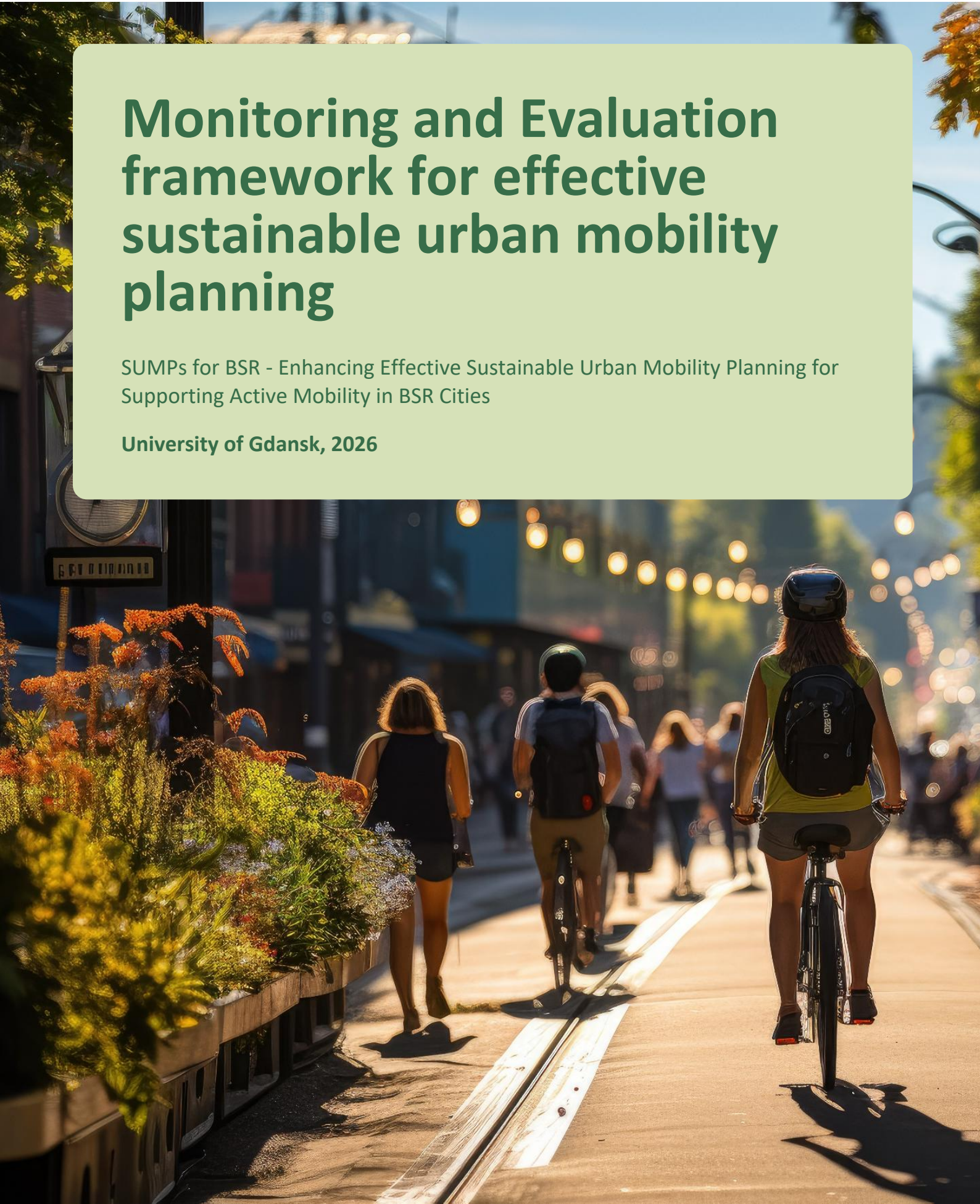


Monitoring and Evaluation framework for effective sustainable urban mobility planning

SUMPs for BSR - Enhancing Effective Sustainable Urban Mobility Planning for Supporting Active Mobility in BSR Cities

University of Gdansk, 2026



Imprint

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Project note

SUMPs for BSR project supports cities shifting their planning practices towards people-centred sustainable urban mobility planning, focusing on active mobility modes to fight the climate crisis. The project aims to increase the uptake of Sustainable Urban Mobility Plans (SUMP) as a strategic tool for sustainable mobility planning by developing tools and offering extensive capacity building for local authorities, especially in small and mid-sized BSR cities. A common framework for monitoring and evaluation for sustainable urban mobility planning will be developed to set up sound local processes suitable for smaller cities. Together with a unified model for testing and experimenting with innovative mobility solutions, it will help to evaluate the performance of the local mobility system and provide crucial information for planning and decision-making.

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1. Introduction

1.1. About the SUMP for BSR project

The SUMP for BSR project aims to increase the uptake of Sustainable Urban Mobility Plans (SUMP) as a strategic tool for sustainable mobility planning for local authorities, especially in small and medium-sized Baltic Sea Region (BSR) cities. The project focuses on 3 key topics: the harmonisation of monitoring and evaluation approaches across borders, the recognition of active modes as key components of local mobility systems and the uptake of small-scale experiments as a strategic tool to promote active mobility. These topics have been identified as challenging for the cities in the need assessment done in the preceding seed money project and during the SUMP for BSR project, both supported by the Interreg Baltic Sea Region Programme.

One of the key outputs of the SUMP for BSR project is a common framework for monitoring and evaluation of sustainable urban mobility, supporting cities in the region to set up sound local monitoring and evaluation processes. It will help to evaluate the performance of the local mobility system and to provide crucial information for planning and decision-making. In addition to testing and validating the framework, partner cities are doing local evaluation and data collection pilots where they are testing new ways to collect data on active mobility. The experiences of partner cities will help to fine-tune the framework for cities of different sizes, resources and levels of knowledge within the monitoring and evaluation framework, and also, be compiled into case studies for other cities for self-study.

The development process of the Framework for Monitoring and Evaluation was multi-threaded and multi-stage. It included a series of meetings and workshops during which knowledge, experience, and perspectives from a wide range of stakeholder groups were shared and discussed. The process involved, among others, representatives of the academic community specialising in research and analysis related to sustainable cities and urban planning, including sustainable urban mobility planning. An important role was also played by representatives of local and regional authorities from the cities participating in the SUMP for BSR project. This made it possible to reflect practical conditions in which cities operate, as well as real needs for monitoring and evaluating activities in the field of urban mobility.

Moreover, throughout the workshops, a broad group of additional stakeholders were invited to contribute, sharing their reflections and experiences regarding approaches and tools for monitoring urban mobility systems. The inclusion of diverse participants helped to better identify key challenges, clarify expectations towards the framework, and develop solutions that can be applied across different urban contexts. The key stages of the development of the Framework for Monitoring and Evaluation are presented in the figure below.

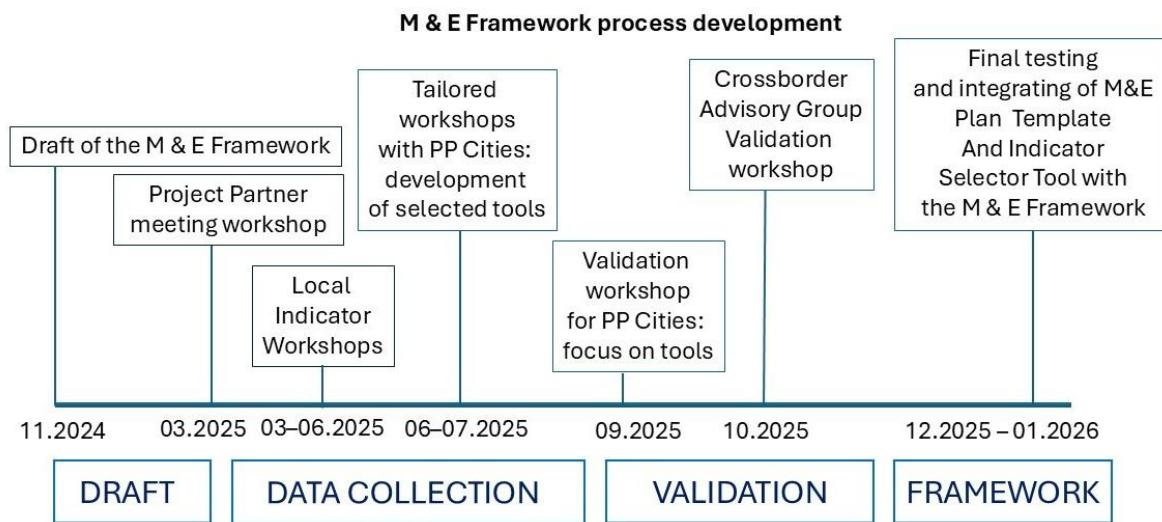


Figure 1. M & E Framework process development

The three tools developed within the project should be understood as complementary components of one coherent support package rather than as stand-alone products. They are:

- the M&E Framework (this document), which explains the logic, principles and strategic purpose of monitoring and evaluation in sustainable urban mobility planning;
- the [Indicator Selector Tool](#) that supports the selection and documentation of indicators suited to local objectives and data conditions;
- the [M&E Plan Template](#) helping to translate these elements into an operational city-level arrangement, including roles, procedures, resources and reporting practice. Used together, the three tools support cities from concept development to practical implementation, while still allowing flexibility to adapt the overall approach to local institutional and territorial contexts.

All these tools are available through the Competence Centre at <https://bsr-sump.eu>.

1.2. Sustainable Urban Mobility Planning – policies and practice

1.2.1. Development of Sustainable Urban Mobility Policies

A sustainable approach to urban mobility and transport planning has become increasingly popular in EU countries over the years. In 2007, it gained support from the European Commission, which proposed the Green Paper titled "Towards a New Culture for Urban Mobility" (European Commission 2007). In 2009, the European Commission followed this by presenting an action plan for urban mobility. Since then, the Commission has continuously encouraged the authorities of EU member states to take action in this area. An official communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions, dated December 17, 2013, called for increased support for European cities in undertaking transport initiatives to more effectively implement EU policy on competitive and resource-efficient mobility. One of the appendices to the communication focused on the Sustainable Urban Mobility Plans (SUMPs) actively promoted by the European

Commission, providing guidelines on how these plans should be developed. (European Commission, 2009; Rupprecht Consult, 2019; Wolek, 2016)

In December 2019, the European Commission introduced the Green Deal, a legislative package aimed at adapting the EU's climate, energy, transport, and taxation policies to achieve the goal of reducing net greenhouse gas emissions by at least 55 percent (%) by 2030, compared to 1990 levels. It also aimed for a 90 percent (%) reduction in transport sector emissions by 2050 to achieve climate neutrality. (European Commission, 2019 & 2021b)

The Sustainable and Smart Mobility Strategy was adopted in December 2020 (European Commission, 2020). It is based on three key objectives (Towards zero emission road transport, 2020):

- sustainable mobility,
- smart mobility,
- resilient mobility.

The strategy also stipulates that "all large and medium-sized cities that are urban nodes on the TEN-T network put in place their own sustainable urban mobility plans by 2030". Other significant provisions for urban mobility include the internalisation of external transport costs by 2050, ensuring that transport users bear the full costs instead of leaving them to society, achieving at least 100 climate-neutral cities in Europe, mass electrification of private cars, integrating electronic ticketing to facilitate seamless multimodal passenger transport, making mobility affordable and accessible in all regions, and unleashing the full potential of data. (European Commission 2021a)

Since the release of the Sustainable and Smart Mobility Strategy, in late 2023 the European Commission has revised the regulation for the Trans-European Transport Network (TEN-T). The updated regulation strengthens the urban layer of the TEN-T policy and makes it obligatory for the cities listed as urban nodes to establish a SUMP by 2027. It should include, inter alia, "measures aimed at integrating different modes of transport and shifting towards sustainable mobility, promoting efficient zero-emission and low-emission mobility, including urban logistics, reducing air pollution and noise pollution, as well as, where appropriate, assessing transport accessibility for users (European Parliament, 2024)".

This new requirement will concern a large number of cities, as the number of urban nodes has increased to over 400. In addition, the revised regulation will require urban nodes to collect and submit relevant urban mobility data to the European Commission. The subsequent implementing act will set out the list of sustainable urban mobility indicators and their calculation methodology. (European Commission 2023a, European Commission 2024)

One of the requirements under the Regulation is that all major cities along the TEN-T network develop sustainable urban mobility plans (SUMP) to promote zero- and low-emission mobility.

The rationale for this requirement is the fact that urban nodes play a key role in the trans-European transport network. They constitute the starting point or final destination of journeys ("the last mile") for people and goods transported within the trans-European transport network, as well as transfer points within individual modes of transport or between them. Therefore, urban nodes should have an effective Sustainable Urban Mobility Plan (SUMP). It should create an effective, harmonised framework for

addressing mobility-related challenges in individual urban nodes on the TEN-T network. In this context, SUMP is a long-term, strategic, comprehensive, and integrated plan for freight and passenger mobility across the entire functional urban area, rather than a single city. Its objective is to “facilitate, in a sustainable manner, access for people and businesses to the functional urban area and the delivery of goods to that area, including commuting zones within or near that urban area, and movement within it, with particular regard to improving quality of life (European Parliament, 2024)”.

In addition, the revised TEN-T Regulation requires the European Commission to adopt an Implementing Act setting out a limited number of indicators covering sustainability, safety, and accessibility (European Parliament, 2024). Therefore, in 2025 the European Commission has introduced a standardised monitoring process, indicating the following areas that should be subject to monitoring:

- horizontal aspects,
- sustainability aspects,
- road safety aspects
- accessibility aspects.

The list of indicators is presented in the Table 1.

Table 1. List of indicators in particular thematic areas

| Indicator | Explanation | Unit of measurement | Data collection method |
|-------------------------------|--|--|--|
| Horizontal aspects | | | |
| HO.1 | Total number of persons, broken down by sex and age group, who have their usual residence in the geographical area | Number | The Commission shall extract the data relevant to urban nodes from Eurostat's published data. Where no geolocation data is available, the Member State shall collect the necessary data by extracting it from the most recent population census. |
| HO.2 | The size of the geographical area | km ² | The Commission shall extract the data relevant to urban nodes from Eurostat's published data. Where no geolocation data is available, the Member State shall collect the necessary data in accordance with its institutional and legal framework. |
| HO.3 | Total number of access nodes in the geographical area | Number | The Member State shall use any method used in order to collect that data. |
| Sustainability aspects | | | |
| SU.1 | Annual CO ₂ -equivalent emissions from road transport in the geographical area | Tons of CO ₂ equivalent per year | The Member State shall use the respective data collection method in accordance with its institutional and legal framework, taking into account existing local, regional, national, European, and international practices and standards, as well as established reporting frameworks. |
| SU.2 | Number of trips per month made by persons, who have their usual residence in the geographical area, broken down by the following four travel modes: walking, cycling, individual motorised transport, and public transport | Trips per month, broken by specific categories | The Member State shall use a survey or a transport model to collect the data. |

| Indicator | Explanation | Unit of measurement | Data collection method |
|------------------------------|--|---|---|
| SU.3 | The stock of registered passenger cars in the geographical area, presented in a matrix format, broken down both by type of motor energy (petrol, diesel, hybrid, zero-emissions, other – i.e. LPG, CNG, bi-fuel) and by category of Euro emission standard | Number of vehicles by particular categories | The Member State shall collect the data by extracting it from the vehicle registration service. |
| Safety aspects | | | |
| SA.1 | Number of road traffic accidents in the geographical area per year presented in a matrix format, showing the two main road users involved in the accident (heavy goods vehicle, bus, minibus, trolley or coach, tram or light rail vehicle, lorry, under 3.5 tonnes, road tractors or agricultural tractors, passenger car including taxis, motorcycle, moped, pedal cycle or e-pedelec, motorised micro-mobility device, pedestrian, other, unknown). | Number | The Commission shall extract the relevant data from the Community database on road accidents (CARE database). Where no geolocation data is available, the Member State shall collect the data by extracting the relevant information from police records, |
| SA.2 | Number of people seriously injured in road traffic accidents in the geographical area per year, broken down by sex, date of birth, and type of vehicle (the same as in SA.1) used by the person seriously injured and by other main vehicle involved in the accident. | Number | The Commission shall extract the relevant data from the CARE database. Where no geolocation data is available, the Member State shall collect it by extracting relevant information from police and hospital records. |
| SA.3 | Number of people fatally injured in road traffic accidents in the geographical area per year, broken down by sex, date of birth, and type of vehicle (the same as in SA.1) used by the person fatally injured and by other main vehicle involved in the accident. | Number | The Commission shall extract the relevant data from the CARE database. Where no geolocation data is available, the Member State shall collect it by extracting relevant information from police and hospital records. |
| Accessibility aspects | | | |
| AC.1 | Number of access nodes in the geographical area with four or more scheduled departures during peak hours per route per hour | Number of nodes | Member State |
| AC.2 | Total number of railway stations in the geographical area | Number of stations | The Commission shall extract the relevant data from the European Railway Station Accessibility Database (ERSAD). |
| AC.3 | Number of railway stations in the geographical area that are reported as accessible by the reporting entity in the ERSAD, meeting specific criteria on access to station, platforms, trains, access to information, access to tickets and signage | Number of stations | The Commission shall extract the relevant data from the ERSAD |
| AC.4 | Number of secure bike parking facilities in the railway stations or their vicinity in the geographical area | Number of parking facilities | Member State |

Source: based on the Annex to the Commission implementing act on the collection and submission to the Commission of urban mobility data per urban node in the fields of sustainability, safety and accessibility in accordance with Regulation (EU) 2024/1679 of the European Parliament and of the Council

The monitoring requirements resulting from the discussed Regulation are not, in principle, new. They constitute a clarification and simplification of the so-called SUMI (Sustainable Urban Mobility Indicators). As indicated by the contents of Table 2, in the scope of the data that needs to be collected, the role of both national public institutions (statistical offices, the police) and the EU level will increase. In addition, individual cities will have to face the challenge of collecting comparable data for the functional area.

1.2.2. Sustainable Urban Mobility Planning on Different Levels

Sustainable urban mobility planning most often applies at the city level, but increasingly, as recommended in the SUMP Guidelines, at the Functional Urban Area (FUA) level. Sometimes the SUMP approach is applied for smaller units, such as specific districts or central areas of cities (Wołek, Gromadzki, Jagiełło, 2021). These central areas experience heavy commuter traffic for various purposes and tend to reveal compounded problems related to the division of urban space, environmental pollution, noise, and other issues. The multilevel approach is applied, for example, in the City of Gdynia, Poland. In addition to the city-level SUMP, the Metropolitan-level SUMP covers 59 municipalities in the Gdansk-Gdynia-Sopot Functional Urban Area. The district-level SUMP covers a single, distinct district within the City of Gdynia, Poland (Figure 2). It can be regarded as a pilot, and it has proven that the scale of such a SUMP is difficult to envision without taking the whole city into account. Thus, the town or city level of SUMP is the most highly recommended place to start for a city with limited experience.

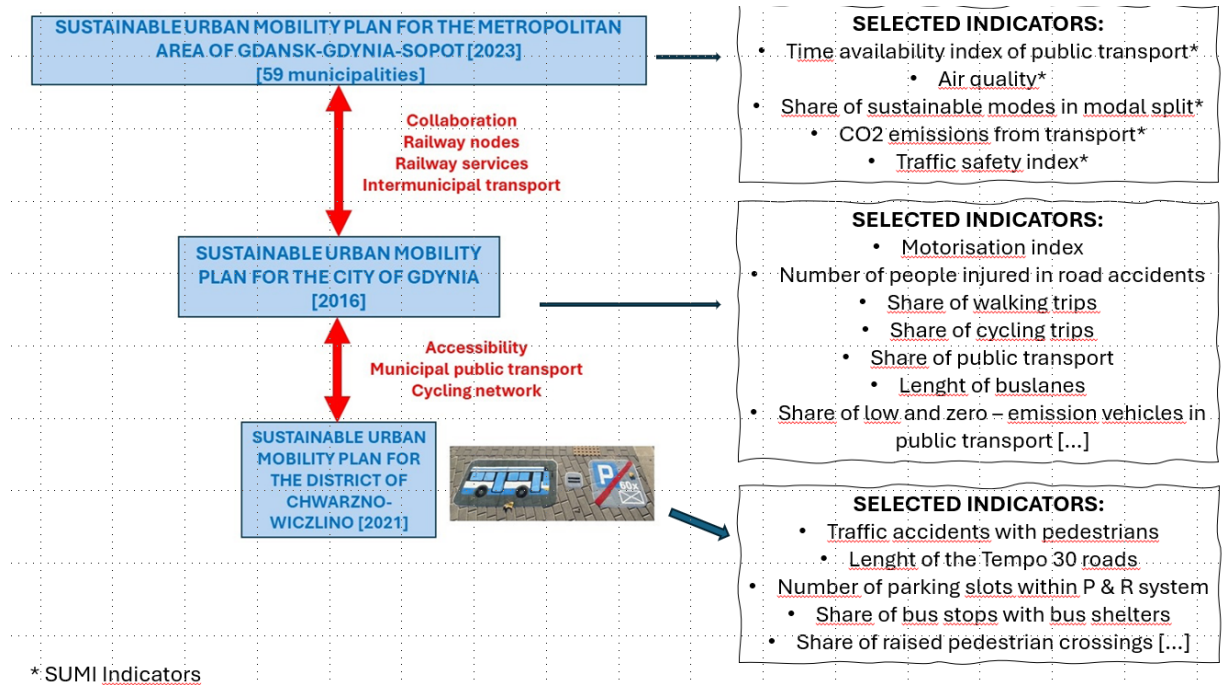


Figure 2. An example of SUMP on three-level in the City of Gdynia (Poland) with selected monitoring indicators, based on a self-study

While in polycentric agglomerations such as the Tri-City (Gdansk-Gdynia-Sopot) in Poland, the levels of SUMP elaboration are varied, not all BSRs have the same level of urbanisation. This is a major factor

determining the level at which a SUMP is elaborated. Almost half (43%) of the EU population resides in small urban areas with populations of between 5,000 and 50,000 inhabitants, and two-thirds (66 %) of the population in areas with fewer than 500,000 inhabitants (European Commission 2023b). The population of the Baltic Sea Region (BSR) totalled 106 million people, representing a quarter (24%) of the EU population in 2020. However, it is distributed unevenly, with most of the population concentrated in Northern Germany, Poland, and Denmark, while the rest of the BSR is sparsely populated. Based on OECD statistics, there are 135 Functional Urban Areas (FUAs) in the Baltic Sea Region, representing 63% of its total population. The urban landscape in BSR is shaped by the smaller and medium-sized cities, which play a key role in creating spatial and social cohesion. Their role is particularly significant in areas with low population density, where they serve as important centres for socio-economic development. (VASAB 2022, p.21-22)

Many EU-funded initiatives, e.g. CIVITAS SUITS project (2021) and the SUMP for BSR project (2023), behind this framework, emphasise the importance of considering the specific needs of small and medium-sized cities in Sustainable Urban Mobility Plans (SUMP). These projects address existing gaps in the capacity of these cities to support sustainable mobility in both policymaking and transport planning, with the aim of improving the overall quality of urban life.

1.2.3. Stakeholder Involvement in Sustainable Urban Mobility Planning

Including a wide range of stakeholders in the process of planning sustainable urban mobility not only reduces the risk of a lack of political acceptance of the planned actions but also facilitates the collection of data for monitoring and evaluation.

A good example of this is the well-defined process for achieving climate neutrality in the City of Turku, Finland. To achieve climate neutrality by 2029, the city has developed specific action plans for various sectors of its operations, accompanied by indicators to track their implementation. Sustainable urban mobility planning assumes a high level of public engagement in the process. This means that, depending on the city's size, its characteristics, and the scope of the document, various stakeholder groups should be involved in its development. Referring to Jan Gehl's book *Cities for People* (2010), the design trends in urban space overlooked the scale of individual persons for years. Restoring this focus means concentrating on people as the most important "users" of the city. Therefore, sustainable urban mobility planning starts with people and their needs. To properly define and address these needs, it is necessary to identify the key stakeholders in the sustainable urban mobility planning process.

Figure 3 presents an example of a stakeholder segmentation scheme for a medium-sized city. The structure of selected stakeholders for mobility planning is determined by the local context. Typically, stakeholders should represent all areas of the city's functioning. Using their relationship with local government as a criterion, they can be roughly divided into "internal" and "external" stakeholders. The first category includes employees of the city administration, particularly those working in departments responsible for spatial planning, transport and mobility, economic development, social affairs, and education. In the Baltic Sea Region, many cities have well-developed ports and maritime & logistics sectors, which have a multifaceted impact on the city's operational and strategic performance. Therefore,

it is necessary to consider specific stakeholders, such as port authorities, representatives of the logistics sector, railway operators and the shipbuilding industry.

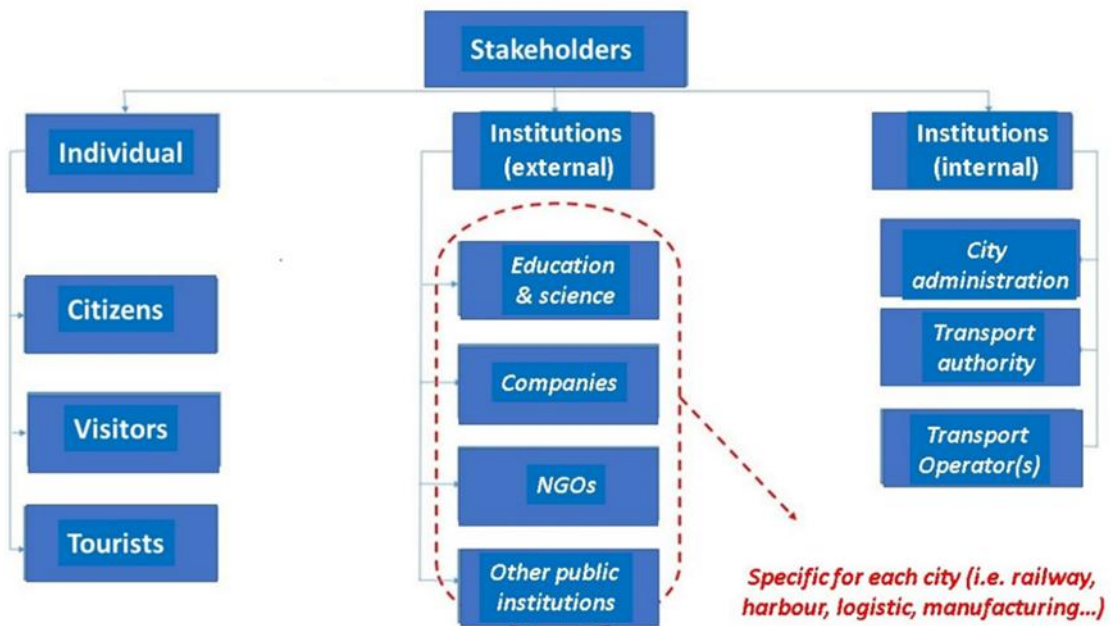


Figure 3. An exemplary segmentation of stakeholders necessary for the sustainable urban mobility planning process based on: A handbook for Preparation of Sustainable Urban Mobility Plans, ed. Wołek 2016

It is also essential to develop a communication scheme with individual stakeholders, considering local specifics and the potential for effective communication (e.g., the limited usefulness of digital tools when engaging with older individuals). As a result, a list of stakeholders relevant to the issues mentioned above should be created, specifying who will be involved at different stages of the planning process.

A particular challenge is selecting individual stakeholders, who are typically the city's residents. The most reliable way to consult with them is through market research, provided that the sample is appropriately selected to ensure representativeness of all resident groups, for example, based on gender, age, or place of residence.

1.2.4. Monitoring and Evaluation for Sustainable Urban Mobility Planning

Monitoring in relation to urban mobility planning and management can be defined as a systematic process of collecting, processing, analysing, and interpreting all data concerning both the ways and the conditions in which the urban transport system functions. The aim of this process is to assess the quality of the policies, strategies, and actions implemented to date and to support informed decision-making for further optimisation of urban mobility.

Evaluation concerning urban mobility planning and management can be defined as a systematic process of assessing and analysing the efficiency, effectiveness, and impacts of the policies, strategies, and actions implemented within urban mobility management. The evaluation examines also the underlying causes of changes observed in the monitoring process (Rye, 2017, p.3). According to this perspective, evaluation should facilitate explaining why the change in a particular indicator within the monitoring system

occurred, reached a specific value, and proceeded in a certain direction. The goal is to provide feedback and recommendations to decision-makers responsible for implementing the ideas of sustainable urban development.

These two elements, monitoring and evaluation, are closely interconnected and create a synergistic process supporting effective planning and management of urban mobility. The monitoring framework thus provides the necessary data for conducting evaluation, and the results of the evaluation inform about the need to modify and improve both the policies, strategies, and actions related to sustainable mobility, as well as the monitoring framework itself.

Therefore, the monitoring and evaluation framework should perform many functions in the process of urban mobility management. Its most important tasks include:

- Acquiring, collecting, and updating existing data;
- Identifying the directions and scales of ongoing changes or trends;
- Monitoring and assessing the effectiveness of implemented actions, strategies, and policies;
- Supporting decision-making processes in situations where there are doubts regarding the necessity, urgency, and significance of specific actions;
- Early detection of problems, enabling quick corrective or remedial actions;
- Detecting particularly effective actions for potential replication;
- Ensuring consistency of actions related to urban mobility with those undertaken in other areas, such as environmental protection or urban spatial planning;
- Providing the possibility of concrete and consistent communication with all stakeholders, especially residents and enterprises operating within the city.

The main objective of monitoring and evaluating in SUMP, is to ensure the effectiveness, efficiency, and long-term viability of implemented urban mobility policies, as well as to track progress toward achieving the sustainable development targets. These objectives should be tailored to the current state of a city's transportation system, the conditions of urban mobility, and the scale of associated challenges. A good example is presented by the strategic objectives of Turku (Finland), which have been defined in a precise and measurable way. However, assessing the degree of their implementation requires a monitoring system (Fig. 4).

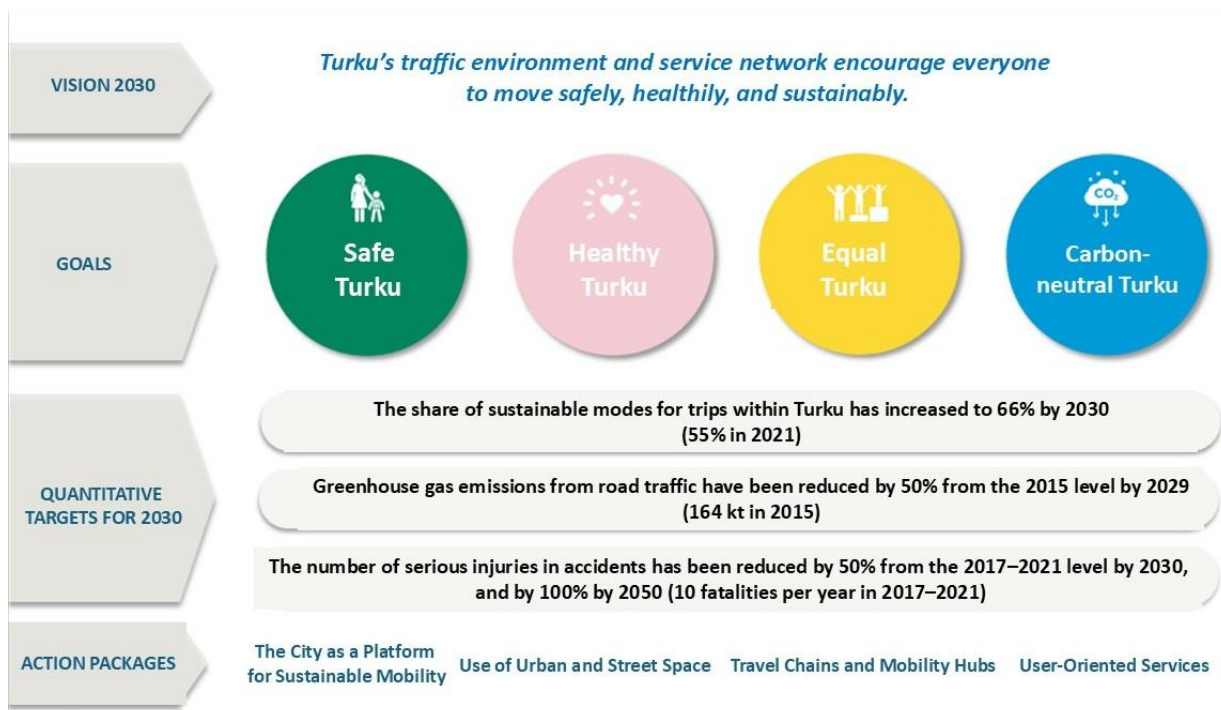


Figure 4. Turku's (Finland) targets in the SUMP and the need for their monitoring

Source: Draft of the M & E Plan for Turku, SUMPS for BSR Project, 2025

The scope of monitoring and evaluation conducted for sustainable urban mobility management depends on the size of the city as well as its functional area. This is because larger cities and their functional urban areas are characterised by, among other factors, more complex transport systems, a greater number of stakeholders, a more extensive range of transport services, and more diverse mobility patterns among residents. This means that larger cities require the use of more advanced analytical tools and a greater number of complex indicators to effectively assess the impact of implemented measures on sustainable development and the efficiency of the transport system. In larger cities, conducting a comprehensive diagnosis of the current situation also requires the acquisition of a larger volume of data and information. These should cover a wider range of variables and originate from a greater variety of sources.

In contrast, in small cities, transport planning focuses on simpler systems and local issues, with changes being more easily implemented. Active mobility, like walking and cycling are common, but parking issues and traffic reduction are less frequent and on a smaller scale. Integration with regional transport and access to modern technologies are limited due to smaller budgets and fewer resources. Public participation is more personal, reflecting close-knit communities, and climate actions are often basic, focusing on emission reduction through the actions like promoting active mobility.

Monitoring results should not be treated as automatically conclusive evidence of the success or failure of a given policy, package of measures, or individual intervention. Changes in indicator values may reflect a wide range of factors beyond the objectives, actions and initiatives of political decision-makers, including external trends, demographic shifts, temporary disruptions, weather conditions, parallel investments, or methodological changes in data collection. For this reason, regular monitoring should be complemented by periodic evaluative reflection that considers not only whether indicator values have changed, but also why they have changed and to what extent the observed outcomes can reasonably be attributed to the

measures implemented. This distinction is essential if monitoring is to support institutional learning and adaptive management rather than serve as a routine reporting exercise alone.

To make monitoring truly meaningful, its results should be integrated into routine management and communication processes within the city administration. This means that reporting should not be treated solely as a formal final output of SUMP implementation, but as an input to internal review, interdepartmental coordination, discussion with operators, and communication with decision-makers, stakeholders and residents. A well-functioning monitoring and evaluation system strengthens not only accountability for the adopted objectives and actions, but also institutional learning, helping cities identify which measures are delivering the intended effects, where corrective action is needed, and in which areas additional analysis should be carried out before further decisions are taken to improve the level of urban sustainability and the quality of life of their residents.

1.3. Summary of the Baseline Analysis

1.3.1. Review of Documents & Guidelines on Monitoring and Evaluation in SUMP

In the SUMPs for the BSR project, the development of the common framework for monitoring and evaluation for sustainable urban mobility planning began by reviewing the work of previous initiatives, such as the CH4ALLENGE project, the SUMI project, and SUMP-UP, which have addressed different aspects of monitoring and evaluation. Selected outcomes of previous projects and initiatives, which were directly or indirectly dedicated to monitoring and evaluation processes and their role in the effective development of SUMP plans, have been utilised in the development of this framework. A selection of these materials is available at <https://bsr-sump.eu> as supplementary learning resources for further reading. The individual studies, concepts, and ideas regarding the creation of monitoring and evaluation systems within the SUMP framework should be seen as complementary rather than substitutive. Each of these approaches contributes unique insights and ideas that, when integrated, provide a more comprehensive and robust framework for the effective implementation of SUMP.

A review of the documents and project reports published to date on monitoring and evaluation as components of SUMP allows for the formulation of the following general conclusions:

- Although general guidelines exist, such as those developed by the European Commission and the ELTIS platform, there is still no consensus on the areas of urban mobility that must be covered by monitoring and evaluation frameworks.
- Despite the existence of indicator sets proposed by various organisations and projects (e.g., CIVITAS, SUMI), a universal and widely accepted set of indicators to be used in monitoring and evaluation frameworks has yet to be developed.
- There remains a lack of consensus on the optimal frequency and intervals for conducting measurements within the functioning of monitoring and evaluation frameworks.
- Although initiatives like " SUMP Guide for Smaller Cities and Towns " highlight the need for individualised approaches, little attention has been devoted in discussions to the differentiation of monitoring and evaluation frameworks among cities of different sizes.

- Despite numerous initiatives, consistent and uniform methodologies for conducting measurements within monitoring and evaluation have not yet been developed, even for such key indicators as modal split.
- It is emphasised that an efficient monitoring and evaluation process requires high-quality data, access to which is currently not always possible. The situation varies not only among cities of different sizes but also between individual EU countries, including those in the Baltic Sea Region.

1.3.2. Baseline Analysis

The next step in the SUMP for BSR project was to carry out a baseline analysis on the partner cities' local Monitoring and Evaluation (M&E) frameworks and a data audit to identify the gaps and challenges, especially in small and medium-sized cities in the Baltic Sea Region. The process included a questionnaire establishing the base for gathering data and information on the actions and solutions for M&E implemented by the partner cities, individual in-depth interviews with key specialists on the topic, a review of the SUMP or related documents of the partner cities, several workshops with project partner cities to continuously develop the framework and input collection from the external cities and national level representatives through the project's Cross-Border Advisory Group and a Sustainable Urban Mobility Indicator workshop.

A key part of this process was the in-depth interviews conducted with representatives from all partner cities in the SUMP for BSR project in 2024. During the interviews, the focus was primarily on obtaining knowledge regarding:

- The division of responsibility for data collection, integration, and archiving among different units within local government offices,
- Which indicators previously used have proven to be particularly useful, and which have been ineffective in the actual management of urban mobility,
- How key indicators for the urban mobility system, such as modal split, are measured,
- What technological, legal, or other constraints the partners encounter while monitoring urban mobility,
- Which social groups are specifically monitored, and which have not been sufficiently covered in terms of monitoring their mobility behaviours and preferences,
- How much influence does the data have on actual actions and decisions made in the management of the urban mobility system,
- To what extent are modern tools and technologies used to monitor transport behaviours and preferences.

The interviews emphasised the need to review the documents, such as SUMP, transport plans, and other strategies (listed in [Appendix 2](#) (p.4), which is also available at <https://bsr-sump.eu>), used in sustainable urban mobility management. The review included an analysis of the thematic areas covered by these documents in each city, as well as the methods and solutions employed during their development to monitor and evaluate urban mobility systems in those cities. A summary of the covered topics is presented in Table 2. It shows that none of the partner cities has, in their previous documents, addressed all of the key thematic areas comprehensively. Notably, certain areas have been poorly covered in the documents, such as circular economy, emissions & air quality, reduction of traffic jams and travel time,

shared mobility, and land use and spatial planning. On the other hand, areas such as walking, cycling, car traffic, and parking policy are particularly well covered in the existing SUMP and related documents, such as urban development strategies.

Table 2. Thematic areas covered by the SUMP or SUMP-related document, based on self-study

| Thematic area | The diagnostic part (refers to the current state) | | | | | | Strategic part (refers to the future) | | | | | |
|---|---|------------|--------|-------|-------|-----------|---------------------------------------|------------|--------|-------|-------|-----------|
| | Gävle | Greifswald | Gdynia | Cesis | Turku | Panevezys | Gävle | Greifswald | Gdynia | Cesis | Turku | Panevezys |
| Walking | X | X | X | X | X | X | X | X | X | X | X | X |
| Cycling | X | X | X | X | X | X | X | X | X | X | X | X |
| Public transport | X | | X | | X | X | X | | X | | X | X |
| Parking policy | X | X | X | | | X | X | X | X | | X | X |
| Car traffic | | X | X | X | X | X | X | X | X | X | X | X |
| Urban deliveries and urban logistics | | X | X | | | | X | | X | | X | X |
| Traffic safety | X | | X | X | X | X | X | | X | X | X | X |
| Integration of transportation means | X | | X | | | | X | | X | | X | X |
| Shared Mobility | | X | | | | | X | X | | | X | X |
| Reduction of Traffic Jams and Travel Time | | | X | | | X | | | X | | X | X |
| Accessibility | | X | X | | | | X | X | X | | | X |
| Emissions & air quality | | | | | X | | X | | X | | X | X |
| Heavy freight traffic | X | | X | | X | | X | | X | | X | |
| Health and quality of life | X | X | | | X | | X | X | X | X | X | X |
| Integration nodes | | | X | | X | X | X | | X | X | X | X |
| Land use and spatial planning | X | | | | X | | X | | | X | X | |
| Circular economy | | | | | | | | | | X | | X |

Source: own elaboration.

Additionally, the review of previously applied methods for monitoring urban mobility in SUMP and related documents in the partner cities of the SUMP for the BSR project revealed several trends across the thematic areas addressed. Specifically, the strategic sections of the documents, those concerning future plans, tend to cover more thematic areas than the diagnostic sections, which focus on the present

and existing conditions. Another observed pattern is that larger cities tend to implement a more comprehensive and sophisticated approach to monitoring and evaluation. This trend is evident both in the number of indicators used and in the range of thematic areas covered by those indicators.

Based on the review documents, it was found that some problems associated with the current performance of urban mobility systems are common across all partner cities, such as the excessive reliance on private cars in the modal split and insufficient financial resources to develop public transport to the expected level. Some problems related to the current functioning of urban mobility systems are unique to specific partner cities and stem from distinctive conditions, such as geographic factors, steep terrain, or the presence of a large seaport in the city's central area. Since unique problems require unique solutions and actions, they may also necessitate exceptional elements within the M&E framework to monitor changes related to these specific issues. Differences in indicators and data-collection methods limit the comparability of results between individual cities and within national or European statistics. It needs to be taken into account that there are discrepancies in the quantity and level of detail of the documents in the possession of partner cities of the project.

2. Data and Information Sources for the SUMP Monitoring and Evaluation Framework

2.1. Collaboration with Key Stakeholders as a Source of Data and Information

One of the fundamental ideas that distinguishes sustainable urban mobility plans from traditional transport documents is the extensive public engagement in the document creation process and the collection of data from a wide range of urban mobility stakeholders, whose interests are often conflicting or not always aligned with sustainable development goals. Table 3 presents a review of the key stakeholders, along with examples of the types of data that could be sought from them.

Table 3. Overview of key stakeholders for the M & E, based on self-study

| Stakeholder | City dependent? | Example of potential data | City size relevance |
|-------------------------------------|-----------------|---|---|
| Public Transport (PT) authority | Yes | Frequency of PT, supply of PT, data on the number of passengers, data on the quality of public transport services (punctuality, reliability, passenger satisfaction level among different social groups), and modal split | Mainly mid-sized. Also, small and very small cities, if the public transport plays an important role in daily mobility |
| Public transport operator | Yes & No | Number of passengers, number of passenger kilometres, rolling stock quantity and structure, number and value of ticket sales, emissions from the PT sector | |
| Road authority | Yes & No | Traffic volume, traffic incidents (geolocation), pedestrian and cycling traffic data at intersections recorded using cameras | Very small and small cities can benefit the most, provided they receive appropriate technological support |
| Railway infrastructure manager | No | Number of passengers on a railway station, parking slots around a railway station, parking slots occupancy rate, cycling parking slots around a railway station, number of bikes parked in the vicinity of a particular railway station | Cities of every size. Critical importance for the very small cities as a railway station is one of the most important intermodal hubs |
| Railway operator | No | Number of passengers, number of passenger-kilometres | |
| Shared-mobility operator | No | Number of vehicle-kilometres, the share of zero-emission vehicles in the entire fleet | Mainly mid-sized cities |
| Food or shopping delivery platforms | No | Number of vehicle-kilometres, the share of zero-emission vehicles in the entire fleet, the share of services performed by bicycles, scooters, and cars | |

| Stakeholder | City dependent? | Example of potential data | City size relevance |
|---|-----------------|--|---|
| Shopping mall | No | Number of visitors, number of parking slots, occupancy of parking slots, "local modal split", accessibility by public transport | Cities of every size with a specific traffic generator |
| Science park & business park | Yes & No | Number of employees, number of parking slots, "local modal split", accessibility by public transport | |
| University | No | Number of students, number of cyclists, number of parking slots, "local" modal split, accessibility by public transport | |
| Primary schools & kindergartens | Yes | Number of kids/pupils, „gravity area“, number of cyclists and micromobility users (counted by the personnel), general evaluation of the "school modal-split", effectiveness of the promotional & education activities | Cities of every size. A very important aspect for the very small and small cities, as school is one of the most significant, regular traffic generators |
| Secondary schools | Yes & No | Number of pupils, walking accessibility, number of cyclists and micromobility users (counted by the personnel), general evaluation of the "school modal-split", effectiveness of the promotional & education activities, perception of safety (pupils and parents) | |
| Hospitals | Yes & No | Number of employees, number of visitors, number of parking slots, number of bikes and micromobility users, accessibility by public transport | Cities of every size with a specific traffic generator |
| Port & multimodal hub & logistic centre | Yes & No | Modal split for freight, traffic intensity, number of parking slots for trucks, and emissions | |

Source: own elaboration.

Apart from the key stakeholders listed in the table, there are others who can provide valuable data but are often overlooked. One of those is bus drivers who represent a valuable source of data and insight into the development of Sustainable Urban Mobility Plans (SUMPs), particularly with regard to the performance of the public transport system. Their input is especially significant due to their daily engagement with real-time traffic conditions, infrastructure, vehicle fleets, and user behaviour. Bus drivers are uniquely positioned to provide critical information on schedule adherence, delays resulting from traffic congestion, issues related to bus stop infrastructure, and specific challenges encountered while navigating various areas, including fluctuations in traffic volumes at different times of day. Their observations also allow the identification of locations and critical points within the transport system that may require optimisation for safety and operational efficiency. [Appendix 3](#) (p.6), which is also available at <https://bsr-sump.eu>, includes an example questionnaire designed to collect data from bus drivers.

Another overlooked stakeholder group is the employees of large office complexes. [Appendix 4](#) (p.8), which is also available at <https://bsr-sump.eu>, presents an example questionnaire for collecting mobility data from large office complexes. Employees of such complexes possess several key characteristics that

make their knowledge particularly valuable in understanding the urban mobility system. These characteristics include the regularity of their commutes, the frequency of their travel to and from the workplace, and their heightened awareness of the transportation conditions along their routes. Additionally, studying large office complexes enables the efficient collection of data and insights from a substantial number of individuals simultaneously, thereby enhancing the robustness of the findings.

Educational institutions are a significant component of the local labour market, particularly in smaller or less diverse economies. Nevertheless, they are also often overlooked as an important source of data for sustainable urban mobility planning. Apart from the obvious stakeholders, there are some underestimated groups within the educational sector, such as parents and guardians and other individuals using the school's infrastructure. [Appendix 5](#) (p.11) (which is also available at <https://bsr-sump.eu>) explains in detail how the education sector can be a potential source of data on urban mobility, while [Appendix 6](#) (p.16) (which is also available at <https://bsr-sump.eu>) provides an example questionnaire for school principals.

As emphasised in all studies on the development of SUMPs, one of the most important sources of data and information is the city's residents themselves. For this reason, [Appendix 7](#) (p.19) presents a sample questionnaire illustrating the types of questions that can be used to gather insights directly from city residents about their travel behaviour and transport preferences. While the questionnaire should always be tailored to the specific information needs of a given city, the sample can serve as a useful inspiration and a starting point for developing a local survey.

An important source of data consists of existing and currently valid strategic and operational documents implemented by cities. Many of them include indicators that can be used to develop or update a sustainable urban mobility plan. The Strategic Development Plan for the city of Panevėžys (Lithuania) includes important actions related to sustainable urban mobility planning. This document is a valuable resource for mobility planners, offering a comprehensive set of indicators with baseline values and targets for 2027 (Table 4).

Table 4. Urban mobility-related indicators in the Strategic Development Plan of Panevėžys (Lithuania)

| Thematic area | Indicator | Description | Units | Value in 2020 | Target value 2027 | Data source |
|----------------|---|--|-------------|---------------|-------------------|--|
| Health | Reduction in number of injuries | Number of people who died from external causes per year / average annual population | per 100,000 | 254.72 | 150 | Panevėžys City Administration – Social Affairs Division |
| Traffic safety | Traffic incidents | Number of registered road incidents in Panevėžys city | Units | 168 | 120 | Lithuanian Department of Statistics |
| Traffic safety | Fatalities | Number of fatalities in Panevėžys city | Units | 9 | 0 | Lithuanian Department of Statistics |
| Transport | Environmentally friendly public transport | Share of public transport vehicles powered by less polluting fuels (electricity and/or gas) out of all public transport vehicles | % | 25 | 35 | Panevėžys City Administration – City Infrastructure Division |

| Thematic area | Indicator | Description | Units | Value in 2020 | Target value 2027 | Data source |
|---------------|-----------------------------|---|-------|---------------|-------------------|--|
| Transport | CO ₂ -free zones | Number of CO ₂ -free zones | Units | 0 | 1 | Panevėžys City Administration – City Infrastructure Division |
| Environment | Greenery Index | Ratio of ecologically effective surface area to the total land area | % | 76.25 | 76.25 | Panevėžys City Administration – Urban Planning and Architecture Division |
| Environment | Air pollution reduction | Number of days when the daily limit value for PM ₁₀ particles (50 µg/m ³) was exceeded | Days | 8 | Not increasing | Panevėžys City Administration – City Infrastructure Division |

Source: Draft of the M & E Plan for Turku, SUMPS for BSR Project, 2025

2.2. GIS Analysis as a Data Source for the Monitoring and Evaluation System

Geographic Information Systems (GIS) have become a rapidly developing field of analytical tools. They are widely used in many areas of human activity, including the design and implementation of public policies, serving not only as a research instrument but above all as decision-support systems. In recent years, the role of GIS has evolved significantly: from tools used primarily for map editing, they have become advanced platforms capable of integrating and linking diverse datasets relating to human activity, businesses, and environmental components.

Modern urban systems generate enormous volumes of data every day, commonly referred to as Big Data. Until recently, the effective use of these resources was limited by both organisational (actor-related) and technical (object-related) barriers. On the organisational side, a key challenge was the shortage of qualified staff able to process data correctly, draw evidence-based conclusions, and apply them in practice. On the technical side, limitations stemmed from the nature of early GIS tools, which offered a narrow range of functionalities and were complex and difficult to access. Today, this situation is changing: GIS technologies are developing dynamically, and so are the competencies of specialists responsible for their use.

Implementing GIS represents an important development opportunity for small and medium-sized cities in the Baltic Sea Region, providing support in key areas of their operation. In the context of Sustainable Urban Mobility Plans (SUMPs), GIS serves as a fundamental data source for monitoring systems. For example, it enables advanced spatial accessibility analyses and the identification of areas affected by transport exclusion, which helps determine the direction of necessary interventions aimed at improving residents' quality of life. These tools enable not only a precise inventory of infrastructure and tracking of its development, but also recording incidents. By identifying locations with an elevated risk of accidents, GIS contributes directly to improving public safety. Moreover, GIS can support the optimisation of public transport. By monitoring passenger loads on individual routes, it becomes possible to efficiently reallocate fleet resources to corridors with higher demand, thereby increasing the economic and operational efficiency of public transport services.

A key feature of GIS is its ability to integrate data from dispersed sources, enabling local datasets to be combined synergistically with national databases. In Poland, an example of such integration is the Geoportal platform, which provides a range of map compositions. Users can not only view resources in preview mode but also download and process raw data, a crucial aspect of analytical work.

The implementation of GIS in small and medium-sized cities in the Baltic Sea Region also supports the development of a participatory society. The COVID-19 pandemic accelerated the digitalisation of public services, turning GIS tools into platforms for social dialogue. They have given residents the opportunity to participate remotely in decisions about the development directions of the areas in which they live. In this sense, GIS becomes an instrument that legitimises the actions of local authorities, increases the transparency of decision-making processes, and builds trust in public institutions.

The growing availability of free GIS software and the increasing volume of data resources are enabling small cities to carry out analyses independently to an ever greater extent. Until now, they have lacked easy access to more advanced spatial analyses, for example, in the context of accessibility.

2.3. Modal Split as a Core Indicator for Urban Mobility Monitoring

A review of the literature and the results of existing projects on the monitoring and evaluation of urban mobility systems demonstrated that modal split remained one of the most widely used and significant metrics. This is partly because many key objectives in Sustainable Urban Mobility Plans (SUMP) are directly related to modal distribution. Consequently, most cities, in their SUMP, aim to increase the share of active travel modes and public transport while reducing the share of private car use to meet transportation needs.

The modal split represents the percentage share of different transportation modes (e.g., walking, cycling, driving, public transport) in the total number of trips in a given area. Modal split is a helpful tool for assessing the degree to which specific sustainable travel goals have been achieved, i.e. as demonstrated by the strategic documents of the Swedish city of Gävle. Over 18 years, the plan aimed to double the share of cycling trips, although the baseline in 2012 had already significantly exceeded 10 %. The increase in the share of cycling trips corresponds to a substantial reduction in the importance of private car usage, finally resulting in CO₂ emission reductions.

From the perspective of building a monitoring and evaluation framework, numerous nuances regarding the methodology for calculating the modal split are essential.

The results of the modal split calculation depend heavily on the methodology used. Figure 5 presents results obtained from the same sample, meaning data collected from the same city residents, but analysed using a different methodology that considers the number of trips, distance, and travel time.

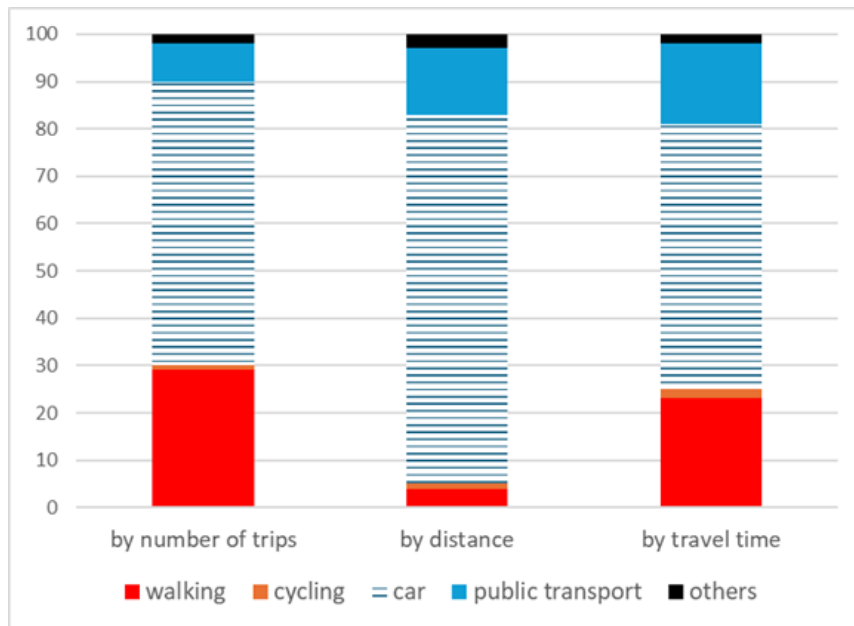


Figure 5. Results of the modal split calculation based on the same sample but a different methodological approach from the National Travel Survey of England (Department for Transport, 2024)

The modal split is also strongly dependent on travel distance. Short trips (up to 1 km) are typically made on foot, while car trips increase with longer distances. As demonstrated by the example of Greifswald, Germany, the share of walking trips can range from 56% (up to 1 km) to just 2% (over 10 km), whereas the share of car trips ranges from 6% (up to 1 km) to 90% (over 10 km) (see Figure 6). Awareness of such large variations in modal split calculations is crucial for effectively planning strategies and actions.

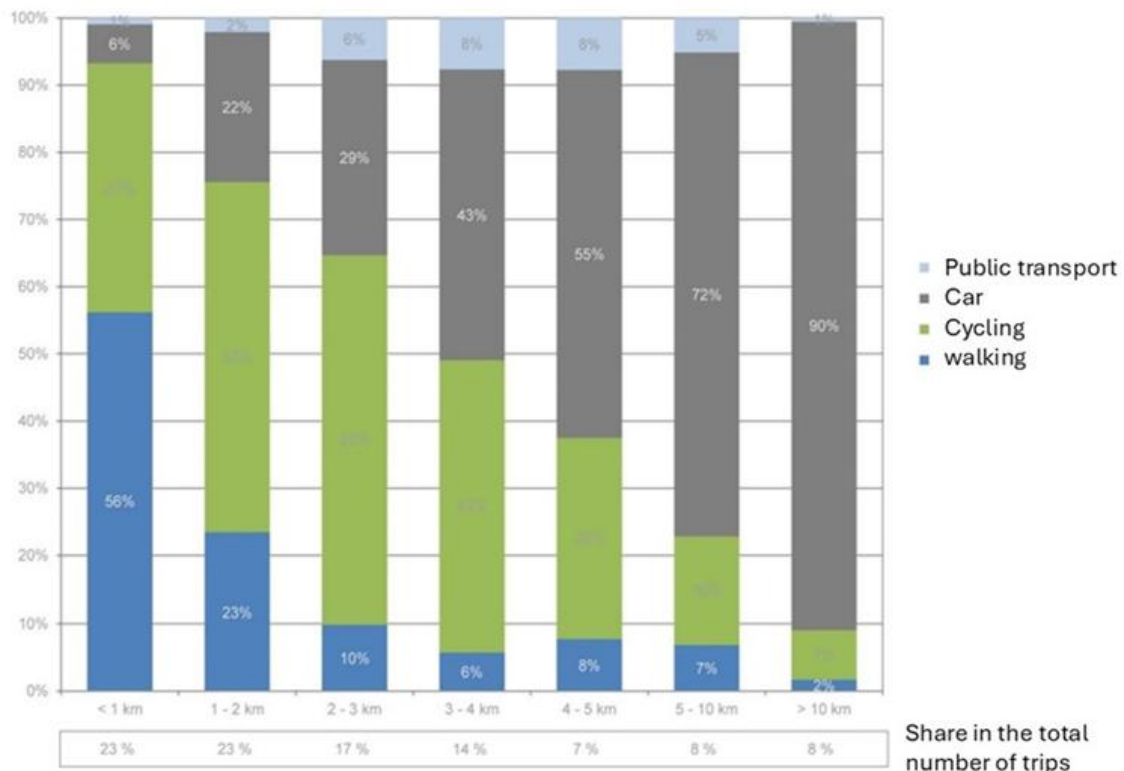


Figure 6. Variation in the share of walking trips depending on travel distance from the modal split of Greifswald, Germany (Universitäts und Hansestadt Greifswald, 2017)

Another important nuance concerning the monitoring of the modal split is that it can vary significantly across different areas of the city. For example, in Bremen, Germany (Figure 7), the share of walking trips can range between 19-35%, while the share of trips made by private cars varies between 18-49%, depending on the specific district of the city being analysed. Once again, knowledge of these variations in modal split across different parts of the city is critical for developing strategies and actions tailored to the actual mobility conditions in each area.

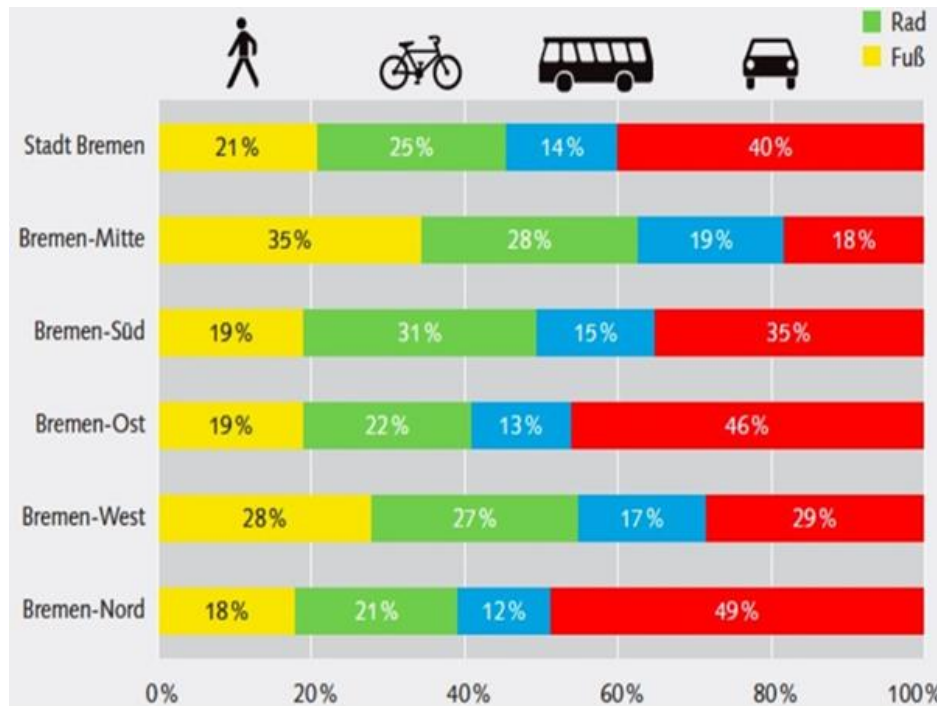


Figure 7. Modal-split calculation for the city and its districts in Bremen, Germany (Senate Department for Environment, 2016)

2.4. New Technologies for Data Collection - findings from the Local Indicator Workshops

As part of the project activities, Local Indicator Workshops were organised in each of the project’s partner cities. These workshops created a space for discussion among local stakeholders to assess the current state of monitoring and evaluation and to identify opportunities for its improvement at the local level.

For example, in the city of Gdynia (Poland), a new method of data collection using an AI camera was tested. It employs advanced artificial intelligence and machine-learning algorithms, enabling precise monitoring of mobility and traffic. The camera detects the movement of vehicles and people within a defined area, such as a road corridor, pedestrian route, intersection, or city square. It then identifies individual objects as specific road users based on predefined characteristics and counts particular groups, such as pedestrians, micromobility users, or cyclists, depending on the city’s needs. The camera can also identify potentially dangerous behaviour in road traffic, unauthorised vehicle movement in a given area (e.g. in a bus lane), and illegal manoeuvres.

In Gdynia, special emphasis was placed on counting pedestrians, cyclists, and scooter users along routes to schools, as well as on measuring the effectiveness of a cycling campaign targeted at secondary school

students. The AI camera was installed at an intersection on one of Gdynia's main roads, in the immediate vicinity of a secondary school, which constituted the most suitable data catchment area. Over a two-month period, the camera collected data that will be used to analyse traffic flows and identify mobility patterns in the area.

The pilot installation aimed to verify the effectiveness of this solution in improving the collection of pedestrian and cyclist data and to increase decision-makers' knowledge of so-called soft modes of mobility. This is intended to support better decision-making in urban infrastructure planning, taking into account all road users rather than just motorised vehicles.

Modern technologies represent an efficient way to collect data, as they enable continuous data acquisition over a defined period, eliminate human error, and address the increasingly common shortage of human resources, particularly in the context of active mobility. They are also more cost-effective. AI technologies make it possible to obtain better and more reliable data on all modes of transport, including pedestrian and bicycle traffic, as well as V2X data, allowing for more effective traffic and mobility analysis (including the analysis of historical data).

Testing modern technologies such as AI cameras, drones, and applications is part of Gdynia's broader strategy for smart traffic and mobility monitoring, as well as for using data to improve safety by predicting situations that may lead to accidents, implementing solutions that reduce risk, and enabling rapid response when incidents occur. The availability of real-time data and monitoring enabled by innovative solutions can improve safety and the quality of life for residents, particularly vulnerable road users.

From the perspective of smaller cities, installing AI cameras at a few key intersections can provide decision-makers with crucial information on traffic volume, structure, and variability, covering all mobility users, including pedestrians who are often underestimated.

When cities use digital tools, sensor-based solutions, platform data or automated observation methods, such as camera-based systems, monitoring arrangements should also address legal, ethical and privacy-related considerations. This is important not only for regulatory compliance but also for ensuring that residents and travellers feel comfortable and do not perceive monitoring as overly intrusive. It includes clarifying the legal basis for data use, ensuring proportionality and data minimisation, defining access rules, and applying aggregation or anonymisation wherever individual-level information could be inferred. Attention should also be paid to the transparency of externally sourced or algorithmically processed data, including possible classification errors, limited representativeness, or restricted access to raw data. Addressing these issues at the design stage strengthens public trust and reduces implementation risks.

2.5. Use of External Data Platforms in the Urban Mobility Planning Process

There are currently many platforms that enable the fast and relatively easy acquisition of data useful for developing a SUMP and, more broadly, for planning sustainable urban development. Such tools can support the baseline diagnosis, the selection of indicators, and the monitoring of progress—provided that the data quality, timeliness, and methodological limitations are properly assessed.

These platforms are also evolving rapidly: coverage is expanding, methodologies are being refined, and new datasets and functionalities are regularly introduced. As a result, while they are already useful today, it is reasonable to expect a further increase in both the volume and the quality of data available through them in the coming years. For this reason, cities should treat external platforms as a living component of their evidence base, reviewed periodically and integrated where they add value alongside local and operator-owned datasets.

One example is Google's Environmental Insights Explorer (EIE), which provides many cities with standardised climate and environmental statistics and data that can support efforts to reduce greenhouse gas emissions. The platform includes, among others, information on:

- building emissions (estimated emissions related to energy use in buildings),
- transport emissions (estimated emissions from mobility),
- rooftop solar photovoltaic potential,
- tree canopy and tree density.

These datasets can be a useful complement to local information sources, particularly for initial analyses and benchmarking. At the same time, they do not replace city- and operator-owned datasets (e.g., public transport operational data), and are therefore best used as part of a broader portfolio of data sources.

Another example of a platform providing valuable data for SUMP monitoring is the TomTom Traffic Index. It is a publicly available benchmarking tool covering 501 cities in 62 countries, based on floating car data (FCD). For its edition reflecting traffic conditions in 2024, TomTom analysed a representative sample covering 737 billion kilometres driven to describe congestion levels and travel conditions across cities worldwide.

It should be noted, however, that the Traffic Index primarily focuses on larger urban areas, which may limit its usefulness for very small, small and some medium-sized towns (e.g., a town may not be included, or data may be less detailed). At the same time, it can serve as a methodological inspiration, demonstrating what types of analyses are possible using GPS/FCD data (e.g., comparing travel times, congestion changes and annual trends).

Looking ahead, as mobility data sources continue to expand (connected vehicles, navigation services), standards mature and data-sharing partnerships grow, it is likely that similar types of insights will become increasingly accessible for smaller cities as well, including those in the Baltic Sea Region (BSR). Cities should therefore monitor the development of such tools and assess how they can complement local and operator-owned datasets.

Platforms such as OpenAQ aggregate air quality data from multiple sources (e.g., official monitoring networks, operators and selected local initiatives), making it easier to access, standardise and compare data across cities. As a result, they can support the environmental baseline for a SUMP and the monitoring of trends over time, especially where data are published continuously and in harmonised formats.

For small and very small towns, a key limitation is often the lack of monitoring stations or sensors within the town itself, which makes it difficult to assess local exposure of residents. In the short term, this may

require using data from nearby stations or modelled datasets, while clearly acknowledging the limitations for interpretation.

At the same time, it is reasonable to expect that more municipalities will become interested in installing their own sensors, and that places already collecting measurements will seek to increase network density and improve siting in sensitive locations (e.g., near schools, kindergartens, playgrounds and key walking routes). As monitoring networks expand and data-sharing practices mature, similar platforms are likely to be increasingly fed with data from small and very small towns as well, improving coverage over the coming years. To ensure practical value, however, cities should also establish data quality assurance procedures (calibration, validation, metadata), so that measurements remain comparable over time and across locations.

2.6. Findings from pilots – practical recommendations on monitoring of active mobility at a local scale in the Baltic Sea Region

As part of the project, partner cities implemented pilots to test various tools and methods for monitoring active mobility. Table 5 provides a summary highlighting key stakeholders, the data collected, the indicators developed, and the lessons learned, all highly relevant to other cities seeking to implement comprehensive active mobility monitoring. The most important overall conclusions from the pilots include:

- Effective internal communication frameworks within the municipal administration should be established, as they form the foundation for developing collaboration with external stakeholders. Internal cooperation is especially crucial when implementing solutions based on modern technologies.
- the emergence of new data collection methods and new datasets often requires the involvement of external experts, which should be taken into account at the planning stage;
- procurement procedures may take longer when purchasing new equipment or services;
- modern methods provide a valuable complement to existing methodologies for collecting quantitative data on active mobility. However, traditional and low-cost methods should not be overlooked, such as school mobility surveys using questionnaires, focus groups and workshops, and interviews with key stakeholders.

Table 5. Comparison of pilots on data collection on active mobility implemented within the SUMPS for BSR project

| City | The pilot description | Crucial stakeholders | Challenge | Indicators |
|----------------|--|--|---|--|
| Cēsis (Latvia) | Using video cameras and machine learning to collect data on cycling habits and infrastructure use in Cēsis and the neighbouring villages | Local residents, urban planners, municipal decision-makers, and village managers | To set concrete goals for increasing cycling or reducing car usage, and to evaluate the impact of planned infrastructure improvements | Number of cyclists, pedestrians, cars, motorbikes, buses, and heavy vehicles in key points in the city |

| City | The pilot description | Crucial stakeholders | Challenge | Indicators |
|-----------------------|--|--|--|--|
| Gävle (Sweden) | Collecting mobility data via a mobile app while encouraging employees to shift short trips to active modes like cycling and walking, thereby supporting data-driven decisions and climate-neutrality goals by 2030 | Employees at companies that have signed Gävle's climate contract, urban planners, traffic engineers, and policymakers | The city lacks reliable, detailed data on short active trips, because existing cycling sensors are limited, unreliable and cover only one location. The city needs precise active mobility data to reduce car use and reach climate neutrality by 2030 | Indicators focused on active mobility and aligning with the pilot's scale and data needs |
| Gdynia (Poland) | Collecting data on the transport behaviour of high school pupils through e.g. surveys, manual counting, and camera observations, i.e. (ITS) to support the SUMP updating process | Upper secondary school students, institutional stakeholders - the city departments, university and YUNEX (the owner of the AI camera leased for test) | A lack of reliable data and automated tools to understand and monitor the mobility of upper secondary school students, as well as general mobility around schools. | Mode choice, cycling and walking frequency, reasons for choosing particular modes, and perceived barriers (based on the mobility survey). Continuous counts of pedestrians and cyclists in 15-minute intervals, directions of movement, object classification (pedestrian, bicycle, scooter, car, etc.), dwell time and gate-crossing events (camera and 4 APR stations) |
| Greifswald | Traffic counting with sensors, observation and surveys to improve conditions for active mobility at a crucial intersection | City authority departments, cyclists, and pedestrians | Contributing to the city's objectives for sustainable mobility | Utilisation of the bicycle parking facility. Modal split at the intersections |
| Panevėžys (Lithuania) | Using open data sources, surveys in the school communities and real-life laboratory and instrumental research | Municipal stakeholders (city officials and urban planners), school communities (students, teachers, and parents), cycling and sustainable transport advocates (local cycling groups and environmental organisations) | The city lacks systematic mobility data (modal split and cycling infrastructure use intensity) and external data partnerships, which limit effective monitoring and evidence-based transport policy decisions | Amount of new infrastructure, Bicycle and scooter racks occupancy rate, modal share of trips, pedestrian, cyclist, scooter flow (pers./h.), car flow (vehicle/h.), local community perception on the implemented pilot, noise level (dBA) |

| City | The pilot description | Crucial stakeholders | Challenge | Indicators |
|-----------------|--|---|--|--|
| Turku (Finland) | Creating a citizen panel and developing a measurement focusing on active mobility (walking, cycling, e-kickscooters) | Residents, cyclists, pedestrians, decision makers, and mobility operators | Existing gaps in active mobility monitoring and public engagement, as well as sensor reliability in harsh weather and sustaining participant involvement | A different set of indicators to be collected on active mobility |

Source: Self-study based on tested approaches for the collection of data on active modes and lessons learned. Experiences from the implementation and evaluation phase of local pilots. SUMPs for BSR project, Institute of Baltic Studies, February 2026

3. Framework for Monitoring and Evaluation for SUMP

3.1. The Scope of the Monitoring and Evaluation Framework

The local monitoring and evaluation framework should address all key areas of the urban mobility system's functioning. It should therefore enable the assessment of the current situation in the following areas:

- The level of utilisation of different travel methods and their associated consequences (e.g., congestion);
- The level of development of subsystems, particularly the infrastructure supporting various modes of transportation;
- The impact of the urban mobility system on residents' health (including traffic accidents);
- The impact of the urban mobility system on the state of the natural environment;
- The current prioritisation of specific travel modes within the transport system.

These areas apply to all elements of the urban mobility system, namely:

- Pedestrian travel;
- Bicycle and micromobility travel;
- Public transport;
- Private cars;
- Shared mobility;
- Urban logistics;
- Heavy freight transport.

With regard to these areas, the M&E framework should enable the determination of the current conditions under which the urban mobility operates, i.e., the conditions experienced by residents prior to the implementation of the SUMP.

The M&E framework developed as part of the SUMP should help establish a set of clear and achievable goals across different time frames (ranging from short-term, one-year goals to long-term, e.g., 10-year goals). The articulation of these goals should be precise and linked to the formulation of indicators, allowing for the continuous assessment of the extent and direction of changes in each area. Therefore, the M&E framework serves both to define the current situation of a given urban mobility system and to monitor the changes occurring within it in the future.

Specific actions should be assigned to each goal, with their implementation enabling the achievement of the respective objective. Each goal should be clearly and precisely assigned to specific entities responsible for implementing and coordinating the actions taken to achieve the goals, as well as for monitoring and evaluating the changes that occur. Depending on the time horizon of the given goal, the time interval for measuring the magnitude of changes in the corresponding indicators should be specified. Thus, it is necessary to identify which indicator values within the M&E framework will be measured at quarterly, annual, or longer intervals (e.g., every three years).

Figure 8 presents a schematic representation of the key areas that should be covered by the M&E framework. It highlights that a comprehensive understanding of the functioning of the urban mobility system, including transport preferences and behaviours, requires data and information not only related to urban mobility itself but also concerning urban space and land use. This is due to the fact that urban space and its management directly affect the availability of transport infrastructure, residents' choices of transportation modes, and travel patterns. Changes in the urban layout, such as population density and the location of residential, commercial, and service areas, can either increase or decrease the demand for transport as well as influence the efficiency of different modes of travel.

This implies that alterations in urban space, just as in the transport subsystems themselves, can lead to both desired changes in the modal split of urban travel as well as unintended, undesirable ones. Given that the transport system of a city and the way urban space is managed can either support or hinder the progress toward more sustainable urban mobility, the M&E framework must assess, diagnose, and measure the scale of both conflict areas and areas of cooperation between these two domains. Addressing both the city's transport system and urban space should also enable the identification and description of best, good, and poor practices.

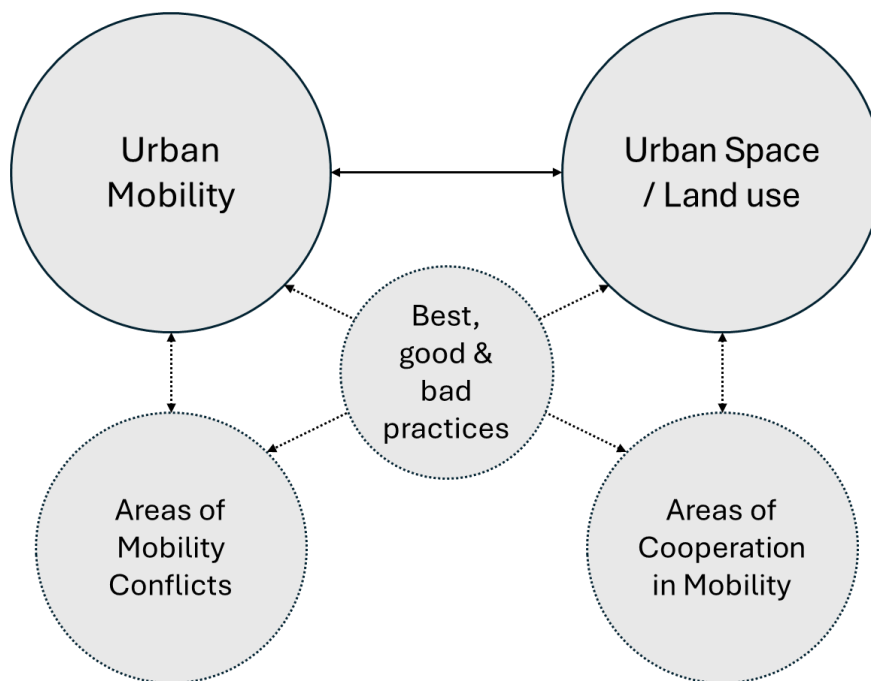


Figure 8. Main areas of Monitoring and Evaluation, based on self-study

3.2. Elements of the Local Monitoring and Evaluation Plan

The monitoring and evaluation framework possesses a dual nature. On the one hand, the indicators used within this framework should directly relate to the goals and actions aimed at achieving them. This approach prevents conducting "measurements for the sake of measurements". On the other hand, the monitoring and evaluation framework should enable a comprehensive diagnosis of the conditions and state of urban mobility in a given city. This means that the implemented indicator system should allow for the identification of problematic areas, both geographical and thematic, even before actions are taken to improve them.

In summary, the set of indicators used in the monitoring and evaluation framework, along with the data collected, should enable both the monitoring of the urban mobility system itself and the assessment of the effectiveness and efficiency of the actions taken. Therefore, this framework should have both a passive character, focused on continuous monitoring of all key areas of urban mobility, and a reactive character, aimed at conducting precise measurements to assess actions implemented in the management of the urban mobility system and urban space.

This relationship is well illustrated in the process of developing a M&E framework presented below in Table 6. It shows that data and the indicators derived from them are essential both in the initial stages of formulating goals and actions, as well as in the later stages of monitoring the effectiveness and efficiency of these strategies and actions. In light of the above, when referring to monitoring and evaluation, it seems appropriate to use the term "cycle" rather than "process," as the former indicates that, when data becomes outdated, collection should commence anew.

The steps of developing a monitoring and evaluation framework for managing sustainable urban mobility are inextricably linked with the process of managing sustainable urban mobility itself. The stages related to monitoring and evaluation can be presented and integrated into the sustainable urban mobility management process, as described in more detail in Table 6. The key conclusions derived from the table can be summarised as follows:

- The planning process within the work on SUMP should begin with an in-depth analysis of existing plans that are contained in current strategic documents.
- Primary data should be collected only in cases where adequate secondary data sources are unavailable.
- Particular attention should be given to areas identified as "data gaps" within the database—those aspects of mobility that have not yet been monitored or analysed.
- In evaluating key areas of urban mobility, it is recommended to review the completeness and sufficiency of data both at the stage of diagnosing the current state and after setting future plans, actions, and objectives.
- The monitoring system should provide sufficient information to enable adjustments in plans, actions, and goals related to the urban mobility strategy.
- If issues in the monitoring system are detected, such as the inability to calculate specific KPIs, the underlying causes should be identified promptly, and appropriate corrective measures should be taken. This may involve adjusting data collection methods, supplementing missing data sources, or modifying the KPIs to better align with available data.

The elements of an M&E framework presented below describe in detail the most critical areas of organising work on monitoring and evaluation. In practice, the process can be divided into stages in different ways, depending on the perspective adopted, the level of detail needed, and whether the goal is a high-level overview or a step-by-step implementation guide. It is also important to note that M&E is not a separate workstream that can be developed alongside the SUMP and "plugged in" later. It is an integral part of the entire urban mobility planning cycle.

The content presented in Table 6 laid the foundation for the development of one of the two important M & E tools, respectively, the [Monitoring & Evaluation Plan Template](#) (also available at <https://bsr-sump.eu>).

Table 6. Elements of an M&E Framework and Their Links to Other SUMP Development Activities, based on self-study

| Element | What to do (and why) | Quick checklist questions |
|---|---|---|
| Review existing strategies and plans | Collect the city's key strategies and mobility/transportation documents, and check what they already monitor. Use this to align the future M&E framework with existing priorities and reporting requirements. | <ul style="list-style-type: none"> • What topics are already monitored in the current mobility plan (or similar document)? • Does the city development strategy (or similar document) define monitoring indicators? • Does the public transport development strategy (or similar document) define monitoring indicators? |
| Audit available secondary data (existing data and reports) | Do an internal data audit: list available datasets, who owns them, how often they are updated, and how usable they are for monitoring (quality, coverage, accessibility). | <ul style="list-style-type: none"> • What data can you obtain from the municipal public transport operator? • Do you have recent studies on residents' travel behaviour (e.g., surveys, counts)? • Are there past research/marketing reports? What do they cover? |
| Identify secondary data gaps | Compare what you need to monitor sustainable mobility with what your existing data can actually cover. Mark the areas where you have a 'data deficit'. | <ul style="list-style-type: none"> • Which important areas are not covered by the current M&E setup? • Which city-specific indicators are missing, and why haven't they been used so far? |
| Decide what primary data you must collect | Prioritise the new (primary) data you need to fill the biggest gaps. Consider urgency, feasibility, cost, time, and expected reliability. | <ul style="list-style-type: none"> • Which data are essential for monitoring and evaluation? • What will it cost (money and time) to collect them? • Will the data be reliable and comparable over time? |
| Choose a methodology for primary data collection | Define how you will collect the primary data so results are credible, repeatable, and fit the local context (methods, sampling, frequency, responsibilities). | <ul style="list-style-type: none"> • How exactly will the data be collected (surveys, counts, sensors, apps, etc.)? • Is there a standardised method (e.g., for modal split) so results are comparable? • Is the method widely recognised or validated? |
| Set strategic and operational goals (based on data) | Use the diagnosed data to define goals that are measurable, realistic, and clearly linked to the overall vision. Ensure goals can be tracked with clear indicators. | <ul style="list-style-type: none"> • Are the goals measurable (SMART enough for decision-making)? • Are the indicators simple and clear for decision-makers? |
| Define actions/measures to achieve the goals | Select actions that are evidence-based and feasible, and that clearly contribute to the goals. Identify measures that require dedicated indicators. | <ul style="list-style-type: none"> • Are the planned actions consistent with the goals they support? • Do any actions require a specific indicator to track delivery or impact? |

| Element | What to do (and why) | Quick checklist questions |
|---|--|---|
| Select a manageable set of draft indicators | Draft indicators that directly reflect your goals and actions, and that can be monitored over the coming years. Keep the set lean and consistent. | <ul style="list-style-type: none"> • Is the number of indicators manageable (not too many)? • Are indicators defined in a clear, unambiguous way? • Are indicators consistent in scope and level of detail? |
| Review monitoring data for tracking change | Check whether existing datasets can track progress against your indicators. Decide if new baseline or follow-up data must be collected. | <ul style="list-style-type: none"> • Which datasets are expensive or slow to obtain? • Do you need any new data to monitor goals and measures properly? |
| Identify new gaps in monitoring data | After selecting goals, actions and indicators, reassess data availability, new analytical needs may reveal new gaps. | <ul style="list-style-type: none"> • Have any new data gaps been identified? • Have you identified gaps that prevent you from monitoring any indicator? |
| Design the full monitoring framework (final indicators set) | Build the final M&E framework to support both continued diagnosis and implementation tracking. Confirm baseline values, targets, and coverage across key mobility areas. | <ul style="list-style-type: none"> • Are baseline (reference) values correct and well-documented? • Are target values realistic and achievable? • Is the final number of indicators still manageable? • Do indicators cover all key areas of urban mobility planning? |
| Implement the monitoring process (roles, targets, timetable) | Turn the framework into an operating process: assign ownership, set reporting intervals, define update routines, and embed targets into a timeline to make responsibilities clear. | <ul style="list-style-type: none"> • Is each indicator (or indicator group) assigned to a responsible organisational unit? • Are targets achievable and time-bound? • Is there a clear schedule for updating and reporting indicator values? |
| Evaluate performance and explain deviations | Regularly compare actual indicator values with planned targets. Analyse deviations and identify whether causes are within the authority's control or external. | <ul style="list-style-type: none"> • Are indicator values deviating from plan? • If yes, what are the causes? • Are the causes external (economic/legal/technological/social) or within local control? |
| Update strategies and action plans when conditions change | If major, unexpected changes make the original plan unrealistic, revise strategies and measures so that documents reflect current conditions and evidence from evaluation. | <ul style="list-style-type: none"> • Do monitoring and evaluation results indicate the mobility plan (or related documents) should be updated? |
| Continuously improve the M&E framework | Periodically refine the framework to keep it useful for decision-making. Incorporate new projects, evidence, tools and best practices as they emerge. | <ul style="list-style-type: none"> • Are there new projects generating useful knowledge on mobility M&E? • Have new best practices emerged that you could adopt? • Are you actively building internal capacity and knowledge on mobility M&E? |

Source: self-study

To implement the monitoring and evaluation framework, a review of data availability and quality should be conducted. Data used in urban mobility management should be of the highest possible quality. High-quality data is characterised by multiple features simultaneously, such as:

- Accuracy: Data should represent the actual state of affairs without errors or distortions.
- Completeness: Missing data can distort the information derived from them.
- Timeliness: Data should reflect the most current state of the urban mobility system.

- Consistency: Consistent data ensures comparability, even when sourced from different origins.
- Reliability: Data should come from trusted and verified sources.
- Correctness: Data should meet specified standards and quality requirements, resulting from the correct methodologies of their acquisition.
- Availability: Data should be accessible when needed.
- Relevance: Data should correspond as closely as possible to the needs of their users.

In the context of urban mobility management, there is often a discrepancy between the data available and the data needed and expected for effective, efficient management. The data that can be used in the monitoring system of urban mobility management can thus be categorised into one of three groups:

- Data that is already available.
- Data that is not currently available but can be easily obtained.
- Data that is not currently available, the acquisition of which would be irrational due to cost, labour intensity, legal, technological, or other issues.

Depending on the area for which a SUMP is being developed, a different data scope is required. Their accuracy varies depending on the level of intervention expected. Very rarely will a situation occur in which all the necessary data are available in an appropriate format and scope. A lack of data should not hinder the urban mobility planning process; however, within this process, it is possible to start collecting data that were previously outside the spatial and transport planners' area of interest. Figure 9 presents a typical data-related dilemma, i.e. accuracy versus availability.

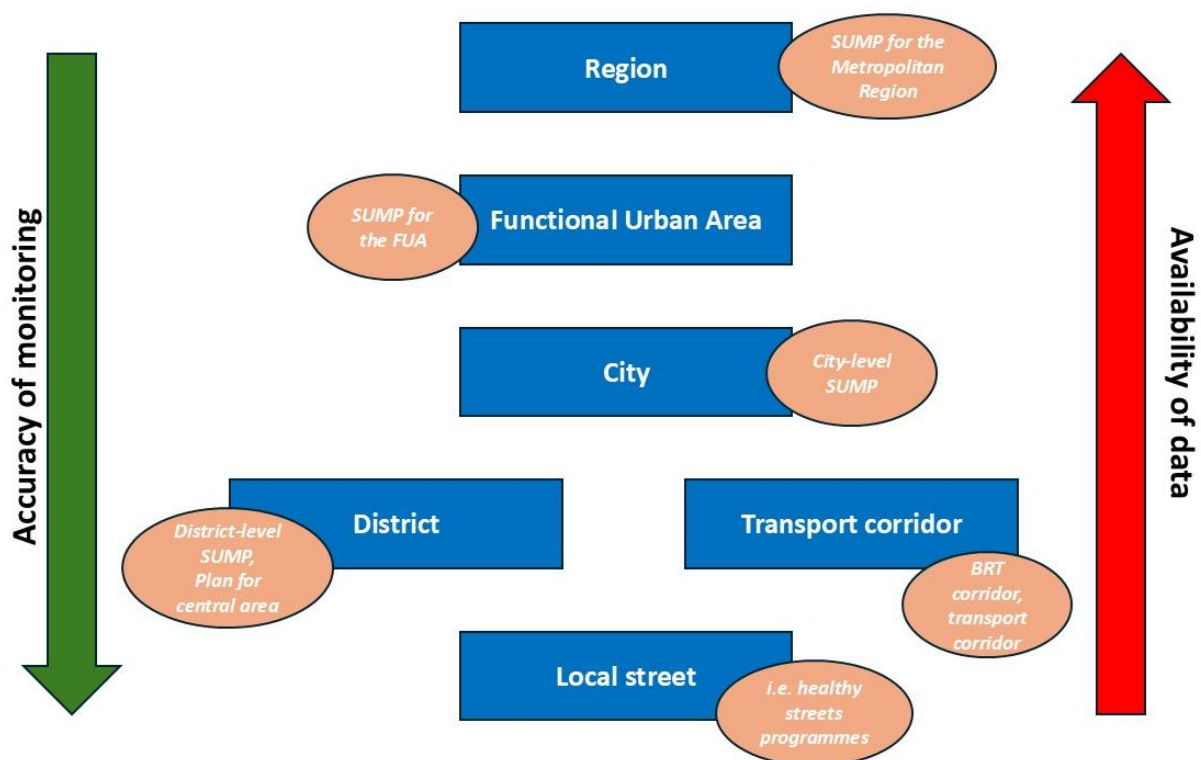


Figure 9. Data accuracy and data availability dilemma in the process of sustainable urban mobility planning

Source: self-study

It is rational to collect data not only in connection with creating a new strategic document, such as a sustainable urban mobility plan, but primarily through continuous and systematic data collection. This approach enables the continuous identification of areas where significant gaps exist in the data and allows for actions to be taken to eliminate these gaps. Continuous and systematic data collection also aims to facilitate cooperation with external entities by allowing the development of cooperation frameworks. Moreover, a systematic approach should lead to the standardisation of data collection and processing procedures, which in turn facilitates the integration of data from different entities, crucial for effective resource management and accurate analysis, leading to correct conclusions.

Adopting an approach that prioritises checking and utilising all secondary data sources first is also considered rational. Secondary data includes information that has been collected, processed, and analysed by other entities or for other research purposes, which can be reused in the planning and management of urban mobility. Secondary data sources, particularly important in the monitoring and evaluation process, include:

- Public statistics collected by statistical offices, concerning demographics, economy, etc.
- Reports and scientific research.
- Administrative registers, such as population records, vehicle registrations, or road infrastructure data.
- Data from Intelligent Transport Systems, originating from traffic management systems, monitoring systems, or sensors measuring road or bicycle traffic intensity.
- Data from transport operators, public transport authority, or carriers, concerning vehicle occupancy rates, timetables, serviced routes, and stops.
- Geospatial data, mainly GIS, provided by public or private institutions, concerning transport infrastructure or spatial development.
- Results of previous studies, such as public opinions on transport topics or residents' transport preferences and mobility behaviours.
- Data from the enterprise sector, particularly from logistics companies, car-sharing platforms, and bike-sharing services.

After conducting a detailed review of available secondary data, it is necessary to identify areas where these data are insufficient and where key information required for effective and efficient urban mobility management is lacking. Subsequently, the possibility of obtaining primary data should be considered, for example, through surveys, traffic measurements, studies of mobility behaviours, or the use of modern technologies such as mobile applications and IoT sensors. It should be emphasised that some primary research not only requires significant financial resources but also time to conduct methodologically correct studies. Therefore, it is essential to ensure that the time needed to obtain primary data does not exceed the time allocated for planning actions or their evaluation.

Particular attention should also be paid to data quality and to the transparent communication of limitations related to the data collection process. Wherever feasible, the data used for monitoring should be accompanied by a short description specifying what they represent, the unit of measurement, source, spatial coverage, data collection procedure, and any key methodological limitations identified by the data

provider. This is particularly important when data are obtained from multiple providers or sources that may apply different methodologies, or when collection methods change between reporting periods. Transparent documentation strengthens the internal consistency of both the underlying data and the indicators derived from them, supports knowledge transfer within city administrations, and reduces the risk of misinterpreting apparent changes that may result from revised collection methods, the inclusion of new data sources, or the expansion of analysis to additional parts of the city, rather than from actual changes in residents' urban mobility patterns.

3.3. General Recommendations and Risks to be Avoided

3.3.1. Risks to be Avoided in Developing a Monitoring and Evaluation Framework for Sustainable Urban Mobility Planning

There are many risks and errors that can occur at different stages of urban mobility planning in the context of data. These include:

- Overloading the monitoring and evaluation framework with excessive indicators can lead to complexity and inefficiency in the evaluation process, potentially hindering the accurate assessment of sustainable urban mobility planning.
- Too complicated indicators — Complex indicators may be difficult to measure and interpret, leading to confusion or misrepresentation of progress.
- Lack of alignment between indicators and the document's objectives — It's crucial that indicators in the monitoring and evaluation framework are aligned with the document's objectives, ensuring they accurately reflect the goals set out in the strategic plan for sustainable urban mobility planning.
- Indicators not referencing the baseline—to track meaningful progress, indicators must be related to the baseline (initial conditions).
- The target values for indicators are too ambitious. Setting unattainable targets can hinder realistic assessment.
- Monitoring irrelevant issues — Focusing on issues not central to the objectives can divert resources and attention from critical areas.
- Lack of indicator prioritisation—To ensure focus on the most important metrics, Indicators should be categorised (strategic, core, auxiliary).
- No reference to existing strategic documents / Not using indicators from existing strategic documents — The monitoring and evaluation framework should incorporate or align with indicators already established in existing policy or strategy documents.
- Using inconsistent methodologies when assessing goal achievement — For example, applying different definitions of walking trips in the modal split can distort evaluation results over time.
- Lack of clear identification of units responsible for monitoring specific indicators.
- Lack of precise indication of the time intervals for conducting subsequent measurements.
- Lack of ongoing and progressive collaboration with external institutions, authorities, and companies regarding data sharing

- Lack of a common glossary and consistent definitions — Different teams may interpret key terms differently (e.g., “trip”, “active mobility”, “accessibility”), undermining comparability over time and across areas.
- No data validation and quality assurance procedures — Without systematic checks (outlier detection, audits, versioning), indicator values may be unreliable.
- Underestimating resources and costs for monitoring and evaluation — Insufficient budget, staff time, IT/GIS tools, or survey capacity can make the framework unimplementable in practice
- Focus on outputs rather than outcomes and impacts — Tracking deliverables (e.g., km of cycle lanes) without usage, safety, accessibility, emission, or service-quality indicators can distort evaluation.
- Lack of qualitative evidence and user feedback — Purely quantitative monitoring can miss barriers such as perceived safety, comfort, convenience, and acceptability.
- Misinterpretation of results (correlation vs causation) — Changes may be wrongly attributed to mobility measures without accounting for external drivers (fuel prices, economic cycles, demographic change, construction works).
- Low transparency and weak communication of results to residents — Absence of clear reporting, public-facing dashboards, plain-language summaries, and method notes reduces trust, accountability, and meaningful engagement of residents and other stakeholders.
- Legal, privacy and data protection risks (e.g., GDPR) — Use of mobility data (ticketing, apps, CCTV, mobile data) without an appropriate legal basis, anonymisation, and security can block data access and create liabilities.

3.3.2. General Recommendations

- Define the scope of monitoring and evaluation based on the document’s content, particularly the strategic and operational goals and planned actions. It also varies depending on the Plan’s territorial coverage. The monitoring and evaluation scope will differ for a functional urban area (FUA), a city, or even a district or smaller area of a city, such as its centre.
- The monitoring and evaluation framework should be adaptable, whether it applies to a functional urban area (FUA), a city, or a specific district. For larger regions like FUAs, broader indicators should be used, whereas for smaller areas, local issues should be prioritised.
- In many cases, the key to successful sustainable urban mobility planning lies in a comprehensive review of all strategic and operational documents. This review should focus on identifying the goals, priority actions, and monitoring indicators outlined in these documents.
- An important yet often overlooked aspect of sustainable urban mobility planning is the clear assignment of responsibility for monitoring and evaluation. This responsibility should be assigned to a specific unit within the administrative structure. Additionally, the evaluation frequency should be determined, taking into account the unique challenges faced by smaller cities.
- It is worthwhile to prioritise monitoring indicators. Strategic indicators should generally include issues such as:
 - Modal split (allowing for long-term analysis of modal shift and covering the main modes of transportation within the analysed area); However, consistency should be maintained

with regard to the previously adopted method of calculating the modal split (i.e. if the modal split was calculated based on the number of trips, this approach should continue to be used). The methodology for calculating the modal split should also be taken into account when analysing different cities.

- Road traffic safety (the possibility of identifying smaller thematic sub-areas, such as road safety on the way to school);
- Emissions from the transport sector (significant for cities that have undertaken or plan to undertake measurable climate goals to reduce emissions);
- Accessibility (i.e. using GIS software, it is possible to measure accessibility for active mobility).

They should establish a baseline for the monitoring and evaluation framework for sustainable urban mobility planning.

- The engagement of various stakeholders should extend beyond the development of the objectives. Some stakeholders may be helpful, or even essential, in creating the monitoring and evaluation framework and providing data. Examples of stakeholders most often connected to city administration include schools.
- If a city belongs to the category of “urban nodes,” it will also be necessary to take into account the indicators required by the European Commission. Measures should be taken in advance to obtain the appropriate data for the entire functional area.

Monitoring and evaluation is often viewed through the lens of monitoring indicators, but the scope of activities in this area is much broader. It does not only refer to the Sustainable Mobility Plan itself but also to the whole planning process. This means it is necessary to monitor and evaluate the process of creating and/or updating the document, with a particular focus on stakeholder involvement. This is an often-underappreciated aspect of monitoring and evaluation in sustainable urban mobility planning.

3.4. Recommendations for Very Small, Small And Medium-Sized Cities on Designing and Developing a Monitoring and Evaluation System

A Monitoring and Evaluation (M&E) system should, to the greatest extent possible, respond to the information needs associated with managing urban mobility—i.e., it should provide insights that are relevant to decision-making, feasible to obtain reliably, and proportionate in terms of costs and workload. In practice, this requires tailoring the scope and complexity of the system to the expectations, organisational capacity and needs of each city.

Although an M&E system should be designed “to fit” local conditions, it is still possible to identify core principles and recommendations for very small, small and medium-sized cities. This reflects the fact that, despite differences in local context (e.g., access to rail services or whether through-traffic runs through the city centre or via a bypass), cities within the same category often face challenges of a similar scale and have comparable financial and staffing resources.

Very small cities (around 30,000 inhabitants) are recommended to:

- Start with priorities and critical locations, rather than monitoring the entire city. Where resources are limited, monitoring should begin with the main points and corridors that generate traffic (e.g., the main street, the area around a school, the market square/city centre, and city entry points). In cities with a simple road network, monitoring one or two key corridors can provide a useful picture of transport conditions across the city (e.g., traffic volumes and their composition, basic levels of walking and cycling).
- Engage local stakeholders in simple observations, using consistent data-collection instructions. It is advisable to formally involve schools, public institutions and larger employers in basic measurements. For example, a school may periodically observe the number of bicycles and scooters parked at a fixed time and estimate the share of children dropped off by car compared with those walking or cycling. At a low cost, this can provide reliable information on the scale of school drop-offs and the potential for interventions to improve safe routes to school.
- Focus initially on organisationally feasible solutions to avoid excessive system complexity. A phased implementation of M&E is recommended: at the outset, the system should deliver basic, regularly updated information. The scope of measurements and analyses should be expanded gradually as capacities increase and processes stabilise.
- Define a short set of “core” indicators and the rules for measuring them. Where competencies and experience are limited, it is recommended to define 5–10 basic indicators to be measured consistently, and to expand this set over time as capabilities grow.
- In a situation of limited human, organisational, and financial resources, build a small but effective team with clearly defined, measurable, and achievable tasks related to the M&E. In particular, the potential of modern technologies for data collection (e.g., AI-supported cameras) requires careful resource planning to fully exploit the data that can be obtained.
- Seek opportunities to participate in international projects that provide opportunities for competence development, knowledge acquisition, testing of new solutions, and hands-on experience with the practices of other cities participating in the project.

Small cities (around 80,000 inhabitants) are recommended to:

- Expand monitoring from individual critical points to a coherent “observation network” with several fixed locations. It is advisable to select fixed measurement points (e.g., for pedestrian and cycling flows) that represent key city functions: the centre, schools, residential areas, service/commercial zones and city entry points. This enables trend monitoring over time and comparisons between areas, rather than relying on single-point observations.
- Introduce simple data-collection automation tools where justified. Examples include bicycle counters in 2–3 locations, basic traffic volume sensors at city entry points, or standardised observation forms submitted by schools. The purpose of automation should be to reduce workload and increase the regularity of measurements.
- Prepare a list of external key stakeholders who may hold relevant data or help in obtaining it. Plan the necessary resources needed to establish regular cooperation with them. Prioritising stakeholders is essential to avoid spreading limited resources too thin.
- Strengthen capacity structures and staff resilience of the system. Dependence on a single person should be avoided. Roles (data collection, verification, analysis, reporting) should be assigned to at

least 2–3 people or organisational units to ensure system continuity is not disrupted by staff turnover.

Medium-sized cities (around 200,000 inhabitants) are recommended to:

- Develop cooperation with data providers and acquire data selectively where it adds decision value. Given larger budgets and a more complex mobility system, cooperation is more often feasible with, for example, mobile network operators, traffic data providers (e.g., floating-car data), shared mobility operators and technology companies. However, data acquisition should be driven by clearly defined needs, rather than by technology availability alone.
- Ensure coordination and clear division of roles across municipal departments. It is advisable to combine competencies across organisational units to support efficient data acquisition, processing, analysis and reporting. In practice, this includes agreeing standards, timelines and responsibilities for specific indicators and reporting products.
- Conduct a review of data already available within the municipality before building or expanding M&E. The city should identify data and information already collected across different units that are currently fragmented, inconsistent or not used effectively. Such an audit can generate rapid informational value without incurring additional costs for new data sources.
- Base M&E development more on information needs, and less on organisational constraints. The greater scale and complexity of transport challenges in medium-sized cities (more trips, more corridors, greater diversity of users and mobility options) mean that decisions taken without robust data can lead to high social and financial costs (e.g., misdirected investments, increased congestion, reduced safety). Therefore, it is recommended that the starting point be the city's key policy objectives, followed by the selection of indicators and data sources that are proportionate and fit for purpose.

3.5. Proposed Indicators Available in the “Indicator Selector Tool”

The Indicator Selector Tool supports selecting indicators for monitoring sustainable urban mobility. The set of indicators (KPIs) was developed in cooperation with partner cities of the SUMPS for BSR project and external experts (including the Crossborder Advisory Group), building on existing practices. In addition to the KPIs, the table includes objectives associated with each indicator. This facilitates the selection of KPIs aligned with the intended directions and areas of change in mobility systems encompassed within a given SUMP. Furthermore, examples of proposed target values linked to specific KPIs are provided, aiming to simplify the integration of SUMP objectives with the monitoring and evaluation framework. As emphasised multiple times in this document, this integration is crucial to the success and effectiveness of the KPIs being applied.

The Indicator Selector Tool also provides recommendations regarding the relevance of particular indicators for very small (around 30,000 residents), small (around 80,000 residents), and medium-sized cities (around 200,000 residents). However, it should be noted that these are merely suggestions. This implies that each case, namely, each urban mobility system in a given city, requires individual analysis to tailor the set of KPIs to its actual needs and expectations. The indicators presented in the table have been

evaluated based on the following scale to determine their relevance for very small, small, and medium-sized cities:

- Critical indicators are essential for management and accountability and are often linked to requirements or standards (e.g., road safety outcomes, basic accessibility measures, key emissions). In most cases, they should be prioritised for monitoring, with clear ownership, a defined reporting frequency, and agreed alert thresholds.
- High-importance indicators are priority metrics recommended for regular monitoring in most cities. They typically form part of the “core dashboard”, while still being reviewed for local relevance and data feasibility.
- Moderate-importance indicators are useful for monitoring, but not essential for every city. They are worth including when they match local priorities and data availability and can be added to an extended KPI set once the core KPI set is in place.
- Complementary indicators are optional supporting metrics that deepen analysis, especially in areas that are particularly challenging in a given city and provide additional context and comparability.

The proposed set of indicators includes measures that differ significantly in the effort, time and cost required for calculation. To support practical design and resourcing of a SUMP monitoring system, indicators can be grouped into three categories according to data availability and collection complexity:

- Easy – data are usually available from existing administrative sources or operator statistics (e.g., police road safety records, public transport ridership data).
- Medium – data can be collected with moderate additional effort, typically requiring traffic counts, GIS analysis, data integration, or additional processing.
- Hard – data require dedicated surveys (e.g., travel behaviour surveys), continuous monitoring (e.g., automatic counters), or advanced technological and organisational solutions.

This classification is a planning tool, but it should not lead to choosing indicators solely because they are easy to measure. In the early stages of implementation or when the city administration has limited experience, it is recommended to start with Easy indicators to quickly establish a basic reporting backbone and ensure continuity of monitoring. At the same time, the monitoring and evaluation system must remain decision-useful: it should provide evidence that directly supports real policy and investment decisions shaping the city’s mobility system. In practice, this may require introducing selected Medium or Hard indicators where they are essential for assessing progress in key SUMP objectives. A simple test is to ask: “What decision would we make differently if this indicator increases or decreases?” If there is no clear answer, the indicator is likely to be of limited value.

The most valuable evidence comes from regularly collected data, at an appropriate interval. Therefore, measurement frequencies should be defined upfront for each indicator. While establishing a regular measurement programme may require substantial initial effort, including methodology design and tool development, subsequent cycles are typically less demanding due to standardisation and accumulated experience. For this reason, decisions to initiate data collection should not be delayed solely because of the initial workload, especially when the data are critical for informed decision-making.

It also allows KPIs to be filtered by thematic areas: accessibility, economy, environment, governance, health, and safety. Importantly, some indicators can be used to monitor multiple themes.

The Indicator Selector Tool also presents expert recommendations highlighting KPIs that may be particularly relevant and useful for very small, small and medium-sized cities in the Baltic Sea Region. These recommendations should be treated as general guidance only, as each city has its own specific context and conditions. In practice, this means that building a monitoring system using the Indicator Selector Tool (and selecting KPIs) requires a thorough assessment of the city's current urban mobility situation, especially in terms of:

- identifying the key mobility problems and challenges (e.g., congestion, transport poverty/exclusion, safety, access to services, quality of public space);
- defining the city's strategic goals and priorities within the SUMP horizon (what should be improved and how quickly);
- analysing mobility demand (who travels, from-to, at what times and for what purposes) and the modal split structure;
- assessing the condition and quality of the transport offer (public transport, walking and cycling infrastructure, traffic management, parking, accessibility of interchanges and transfer points);
- assessing accessibility and equity conditions for different user groups (e.g., older people, children and youth, people with disabilities, lower-income residents, residents of peripheral areas);
- assessing the impacts of transport on the environment and climate (emissions, noise, air quality, energy consumption, resilience to extreme events);
- analysing road safety and perceived safety while travelling (crashes, collisions, speeds, hazardous locations/"black spots", safety in public transport);
- assessing economic conditions;
- reviewing governance arrangements and institutional capacity (division of responsibilities, inter-departmental cooperation, role of operators, consultation and participation);
- assessing data availability and the feasibility of regular data collection (data sources, frequency, quality, costs, legal and organisational aspects).

Only on this basis can a city select a KPI set tailored to its specific needs, define baseline and target values, determine measurement frequency, and assign responsibilities for data collection and reporting, so that monitoring genuinely supports management and decision-making within the SUMP framework. The Indicator Selector Tool can support the development of a monitoring system throughout all stages:

- At the initial stage, it helps structure the thematic scope and build a preliminary list of potential indicators, which can then be validated against local objectives and data availability.
- During the planning process, it serves as a tool for iterative verification, facilitating ongoing alignment of KPIs with an evolving diagnosis, planned measures and priorities.
- At the final stage, it helps assess the coherence and completeness of the selected KPI set, including coverage of the key themes, balance between indicators describing the current situation

and those measuring the effects of interventions, and the rationale for defining a core and an extended indicator set.

In this sense, the Indicator Selector Tool does not replace a local diagnosis. Instead, it supports the entire process of building a monitoring system by helping translate the knowledge gathered and concepts developed into a practical, implementable, and clearly communicable SUMP monitoring framework.

Equally important, the Indicator Selector Tool specifies which exact input data are required to calculate each indicator. This allows for quickly comparing the data already available in a city with the requirements of individual KPIs and assessing which indicators can be implemented immediately and which would require additional data collection.

The information on required data also provides a useful starting point to discuss existing data gaps. It helps identify what information is currently missing, how frequently it should be collected, who is likely to own it, and in what format it could be shared. In practice, this supports planning how to obtain the missing data—for example by establishing new collaborations with key stakeholders (public transport operators, road authorities, police, environmental agencies, public health institutions), integrating existing databases, launching new measurements, or carrying out dedicated studies (such as surveys, traffic counts, travel demand studies, or field observations).

The final output of applying the Indicator Selector Tool should be a set of well-documented indicators intended to monitor the mobility system in a given city. [Appendix 8](#) (p.21) (which is also available at <https://bsr-sump.eu>) presents an example table containing selected indicators planned for monitoring the urban mobility system in Turku (Finland). It can be used to illustrate how the tool's results may be presented, and also as a reference point when developing analogous indicator lists for other cities.

3.6. Monitoring and Evaluation Plan Template as a Support Tool in Building a Monitoring System

The Monitoring & Evaluation Plan Template is one of three tools (the others being M&E Framework and Indicator Selector Tool) for monitoring and evaluation, developed within Interreg BSR SUMPS for the BSR project to support cities in establishing effective monitoring and evaluation processes.

It offers:

- a clear structure for designing or improving a local M&E plan,
- flexibility for cities of different sizes and capacities,
- strong emphasis on active mobility indicators,
- a practical guide complementing the Indicator Selector Tool and the M&E Framework
- examples drawn from the BSR region.

It can be used to:

- create a standalone M&E plan,
- update or improve the monitoring section of an existing mobility plan,
- serve as a checklist for cities with a functioning SUMP,
- support internal evaluation of current practices and resources,
- guide cooperation between planners, management, and decision-makers.

The basis for developing the M&E Plan Template was the cooperation of project partners, complemented by an analysis of good practices from other cities. For the development of the M&E Plan Template, elements from Section 3.2 were used, which were validated by the project partners and experts forming the Cross-border Advisory Groups. As a result, the M&E Plan Template constitutes a multifunctional tool for creating, updating, and reviewing a city-specific M&E system.

The Template is intended for public administrations, mobility planners, stakeholders, and experts engaged in developing, monitoring, and evaluating sustainable urban mobility plans. It provides a practical framework for creating a standalone M&E plan or improving the monitoring and evaluation chapter within an existing mobility plan or another strategic document.

The template offers guidance on structuring the M&E process, defining responsibilities, identifying data needs and resources, and determining how progress will be communicated and reviewed. It should be supplemented with a clear set of monitoring indicators and, where applicable, a short descriptive section outlining processes, responsibilities, resources, formats, and reporting intervals. These components could later be incorporated into the publicly available mobility plan to ensure transparency and accountability.

The M&E Plan Template consists of 12 sections, grouped into four thematic blocks, which represent components of M&E planning. Each thematic block (cluster) is marked with specific colour to make the navigation more transparent and clear:

■ Green block – Context, vision, objectives

Helps to describe the overall mobility situation and identify the key visions and targets for the development of sustainable urban mobility in your city. If this information is already included in the city's SUMP or similar plan, it may proceed directly to the next block.

■ Orange block – Reflection and gap analysis

It guides through assessing existing monitoring and evaluation practices and identifying gaps. Cities without an M&E plan can use this block to establish their starting point.

■ Blue block – Indicators

Helps to define targets and select meaningful, realistic, and relevant indicators to monitor progress toward the city's vision and objectives.

■ Red block – Procedures and implementation

Helps to develop the monitoring and evaluation section of your mobility plan, including responsibilities, collaboration, resources, timelines, reporting, and evaluation methods.

The entire M & E Plan Template is available on the Baltic Sea Region Competence Centre on SUMP website at: <https://bsr-sump.eu> .

Cēsis, with a population of 14,000, is the hub of a district with nearly 45,000 inhabitants. The district's economy is primarily driven by agriculture, retail, transport, construction, woodworking and carpentry products, furniture and wood items, and health services. During the work carried out within the SUMPS for BSR project, Cēsis developed a draft version of the M&E Plan Template. One part of it is provided in [Appendix 9](#) (p.23) (which is also available at <https://bsr-sump.eu>). It serves as an example of how even smaller cities with less experience in sustainable urban mobility planning can prepare in a structured way for the development of monitoring and evaluation.

4. Testing and Validating the Framework

Drafting the M&E framework for sustainable urban mobility planning for local authorities will serve as a starting point for the subsequent activities foreseen in the SUMPS for the BSR project. These include testing and validating the M&E framework for selected pilots and testing different data collection methods for active modes. Local monitoring and evaluation plans will be prepared and supported with careful selection of indicators.

The actions undertaken will also aim to ensure that the M&E framework remains sufficiently flexible to be applicable across a broad range of cities, while simultaneously being specific enough to accurately reflect the current conditions of transport systems and address the most critical issues. The framework's adaptability is intended to maximize its usability, allowing various municipalities to implement and benefit from its guidelines. Urban mobility planning is a process that takes place in a diverse environment, involves various stakeholders, and affects all residents and businesses in a given city or functional area.

Most of the activities and processes resulting from the adoption of a SUMP are carried out by public authorities or their subordinate units. This means that the mobility plan is prepared, adopted, and implemented within the specific political reality of each city and Member State. Therefore, in the SUMPS for BSR project, the actions aimed at developing the M&E Plan Template were carried out with broad participation and strong engagement from the project partners. These were mainly cities involved through workshops and consultations: the Local Indicator Workshops (in 2025), held in each city, and validation with representatives of the Cross-border Advisory Group, which provided a broader perspective for the final assessment.

The M&E Plan Template was validated, among other activities, during workshops held in 2025 with representatives from the partner cities. During these sessions, the individual cities (Gävle, Greifswald, Gdynia, Cēsis, Turku, and Panevėžys) worked on developing their own specific monitoring and evaluation issues tailored to their local context, institutional settings, and the specific characteristics of their transport and mobility systems. The workshops were designed as hands-on working sessions and included: defining objectives and indicators; identifying and assessing relevant data sources; assigning roles and responsibilities for data collection and analysis; setting reporting timelines; and discussing how monitoring results should feed into decision-making and continuous improvement.

The involvement of such a broad and diverse group of cities, differing in terms of area, population size, the complexity of their transport and mobility systems, experience in data collection, and the availability and quality of data and information, as well as in aspects such as governance and institutional arrangements (including the level of centralisation), organisational structures, the maturity of mobility policies (including

the stage of SUMP implementation), the level of digitalisation, available human and financial resources, and the extent of cooperation with operators and external institutions enabled for better understanding of existing Monitoring & Evaluation practices and to define the most important challenges. SWOT analysis being a summary of the workshop was a useful input to the final documents on Monitoring & Evaluation.

The validation process was iterative and unfolded across several cycles (draft version > testing with cities > feedback collection > tool revision> re-checking). Throughout the process, structured feedback was collected from each partner city during moderated workshop sessions and after the workshops, using questionnaires, short interviews, and reviews of working materials produced by participants (e.g., completed sections of the template). This approach enabled capturing not only overall assessments of the tool, but also concrete usability issues observed when the template was applied in practice. The assessment focused primarily on the clarity of instructions, the completeness and internal coherence of the template components, feasibility under constrained human and financial resources, alignment with available data sources, and consistency with the SUMP logic (i.e., the link between objectives, measures, outputs/outcomes, and indicators).

A key part of the validation also focused on the design of the indicators and the quality of their descriptions. The review covered, among other aspects, the precision of definitions, the unambiguity of measurement approaches, the appropriateness of proposed units, the possibility of establishing baseline values and targets, as well as the practicality of recommended measurement and reporting frequencies. Indicators were also examined with regard to comparability over time, susceptibility to misinterpretation, and whether data collection requirements were proportionate to their informational value.

As a result of the testing and validation, indicators assessed as overly complex, unclear, difficult to operationalise, or of limited relevance to the core objectives of the monitoring system were removed. At the same time, those elements that were criticised in the initial version but considered too valuable to be discarded entirely were revised. The revisions primarily included clarifying definitions and measurement guidance, simplifying wording, harmonising terminology, adjusting units, and improving examples and practical guidance on target setting. Consequently, the final version of the tool achieved greater clarity, usability and implementation feasibility.

As a result, the proposed M&E Plan Template should be regarded not only as an expert-developed theoretical instrument, but also as a practice-tested tool, shaped by end-user feedback and suitable for implementation under varied institutional and operational conditions. The engagement of different city profiles also helped to identify weaknesses in the initial concept, particularly regarding the appropriate level of detail, indicator definitions and comparability, alignment with available data sources, and to introduce the necessary improvements that enhanced the clarity, coherence and overall usability of the template.

5. Recommendations on Presenting Data and Information from the Monitoring and Evaluation System

The effectiveness of a Monitoring and Evaluation (M&E) system for urban mobility systems depends not only on data quality, but also on how results are presented. Findings should be communicated in a clear, transparent and consistent manner and remain comparable over time, so that they can be used both in decision-making processes and in communication with external audiences.

Consistent reporting also strengthens cooperation with data providers (e.g., residents, operators, public institutions, companies and organisations), as it makes it easier to demonstrate how the information they supply translates into analyses, conclusions and implemented actions.

The principles below apply when communicating results to:

- Residents and institutional stakeholders (e.g., public transport operators, car-sharing companies, schools, large employers) to clarify what is changing and why, strengthen shared understanding, and reduce disputes driven by differing interpretations of the data.
- Political decision-makers to inform allocation and regulatory choices, support accountability for agreed public objectives, and manage communication-related risks by ensuring decisions are grounded in transparent evidence.

Key principles for presenting M&E results for political decision-makers and the public:

Monitoring certain aspects of sustainable mobility planning can become a source of political conflict (e.g. parking policy or the reallocation of urban space). Therefore, it is crucial that results are presented to avoid misinformation or manipulation of monitoring data and indicators.

- Present results over time rather than as single snapshots. Use “before–after” comparisons, account for seasonality where relevant, and include clear reference points, such as targets or benchmarks (e.g., a baseline year or comparable districts/cities).
- Ensure data comparability and methodological consistency. The same units of measurement and comparable observation periods should be used. Any changes to indicator definitions or data-processing methods should be clearly documented (including the effective date). Where appropriate, historical back-calculations or parallel time series should be provided.
- Where possible, averages should be complemented with distribution measures (e.g., percentiles, deciles) and distribution visualisations (e.g., histograms). Means can conceal important variability (including very short or very long trips and substantial differences across user groups or areas).
- One or two brief case studies may be used to illustrate the practical meaning and plausible drivers of observed changes. Such examples should support, not substitute, the analysis and must be backed by quantitative evidence.
- Both improvements and deteriorations should be reported. Where indicators worsen, the report should outline plausible causes.
- Trade-offs should be presented clearly, including the scale of benefits and costs. Interdependencies between indicators should also be described, i.e., situations where

improvement in one metric is associated with a change in another (e.g., number of cars per capita versus public transport speed; paid-parking zone coverage versus parking turnover).

- A standard should be introduced whereby each figure includes, a descriptive title, unit of measure, time range, data source and indicator definition (and, where applicable, the target value). Axis scales should be selected so as not to exaggerate or downplay observed changes.
- Reports should clearly indicate what actions are triggered by observed changes in indicators. Monitoring that is not demonstrably used in practice may be perceived as reporting for its own sake.
- Aggregation, anonymisation and data-sharing rules should be documented (especially for app-based data, GPS data and operator-provided data) to mitigate legal and reputational risks and to increase partners' willingness to share data.
- Reports should follow accessibility principles (e.g., contrast, descriptions, mobile-friendly versions) and provide short-form communication products (e.g., a one-page summary, an infographic) for audiences that are less engaged with urban mobility topics.

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