



U-SUMP

D3.3 U-SUMP: Data-based planning for climate neutrality with PT as backbone

WP3 Supporting tools and solutions to plan and
develop user-centric and PT oriented infrastructure



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| Author(s) | Organisation |
|-----------------------------------|--------------------------|
| Clara Schneider, Laura Lopez | Rupprecht Consult (RC) |
| Christopher Harms, Wolfram Buchta | SKOPOS elements (SKOPOS) |

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Abstract

This document presents the user manual of the U-SUMP tool, developed within the UPPER project. The U-SUMP tool is a platform designed to enable cities and public transport authorities to monitor the implementation of Sustainable Urban Mobility Plans (SUMP) effectively. By providing functionalities to track the performance of mobility measures over time, U-SUMP aims to ensure that mobility and climate protection objectives are met. The platform offers advanced visualizations and diagrams for a specific set of mobility indicators, facilitating a deeper understanding and benchmarking of urban mobility trends. Built with cutting-edge technologies such as Airbyte, Snowflake, and Microsoft PowerBI, U-SUMP provides a robust framework for data ingestion, storage, and visualization. This document describes the system's functionalities, user roles, and future development steps, emphasizing the tool's role in promoting sustainable urban mobility across cities and regions participating in the UPPER project.

Keywords

U-SUMP, Sustainable Urban Mobility Plan (SUMP), Public Transport, Sustainable Urban Mobility Indicators, Data Visualization, Data-Driven Decision Making



1. About U-SUMP

1.1. Overview

U-SUMP is a platform to enable cities and public transport authorities to monitor the implementation of their Sustainable Urban Mobility Plan's (SUMP) measures. Its main goal is to facilitate the tracking of the effectiveness of SUMP measures over time, ensuring mobility and climate protection objectives are achieved. The tool will offer visualizations and diagrams for a specific set of mobility indicators, enhancing the understanding and benchmarking of mobility trends in cities.

1.2. Purpose of the Tool

By facilitating the monitoring and evaluation of SUMP measures, U-SUMP contributes to the UPPER project's objective of promoting a shift from private cars to public transport across ten European cities. The tool's development reflects a commitment to pushing sustainable urban mobility forward, providing a novel approach to data visualization and analysis that supports these goals.

The U-SUMP tool was built using the following technologies:

- **Airbyte:** An Open-Source software for automated data extraction and loading. It is used to ingest data relevant for monitoring the measures and indicators.
- **Snowflake:** A Cloud-based data-warehousing technology where all data is stored, harmonized, and processed for later visualization.
- **Microsoft PowerBI:** The software framework for the actual data visualization for the end-user.

Users will be able to log in to the tool using a standard web browser to use the PowerBI-based visualizations.

1.3. Intended audience

The intended audience for U-SUMP includes cities and municipal representatives, public transport authorities, and other stakeholders involved in developing and implementing sustainable urban mobility in the area. These entities are looking for innovative ways to track, evaluate, and report on the progress of their mobility initiatives.

1.4. Societal Readiness Level (SRL) Explanation

The U-SUMP tool is currently positioned at an early stage in the development process, specifically within the prototype development phase. The societal readiness level (SRL) indicates an active transition from theoretical design and planning to practical application, testing, and acceptance in real-world scenarios. This phase is critical for identifying and addressing potential challenges, refining operational specifications, and setting the groundwork for subsequent phases of development and scaling. The current SRL reflects the tool's readiness to engage with end-users to ensure its societal impact and integration are effectively realized.

2. System Requirements

2.1. Hardware Requirements

The primary hardware requirement for accessing and utilizing the U-SUMP tool is a digital device capable of connecting to the internet. This ensures that users can engage with the tool from virtually any location, provided they have a stable internet connection, enhancing the tool's accessibility and user convenience.

2.2. Software Requirements

The U-SUMP tool is accessible through Microsoft PowerBI and is available to end-users through the web browser. Therefore, end-users do not need to have PowerBI as software installed on their device. Users will be provided a username and a password for login and then have access to the dashboard via any browser.

The tool itself makes use of above-mentioned technologies (see chapter 1.2). These technologies are critical to ensuring the U-SUMP tool's operational efficiency, providing a robust foundation for data analysis, visualization, and overall management.

2.3. Supported operating systems and browsers.

Power BI supports these browsers on all platforms where they're available:

- **Microsoft Edge** version 120 and later.
- **Chrome desktop** latest version and Windows 10 version 1703 and later.
- **Safari Mac** latest version.
- **Firefox desktop** latest version. Firefox might change the fonts used in Power BI.¹

3. User Roles and Permissions

The U-SUMP tool offers a robust user management system leveraging Microsoft PowerBI capabilities. It allows the admin to create different user roles, each designed to provide tailored access to specific data subsets. Role-based access control ensures precise management of who can see and interact with the data.

Users can have full access to view all data within the U-SUMP instance without any filters or restrictions. Alternatively, admins can customize user roles to filter data based on specific criteria, such as limiting access to certain indicators or excluding information from other cities.

Below are the details of the access permissions associated with each role:

¹ [Supported browsers for Power BI and Fabric. - Power BI | Microsoft Learn.](#)

Admin (RC):

- Has full access to all data without any restrictions.
- Has the ability to create users, assign user roles, and manage their access.

Viewer (Total):

- Can view all data across the entire U-SUMP instance.
- Has read-only access, ensuring data integrity while allowing comprehensive data visibility.

Viewer (Restricted):

- Access is limited to specific parts of the data, such as data from their own city or a predefined subset of indicators.
- Can only see information relevant to their role, ensuring data privacy and focus.

This flexibility in user role definitions ensures that each user only interacts with data relevant to their responsibilities and needs. This structured approach to access permissions enhances data security and privacy while optimizing the user experience by providing relevant data access tailored to the user's role and responsibilities.

4. Getting started

4.1. Access and Authentication

Rupprecht Consult manages the users through the Microsoft platform and assigns individual user permissions. End-users will login through <https://app.powerbi.com> and are presented with this user login form:

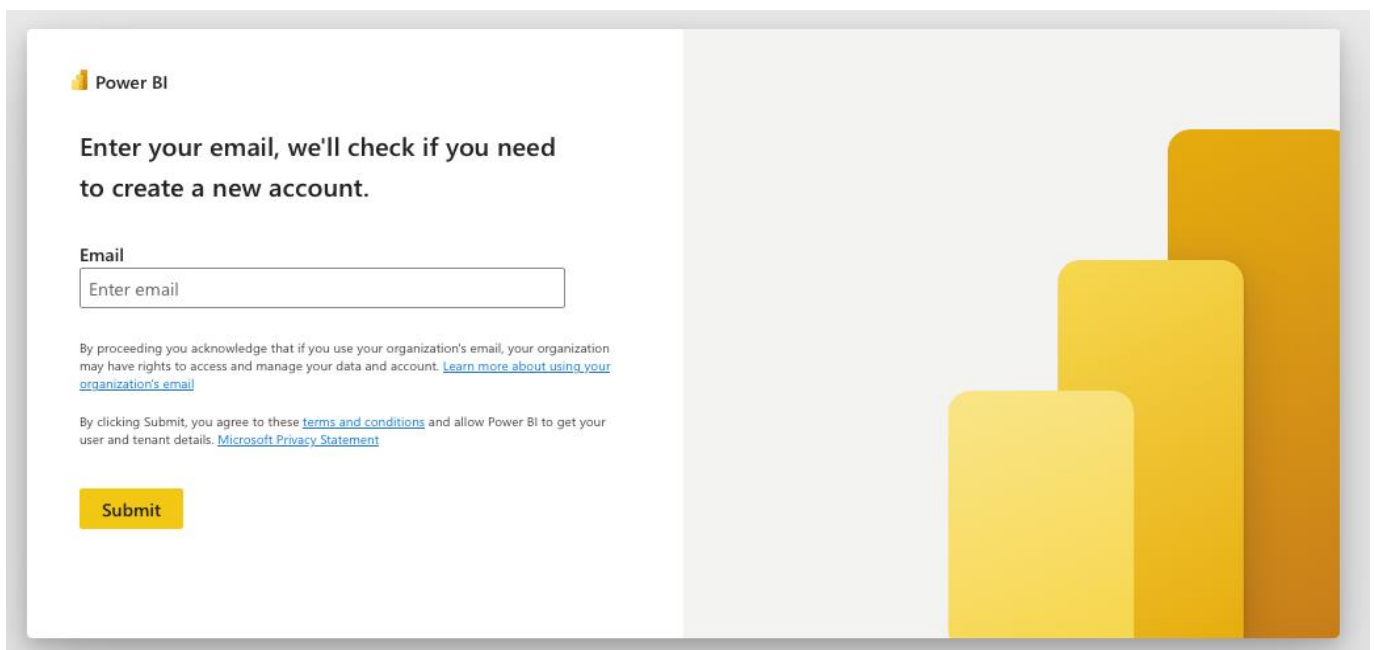


Figure 1: Power BI user login form

After login, all users are presented with an overview of all available reports through the U-SUMP tool:

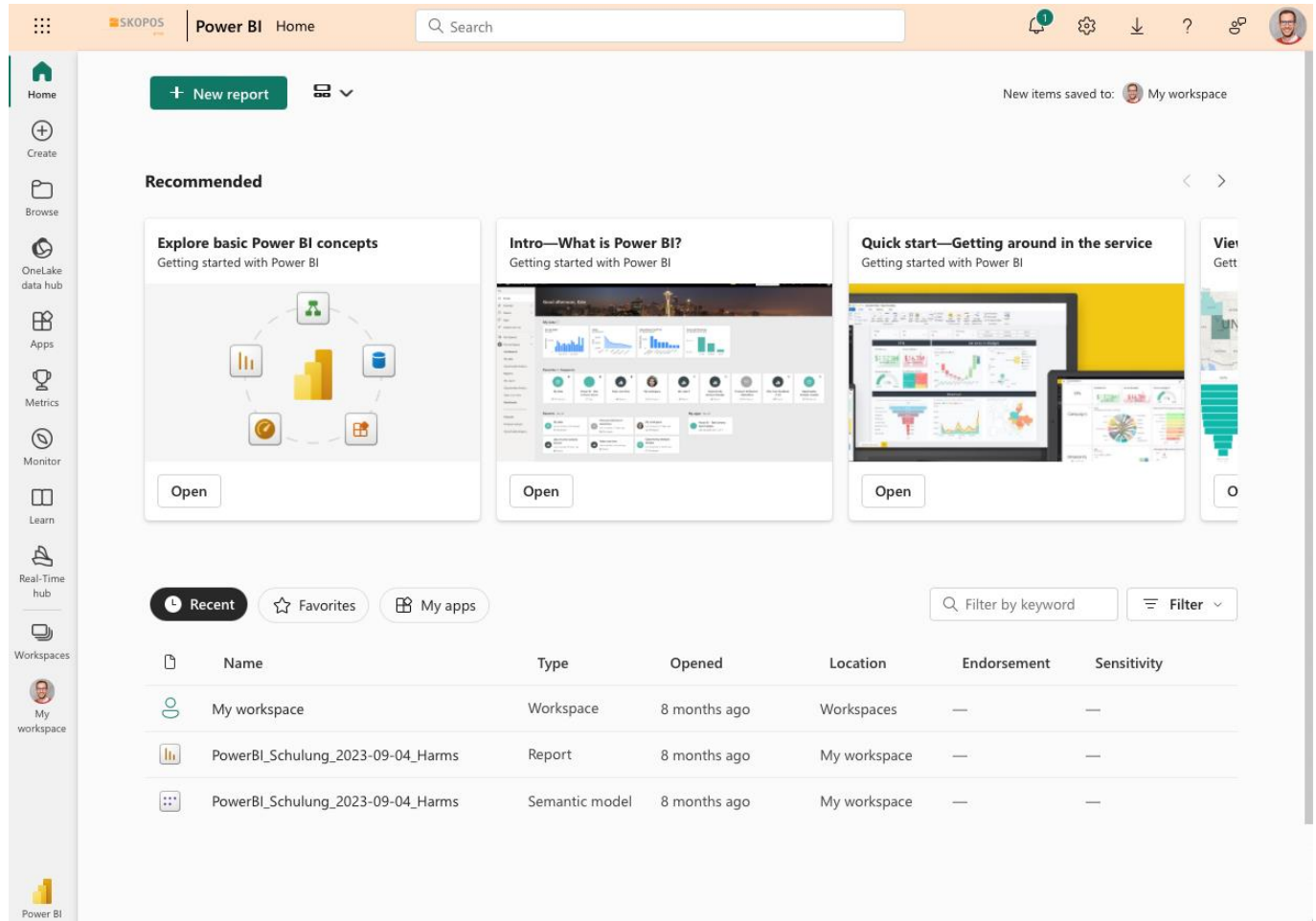


Figure 2: PowerBI Frontpage

After selecting the U-SUMP tool report, the user is presented with the actual User Interface for the U-SUMP-tool:

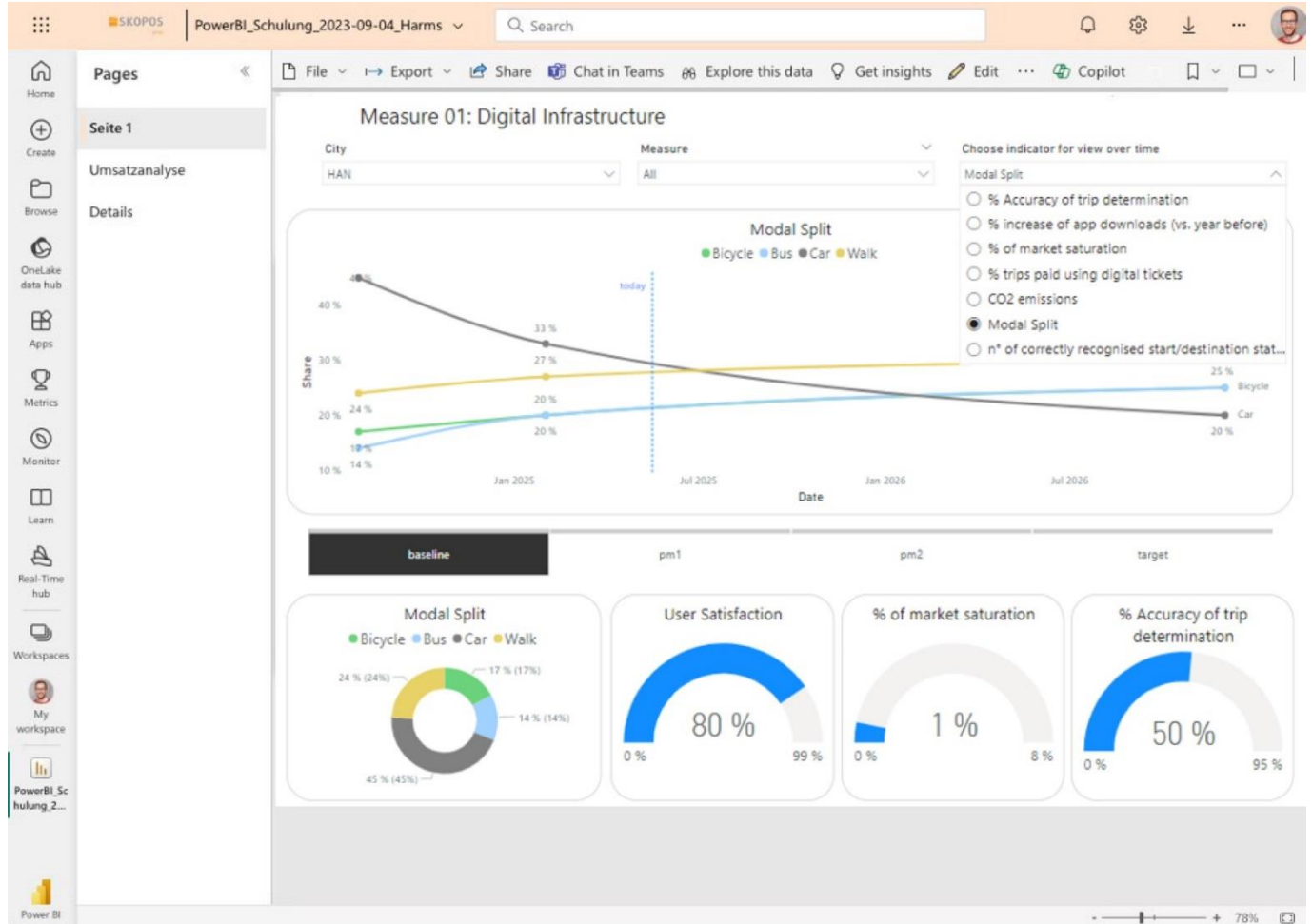


Figure 3: U-SUMP User Interface

4.2. User Interface Overview

The User Interface of the U-SUMP tool (see Figure 4) consists of the following: As you enter the tool the user finds several filters to set in the very first row. In these filters, the user defines the data that should be visualized by the tool:

- Filter city (1)
- Filter measure (from the UPPER set of measures to be implemented in the site) (2)
- Filter Indicator for view over time (3)
- Filter measurement time point for indicators (4)

Below the filter options, the user will see a large line diagram that shows the development of the chosen indicator over time. Filter 3 only applies to this line diagram.

Below the line diagram, the user finds small visualisations of all indicators that fall into the category of the chosen measure. Since they do not show the development over time, the user can choose which point in time (measurement timepoint) they would like to see. The target that the city has set for themselves is also indicated.

In an early stage of development and filled with dummy data, the dashboard looks as follows:



Figure 4: U-SUMP Dashboard

In a later phase of development, a further dashboard will be created in which the user can choose a single indicator. The user will then see a detailed description of the indicator.

5. Functionalities of U-SUMP

The U-SUMP tool is designed to empower users with quick and understandable insights into the status of mobility-related measures and their overall impact. This is achieved through the linkage to mobility indicators, which can be both pre-defined (such as those in the SUMI framework) and customizable according to specific needs.

- **Enhanced Overview:** The tool provides an overview of the performance of measures based on their associated indicators. It allows users to track the baseline, monitor progress, and evaluate against targets. By processing data with the tool, relevant data becomes accessible to those involved in the SUMP implementation. Visualizing that data in the cities' dashboards supports effective communication with various stakeholders, including other cities and the general public.
- **Data-Based Insights:** By leveraging data-driven insights, the U-SUMP tool supports the evaluation, reporting, decision-making, and planning of mobility measures. This helps cities to make informed decisions about their mobility strategies.
- **Customizable Measures and measurement time points:** Users can select the city, specific measures, and time points they are interested in. Indicators are displayed in user-friendly diagrams that are easy to interpret.
- **Comprehensive Indicator Monitoring:** Users can access information on all indicators measured by the respective city and uploaded to the U-SUMP tool. This includes viewing different indicators and their performance over time, understanding trends and developments, and comparing the current status of indicators with the targets set in the city's SUMP. This functionality helps identify whether progress is sufficient or if adjustments are needed, thereby aiding in decision-making for mobility planning.

At a later stage, the U-SUMP tool aims to expand its features based on the needs of cities (see Chapter 7). This planned evolution will ensure that the tool continues to meet the dynamic requirements of urban mobility planning and monitoring.

6. Data Management

6.1. Importing Data

The U-SUMP tool can extract and load data from different sources and through different technical ways:

- **REST APIs:** The tool supports fully automated integration of data through REST APIs. That means, the tool regularly connects to a custom API provided by a data supplier and loads all or only new data from the supplier. The data is then stored in the U-SUMP tool's database system and further processed there.
- **Other data sources:** Additionally, data can be supplied through an SFTP server or a web-interface. Data provided as CSV or Excel files are then transferred regularly or on-demand in the database system.

For both ways of data ingestion, the data must conform to a pre-defined data structure, i.e. column names and data formats have to be consistent. Data is validated on import and the tool will notify the developers in case of mismatches of the format.

6.2. Exporting Data

Data can be exported from the PowerBI-based User Interface into Excel, PowerPoint or PDF:

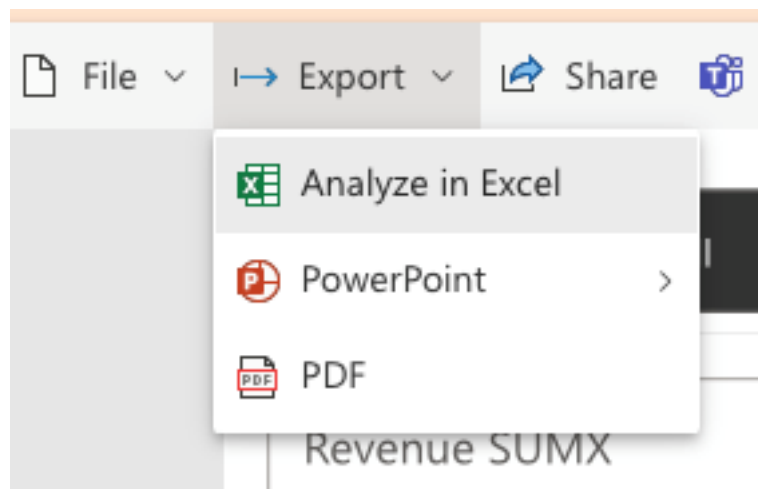


Figure 5: Exporting Data

6.3. Data requirements

Currently, data is provided by KU Leuven through a REST API. Data is transferred daily to have up-to-date data.

At a later stage of the tool development, cities will be responsible for delivering their data, which is ingested into a framework developed based on the cities' measures and associated indicators. The requirements for data processing are dependent on the individual status of data harmonization by the cities. The exploration of needs and the development of a data-skeleton for cities will be a crucial step in the next tool development phases.

7. Next steps in the tool development process

The further development of the U-SUMP tool will expand the tool's capabilities, ensuring comprehensive coverage and utility for its intended users. The detailed steps are as follows:

- **Workshops with cities:** In collaboration with the UPPER Cities, workshops will be organized to explore the tool features. Using a Scrum approach, the functionalities and visualizations of U-SUMP will be developed in order to optimally meet cities' needs in monitoring their measures.
- **Integration of UPPER Measures across the 10 Cities:** The immediate step succeeding the prototype development involves the integration of UPPER measures specific to all ten cities involved in the project. This integration is predicated on the indicators developed under Work Package 7 (WP7). This phase is crucial for embedding a standardized set of metrics that will facilitate the monitoring of the cities' UPPER measures.
- **Incorporation of SUMP Data from Selected UPPER Cities:** Subsequent to the integration of UPPER measures, the focus will shift towards incorporating Sustainable Urban Mobility Plan (SUMP) data from a selection of UPPER cities. This phase aims to broaden the scope of mobility measures and indicators represented within the U-SUMP tool. This integration not only enriches the tool's analytical depth but also aids in fostering a more nuanced understanding of urban mobility trends and the effectiveness of various SUMP measures.



These phases are pivotal in realizing the full potential of the U-SUMP tool. By methodically expanding the tool's dataset and analytical capabilities, the development process is set to significantly contribute to the broader objectives of the UPPER project. Each phase is carefully aligned with the goal of promoting sustainable urban mobility and facilitating data-driven decision-making processes among cities and public transport authorities.