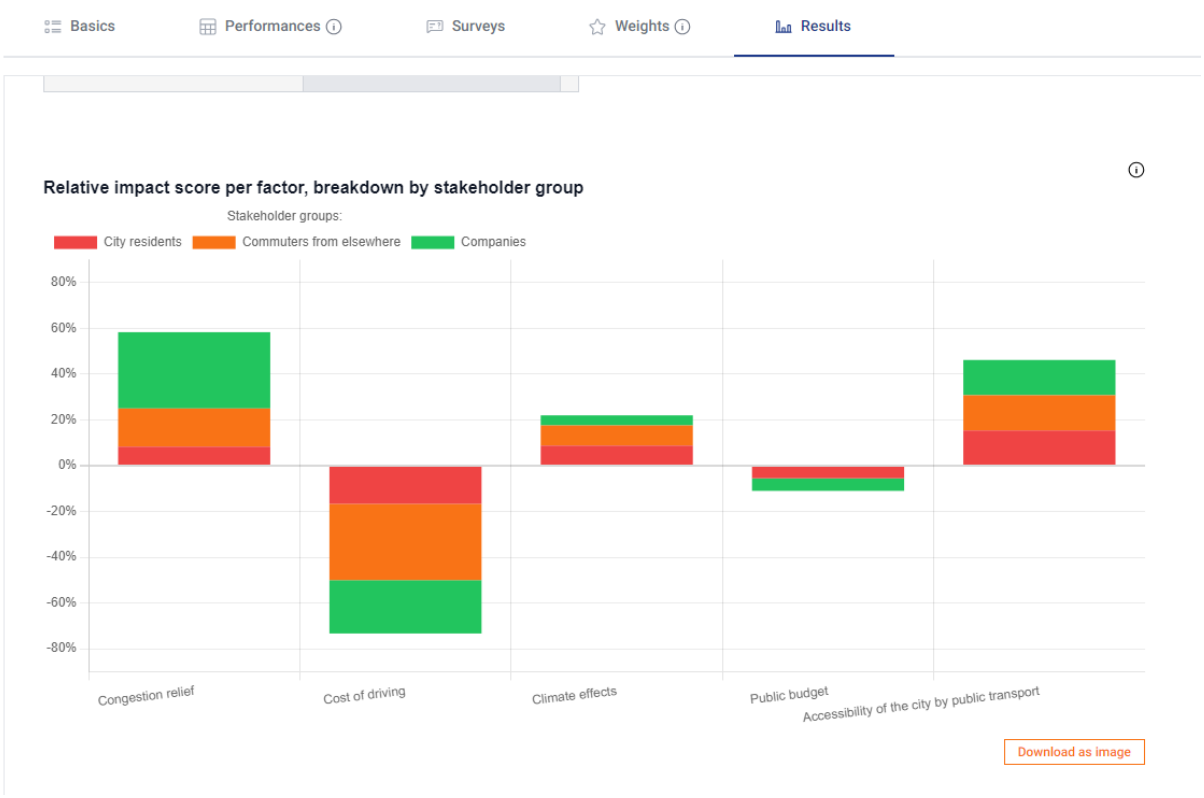
The option-specific subtabs allow you to see, for one option, what its (dis)advantages are and for which stakeholder they are relevant.

Absolute impact score per stakeholder, breakdown by factor: This shows the impact of the option on each factor and displays the stakeholders for whom the impact is relevant. Stakeholders are shown on the horizontal axis. On the vertical axis, a score of 1 corresponds to the maximum (positive or negative)

impact for one stakeholder on one factor. Therefore, the more relevant factors there are per stakeholder, the higher the potential impact score.



Relative impact per factor: This shows the impact of the option on each factor and the stakeholders for whom that impact is relevant. 100% represents the maximum possible impact per factor.



References

te Boveldt, G., Keseru, I., & Macharis, C. (2022). When monetarisation and ranking are not appropriate. A novel stakeholder-based appraisal method. Transportation Research Part A: Policy and Practice, 156, 192–205. https://doi.org/10.1016/J.TRA.2021.12.004