UPPER

Unleashing the Potential of Public Transport in Europe

D1.3 Data Management Plan – Update v2.0

WP1 Project management and coordination

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Dissemination Level: **PU: Public;
CO: Confidential, only for members of the consortium (including the Commission Services);
EU-RES: Classified Information - restraint UE;
EU-CON: Classified Information - confidential UE;
EU-SEC: Classified Information - secret UE

Contents

Abstract

This document provides a review of the Data Management Plan of the UPPER project. The purpose is to set out the main elements of the consortium data management policy for the datasets used and generated as part of the project.

The Data Management Plan presents the procedure for managing datasets and information created during the project lifetime and describes the key data management principles. Specifically, the plan describes the data management life cycle for the datasets to be collected, processed and/or generated as part of the research within the project.

The second version of the Data Management Plan also provides an overview of the data collected already in the first 18 months of the project and the procedure for managing them.

Keywords

Data Management, Privacy, Data Protection, Open Data, Ethics

1.Introduction

1.1. Project Overview

There has been no change in the UPPER project overview.

UPPER is a **Cities Mission** project that will put the Public Transport at the centre of the mobility ecosystem by implementing a combination of **over 80 measures** to push people away from private motorised travel and pull them towards public transport and shared mobility - **push and pull measures** - acting on the five innovation axes that condition users' choices: mindset and culture, urban mobility planning, mobility services ecosystem, road network management and democratic governance.

UPPER **vision** is to reach a safe, resilient, efficient and inclusive PT that becomes the backbone of the urban mobility in European cities.

1.2. Objectives of the project

There has been no change in the UPPER project objectives.

The project will be developed around 7 main goals:

- to understand the needs of different urban areas, user groups and dependencies between public transport and active travel modes;
- to establish a local policy framework and innovative spatial planning to promote a sustainable and public transport-oriented culture in line with the SUMPs;
- to co-create new local solutions and services to improve the overall PT offer and attractiveness in line with users' needs and expectations and trigger behavioural change;
- to develop a set of cross-pilot supporting tools as an integrated and replicable approach to plan, test, evaluate and upscale mobility measures;
- to implement packages of "push and pull" urban mobility measures in the living labs, supported by the UPPER toolkit, to improve the overall PT share in the modal distribution;
- to establish new solutions, strategies and business models, where public transport and mobility providers cooperate to offer services addressing user needs and;
- to ease and accelerate the transferability of results, cooperation and uptake of replicable public transport solutions.

1.3. UPPER results

There has been no change in the foreseen results of the UPPER project.

UPPER is an impact-oriented project driven by cities that will demonstrate and evaluate a set of **"push & pull" measures**, to be implemented within 5+5 living labs and twinning sites, addressing 5 innovation axes to boost and reinforce the massive potential of PT in Europe:

- Innovation axis 1: Mindset and culture: Perception of accessibility, User satisfaction, Concept of Freedom, Maslow applied to PT, the status of PT, PT as a carrier of culture, image, 'coolness'.
- Innovation axis 2: Urban mobility planning: Ability to structure space at regional, local and hyperlocal level, PT as the focal point for urban development and economic activity, the combination of infrastructures and services.
- Innovation axis 3: Mobility services ecosystem: Intermodality, MDMS, digital ecosystem, eMobility system, the first mover in automation.
- Innovation axis 4: Road network management: Priority management (traffic lights), access regulation, low emission zones regulation and monitoring, parking space management
- Innovation axis 5: Democratic governance: Multi-stakeholder and multi-level governance, PT as a driver for inclusion, societal return on investment of long-term capital and revenue spending.

In addition to the measures, UPPER will develop a set of 7 IT supporting tools (**UPPER Measures Implementation Support Toolkit**) that will complement the measures in different phases of their design and implementation and will ensure the expected objectives of citizen participation, behaviour understanding, impact, and definition of new policies, knowledge transfer and scalability:

- **U-TWIN**: A solution to provide city and mobility authorities with a comprehensive solution for holistic real-time visualisation and monitoring of PT systems and decision support based on the identification of abnormal situations. A first version of this tool was released at the end of April 2024, M16 of the project.
- **U-SIM**: A tool to simulate the effect and potential of the "push & pull" measures before its implementation or its upscale to a wider area. Following the process of identifying the requirements of this tool, it was decided to develop U-SIM via two separate software components: U-SIM.plan and U-SIM.live. U-SIM .Plan is fully available as a software package. The UPPER deliverable describing the user manual of U-SIM.live was released at the end of April 2024, M16 of the project.
- **U-SUMP**: A platform to monitor the results of the "push & pull" measures and guide the development, implementation and update of the Sustainable Urban Mobility Plans. A first version of this tool is being developed and was released at the end of June 2024, M18 of the project.
- **U-NEED**: A tool to support the Public Transport Operators in defining the optimal capacity and frequency of PT lanes based on the user needs and passenger transport flows. A first version of this tool was released at the end of April 2024, M16 of the project.
- **U-GOV**: A community engagement platform to power democratic governance that facilitates citizen participation in the different phases of the decision-making process related to PT. A first version of this tool was released at the end of April 2024, M16 of the project.
- **U-KNOW**: A knowledge powerhouse for PT through a Mission-oriented platform for activating a new bottom-up and dynamic capacity building process among cities.

- **U-TRANSFER**: An exchange hub for the UPPER cities based on an online interactive space, resources, calendar, and collaborative tools to promote cooperation, shared initiatives and lessons learnt among cities.

1.4. Data Management Proposed Plan

The revision of the UPPER Data Management Plan (DMP) describes the data management process for the information that has already been gathered, analysed and generated during the project. For data yet to be gathered, changes to compared with the initial DMP are highlighted. As part of making research data findable, accessible, interoperable, and reusable, the DMP includes information on:

- the control of research data, both during and after the conclusion of the project;
- what type of information is or will be gathered, analysed or produced;
- which framework and guidelines is or will be used;
- whether data are or will be publicly available;
- how data are or will be handled and stored throughout the project's lifetime and beyond;

This Data Management Plan will provide a guiding framework for Partners for the management of the data collected and analysed during the project.

This document is an update of the first version of the UPPER DMP, which was published in project month 6. It is foreseen to be revised in month 36 (December 2025) and in month 48 (December 2026), taking into account further data that has been collected, analysed and published during the course of the project, and how the data and knowledge generated throughout the project lifetime will be stored and made available after the end of the project.

2.Data Summary

2.1. Data summary

The UPPER project tasks generate and analyse data as an essential condition for their completion and creation of the required outputs and deliverables. The following types of data will be used and generated as part of the UPPER tasks.

2.1.1. EXPERT INPUT AND INTERVIEW RESPONSES

Such inputs from within the Consortium, or expert interviews with individuals working for entities outside the UPPER Consortium will be treated as internal to the Consortium. Any proceedings of workshops or meetings eliciting such inputs will only be made available to the relevant participants. Intermediate outputs and draft documents will also be treated as internal to the Consortium.

Expert information from consortium members also includes audio recordings of in-person meetings, recordings of online workshops, and further extends to online collaboration tools such as Miro boards or shared spreadsheets. During the 3rd General Assembly of the project held in Rome the proceedings of the parallel workshop sessions, aimed at exchanging information and experiences between cities developing similar measures have been recorded in audio format.

Within the UPPER technical WPs which will produce a number of toolboxes and guidelines for measure development, a series of 4 online workshops have been organized, their recordings being available for the project partners. As UPPER activities continue and replication activities are sought, e.g. through U-TRANSFER tool, the use of these materials will be further explored.

2.1.2. MOBILITY AND OTHER CONTEXTUAL DATA

As part of the process of developing the 7 U-Tools of the project, each leading partner will specify the data and information required for the respective tool. The developers, in cooperation with the UPPER cities, will specify the data sources, standards and formats required for the optimal functioning of the tool. Whenever possible open data will be used for such purposes. The UPPER Consortium partners will respect the conditions applying to access and use of the entities providing the data.

Following a first release of 5 of the U-Tools of the project, mobility data used in the project include:

2.1.2.1. U-TWIN

The tool uses the following information:

- Information on the provision of public transport services in the area, both static and real-time, in GTFS format. This refers to the shapes and schedules of individual public transport lines, stop locations, vehicle arrival times.
- Bike-sharing and micromobility services status
- Traffic Level of Service
- Traffic alerts and incidents
- Weather conditions
- City distribution, like road network, cycle roads, services or zones.

2.1.2.2. U-SIM

The tool is divided in two sub-systems, U-SIM.plan for long- and mid-term measures, and U-SIM.live for the operative measures in real-time.

U-SIM.plan uses the following information and data:

- Public transport demand data from household surveys, Public transport tickets sold, number of passengers boarding/alighting (when available form local public transport operators)
- Other mode of transport demand data (private traffic, cycling, pedestrians) from household surveys, GPS data, ...
- Segmentation of the population on traffic zones, also from household surveys.
- Supply data for public transport: GTFS of public transport services in the area, static
- Supply data: Digital map of road network in area including any access restriction policies and zones
- Origin-Destination matrices including travel times

In the context of the project, partners using U-SIM.plan already have a VISUM model, which is a prerequisite for using U-SIM.plan in the project. For this reason, the data contained in the model can come from different sources and be of different types. The list is therefore not exhaustive. Other types of data are also used to calibrate and validate the model such as vehicle counts, value of travel times etc.

U-SIM.live uses the following information and data:

- GTFS of public transport services in the area, both static and real-time
- Passenger expected demand matrices, with time-variability
- Number of passengers in real-time (when available from local public transport operators) at alternative locations: boarding/alighting from vehicles, on board, in station/at stop, station entrances/exits

2.1.2.3. U-SUMP

The tool uses the following information and data:

- Indicators defined by the user cities as part of the monitoring and evaluation plan of the UPPER measures and its respective data sets.
- Indicators as defined by the cities' SUMP measures and its respective data sets.

As the U-SUMP tool is based on the indicators that UPPER sites define in order to monitor their respective Sustainable Urban Mobility Plans, the list of data used will be fully defined as cities work with the tool developer to test and implement the software. Without prejudgement on the above, the tool itself is configured to handle the treatment of datasets such as:

- Data from citizen surveys on user satisfaction or their travel behaviour, resulting in e.g. modal split assessment
- Data from ticket sales, traffic counting, etc.
- Data on weather, events, etc. for more context.

2.1.2.4. U-NEED

The tool uses the following information and data:

- Geospatial data based on KeplerGL (library for visualizing geospatial data based on WebGL)
- Mapping information in a city, at zone level, road network and any access restriction policies
- Mapping information related to buildings or spaces in the city and their zoning category
- GTFS feed of public transport services, static data
- Origin-destination matrices for trips (particularly using public transport), when available.
- Historical weather information
- Calendar data, showing working days and public holidays
- Bike-sharing and other micro-mobility data, when available (using GBFS standard)

- Private vehicle trips origin-destination data, (under agreement with TomTom)

2.1.2.5. U-GOV

The tool uses the following information and data:

- Mapping information in a city, at district level, including road network and any access restrictions policies
- Mapping information related to buildings or spaces in the city and their zoning category
- Data about registered users (including email addresses, username and password credentials for accessing the tool). Personal information including name, age, gender, area of residence, functional diversity status, areas of interest for the tool can be provided, but are not required for the use of the tool. GDPR restrictions have been identified as a main requirement of the tool, due to its intended user profiles.
- Registered users may also provide information about their individual mobility behaviours.

2.1.3. INDICATORS CALCULATED WITHIN THE LIVING LABS AND TWINNING SITES

Especially for the evaluation of the impact of UPPER measures in the cities, data related to mobility patterns and behaviour will be used. This data will be used and analysed in accordance with the conditions laid out by the data producers. The UPPER measures will require a variety of data for their development to help in the targeting and development of the various interventions, e.g. selecting the specific network hubs to connect multi-modal services to. Such data may be historical, static, or real-time data coming from a variety of sources, including municipal authorities, Public Transport Operators or public transport authorities.

In the process of building the UPPER Local Evaluation Handbook (Deliverable 7.1) such data was collected and used, and each UPPER site identified a suite of indicators intended to be used for the evaluation of the impact of the work done in UPPER. These indicators, their baseline values and target values at the end of the project are treated as sensitive to the project partners. These data are managed in an Indicator Database with access restricted to the project partners through a dedicated web interface. U-SUMP uses REST calls to directly access the data in the database.

During the work of developing the UPPER measures in the 10 sites of the project, a number of questionnaires to citizens, focus group exercises, simulations and modelling exercises were conducted. The results of these exercises served as intermediate inputs for the development of the UPPER measures, and are internal to the consortium.

2.1.4. SOFTWARE DEVELOPMENT

As seen in section 2.1.2 above, the UPPER project has developed a comprehensive software toolkit, 5 of which have been made available to the project partners already. This development has been done in an iterative manner by inputting, validating and testing the various requirements for the tools,. All project partners contributed via a secure environment to this process and their respective contributions are internal to the UPPER consortium.

The resulting software products for the following U-TOOLS will be made available to the project partners: U-TWIN, U-SIM, U-SUMP, U-NEED, U-GOV. The results of their use by the UPPER cities using them will be shown on the project website. Members of the public interested in using the U-TOOLS from UPPER will be able to express their interest with the relevant UPPER project partners once the development and testing of the tools is completed.

The creation of any of the U-TOOLS software shall not imply the publication of algorithms or software previously developed by the project partners and indicated as background information in accordance with Art. 16 of the UPPER

Grant Agreement. Moreover, software developed as part of the project activities will be protected by applicable IPR provisions as described in the UPPER Grant Agreement. The Results Ownership List that will be included in the final version of the DMP will refer to these aspects.

The U-KNOW and U-TRANSFER tools are based on the common available knowledge and expertise held by the project partners and on learnings from the project activities. These tools will be accessible publicly via a dedicated website. To facilitate the tools' use beyond the lifetime of the UPPER project, this website is distinct from the main project website. However, the link with the project is stated through the use of the logo, visual design and graphic elements of the project visual identity, as described in the UPPER Dissemination and Communication Plan.

2.1.5. SURVEYS, CONSULTATIONS AND PARTICIPATION IN EVENTS

As part of the activities related to measure development, testing, or impact evaluation, surveys may be carried out. Additionally, individuals may be invited to participate in public consultations, contests, or focus group simulations. All such interactions and their results for the project will be treated in accordance with the applicable data protection and privacy regulations. Information that may identify respondents acting in a personal capacity will only be made available with prior consent.

2.2. Anonymisation

Apart from specific cases where an individual's name is necessary for the UPPER task at hand – e.g. name of representative from project partner needed for dissemination task; name of contest winner for communication video – other data will be anonymised. When data identifying individuals is used, this information will be discarded, such as in using online reviews. This was the case in task in T2.1 Netnography study. The study focused on the analysis of various social media, reviews and comments, analysed using natural language processing. Information related to the usernames providing the reviews has not been used, while demographic information has been used as part of the analysis.

If mobility data is obtained via the use of devices using cameras, such as traffic counts, parking enforcement vehicles, automatic vehicle license plate recognition, any information related to the license plate the personal data will not be shared. Only anonymised or pseudonymised vehicle characteristics will be used. The same applies to cases where cameras are used to measure or estimate the number of users or passengers entering and alighting a vehicle, using various PT stop furniture or devices, etc.

2.3. Open data

The project partners will endeavour to use open data (such as, but not limited to GTFS feeds, Open Street Map) whenever feasible for the respective tasks, and will also strive to make the results from the project openly available. This will be done while taking into account all existing IPR from any of the UPPER partners that has been identified as background information.

Whenever data produced in the framework of UPPER will be provided as open data, this will be done in accordance to the following principles:

- Availability and access: data is made available as a whole, at no more than a reasonable reproduction cost. The data should also be available in a convenient, preferably machine-readable format.
- Reuse and redistribution: the terms under which the data are provided should permit re-use and redistribution, including intermixing with other datasets
- Universal participation: everyone must be able to use, re-use and redistribute, without discrimination against persons, groups or fields of endeavour.

2.4. Privacy policy

The information and data provided by the UPPER partners in response to surveys or requests coming from other Consortium partners for the completion of tasks described in the UPPER Grant Agreement will be treated as internal to the UPPER Consortium. Such contributions, or parts thereof will only be included in one of project deliverables or published using the project communication channels if agreed with the party providing the original information.

3.FAIR Data

3.1. Making data findable, including provisions for metadata

All UPPER data used for and resulting from research and the production of the research publications included in the Grant Agreement will be made available via the Zenodo Repository. Through rich metadata provided by the UPPER project and the Digital Object Identifier attached to the publications, the research outputs, and whenever possible the data collected as part of the analysis will be findable. However, when the UPPER project uses data that is not made public by the entity producing it, the UPPER Consortium will not make an attempt of making this data open. Metadata will be provided for all datasets used and created.

For example, in evaluating the level of satisfaction with public transport services in one of the project living labs, the UPPER partners may be given access to detailed information regarding the responses from individuals participating in the survey. UPPER will make the necessary calculations and breakdowns of the data to enable the calculation of impact a certain measure or group of measures have had. However, if the entity conducting the survey has decided to make public only aggregate information related to satisfaction with public transport, UPPER will not attempt to make available more data than had already been published.

3.2. Making data accessible

Standard protocols (REST API, MQTT, message brokers...) will be used within the Consortium, allowing the involved partners to take advantage of open data used in the project (such as Open Street Map, public transport NeTeX profile, etc.) for the development of the project outputs. These include among others the 7 IT Tools that UPPER will develop, user research, or indicators databases.

Through the Zenodo Repository, data created by the UPPER project will be accessible outside the project. As mentioned before, this can be subject to restrictions.

3.3. Making data interoperable

The UPPER Consortium acknowledges that the project partners may already operate solutions similar with those proposed in the project. As such, all solutions proposed by the UPPER project will be designed to be interoperable with tools which are already in use. Interoperability refers to tools and datasets within the UPPER Cities or partners directly, but also outside the project activities, such as National Access Points for Mobility as mandated by the ITS Directive (Directive 2010/40/EU).

For example, the digital twin solution proposed in the UPPER project, the U-TWIN tool, is based on multiple layers of information, integrating background information, such as street maps, public transport stop locations and planned timetables with real-time information from the vehicles, as well as real time alerts. Moreover, U-TWIN will also include a layer predicting demand or delays. The tool is interoperable as each of these layers can fit with the digital tools that a city administration or public transport operator may have to generate these data.

Open datasets created by the UPPER project will be published using common formats and standards, and where applicable making use of controlled vocabularies.

3.4. Increase data re-use

The research papers and deliverables that will be produced as part of UPPER will be made available via the Zenodo Repository. Thus, the datasets and papers can be quoted and re-used by other interested researchers. Moreover, the open research conducted as part of UPPER will also be published on the project website, enabling the dissemination of project research results towards policy-makers as well as the general public.

Datasets will be well-documented and clear license and use conditions will be provided. Data provenance will be part of the documentation.

4.Data Privacy and Security

4.1. Storage and backup

During the course of UPPER, a secure environment to share data and documents has been made available by the Project Coordinator via Microsoft Teams. This is being backed up and secured using the state-of-the-art secure processes. Project meetings, Work-Package or Task-level meetings where the participants have given their consent are recorded and the recording/transcription of such meetings are stored on the shared channel to which access is allowed only to representatives of project partners.

4.2. Access and Security

Access for project partners to the UPPER shared secure environment has been set up via a 2-step authentication factor process, the current state of the art in the sector.

When in the case of IT tool development, the development process will be done using the secure environment of the lead partner for the task, using their usual high standard for securing access to data. Project partners involved in the respective task will be given access to the information required for the performance of the task with appropriate level of access.

Additionally, data required for the development of the software tools is collected by the respective Task leaders and the Tool developers via their respective secure environments.

Access to project documents or data collected and used as part of the UPPER will be granted to only to users with email addresses verified as belonging to the Consortium.

5.Ethical aspects

UITP will be the Ethics Manager of the project. Together with the other Work Package leaders and Task leaders within the project, it will verify and ensure that the latest standards with respect to ethics, gender and inclusiveness standards will be followed. Inputs will be sought from a wide variety of groups for any consultation, research or demonstration activity to ensure balance and inclusivity.

For example consultations on the use of or predisposition towards the use of shared mobility services will seek out responses from all genders, economic backgrounds, from users of services or non-users, as appropriate to the measure to be implemented in an UPPER Living Lab. In such cases, relevance of the measure for the respective group will be the main criterion for consideration. In the case of multi-modal hubs for example, those living or working within the vicinity of a proposed hub, as well as current users of public transport routes connecting into the hub would be considered and within this population an inclusive and balanced number of responses will be sought.

6.Conclusion

The present deliverable D1.3 - Data Management Plan – provides a set of guidelines complying with European legislation on the acquiring, handling, and processing data generated during the UPPER Project. The deliverable provides an update of D1.2, in light of the advancement of activities described in the UPPER Grant Agreement. A further revised version will be submitted in M36 of the Project and a final one in M48, the foreseen final month of the Project.

This final version shall also contain a Results Ownership List, detailing which organisations or individuals have rights to specific results generated within the project.