smartin

Data Management and Ethics Plan, 1st version

Project Deliverable D1.2

Co-funded by the European Union

DELIVERABLE ADMINISTRATION

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LEGAL DISCLAIMER

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PROJECT EXECUTIVE SUMMARY

SMARTIN brings together leading research institutions, industry partners and public authorities to reimagine the way transport infrastructure is planned, monitored and managed across Europe and accelerate the adoption of innovative digital tools.
The project harnesses the power of digitalisation, Artificial Intelligence (AI) and data-driven innovation to improve the performance, safety and environmental sustainability of transport networks. By leveraging existing advanced digital technologies and developing further tools for monitoring, predictive maintenance and performance assessment, the implementation of SMARTIN aims to improve the safety, efficiency, resilience and inclusiveness of urban mobility systems.
A key ambition of the project is to ensure that digitalised infrastructure assets and mobility optimisation services can operate in harmony. AI-driven analytics will fuse data from multiple sources and geospatial levels, enabling proactive incident detection and supporting infrastructure providers in efficient operations and maintenance management. This will be achieved through the development of an integrated platform that brings these technologies seamlessly together as coherent system of systems, creating interconnected synergies.
The project is driven by a co-creation approach, engaging stakeholders in the design and development of user-centric solutions, which are both scalable and transferable. These innovations will be tested and validated under real-world conditions at four pilot sites across Europe. They will showcase their potential to improve infrastructure accessibility and resilience, promote multimodality, and accelerate the uptake of digital solutions.
Ultimately, SMARTIN contributes to the objectives of the European Green Deal, Vision Zero and Digital Europe, helping Europe move towards a more connected, inclusive and low-carbon transport future.

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DELIVERABLE EXECUTIVE SUMMARY

This Deliverable D1.2 – Data Management and Ethics Plan (1st version) presents the initial strategy and framework for managing all data generated, collected, and processed within the SMARTIN Project. It defines the principles, standards, and responsibilities for ensuring that all research data adheres to FAIR (Findable, Accessible, Interoperable, and Reusable) standards, while fully complying with ethical, legal, and gender-inclusivity requirements established by the European Commission (EC).

Developed under Task 1.5, "Data Management, Ethics and Open Science", led by FRONT, this document provides a comprehensive overview of several key areas. It details the data lifecycle associated with SMARTIN activities, which encompasses data collection, processing, storage, sharing, and preservation. In addition, it outlines mechanisms for compliance with the General Data Protection Regulation (GDPR, Regulation (EU) 2016/679) and the EU Data Act.

Further, the plan emphasizes the alignment with Open Science practices, ensuring that Project results and datasets are accessible via repositories such as Zenodo and OpenAIRE. The document specifies the application of metadata standards, naming conventions, and documentation procedures essential for ensuring long-term data usability. It also addresses protocols in place for data security, confidentiality, and restricted access, when necessary, thus safeguarding sensitive information.

Ethical considerations are a focal point of the plan, covering transparency in AI, strategies for bias mitigation, and the necessity for human oversight within algorithmic systems. Additionally, the document underscores the integration of gender equality and inclusiveness across all aspects of data governance, collection, and analysis processes.

This Data Management and Ethics Plan is intended to evolve alongside the Project, with updates scheduled for inclusion in D1.4 (2nd version, M18) and D1.6 (final version, M36). Each update will incorporate advancements in SMARTIN's framework components, data models, and ethical evaluations, conducted in collaboration with the TIPAB and relevant EU policy stakeholders.

Ultimately, this deliverable reinforces the commitment of the SMARTIN Project to uphold the highest standards of ethical and scientific integrity, thereby promoting responsible research and innovation (RRI) and contributing to the European vision for a sustainable, inclusive, and trustworthy digital transport ecosystem.

ABBREVIATIONS AND ACRONYMS

ACRONYM	MEANING
AI	Artificial Intelligence
CARE	Community Road Accident Database (EU)
CC	Creative Commons
CC 0 / CC BY	Creative Commons Public Domain / Attribution Licences
CCAM	Connected, Cooperative, and Automated Mobility
C-ITS	Cooperative Intelligent Transport Systems
DLM	Dynamic Lane Management
DNSH	Do No Significant Harm (principle)
DOI	Digital Object Identifier
EC	European Commission
ERSO	European Road Safety Observatory
GA	Grant Agreement
GDPR	General Data Protection Regulation
IEC	International Electrotechnical Commission
IoT	Internet of Things
ISO	International Organization for Standardization
ITS	Intelligent Transport Systems
KPI	Key Performance Indicator
OA	Open Access
ORCID	Open Researcher and Contributor ID
PIS	Participant Information Sheet
PT	Public Transport
SUMO	Simulation of Urban Mobility
TIPAB	Transport Infrastructure Performance Advisory Board

TLS	Transport Layer Security
TRL	Technology Readiness Level
TSO	Transport System Operator
DT	Digital Twin
VMS	Variable Message Sign
VRU	Vulnerable Road User
WP	Work Package

1 INTRODUCTION

The SMARTIN Project (Smart digital solutions for multimodal, accessible, resilient, user-centric urban infrastructure) funded under Horizon Europe Grant Agreement (GA) No. 101203240 aims to advance the digital transformation of Europe's transport infrastructure by developing a smart, data-driven framework for monitoring, analysing, and optimising multimodal mobility systems. Its central objective is to create an integrated digital platform that combines AI, Internet of Things (IoT), Earth-observation data, and advanced analytics to enable predictive maintenance, real-time performance assessment, and evidence-based decision-making for transport authorities and operators. To realize these goals, SMARTIN connects diverse data sources, including sensors, control systems, satellite positioning (Galileo/EGNOS), and stakeholder feedback, to create a unified data space. By employing machine-learning models and digital twins, the Project converts raw data into actionable insights to improve safety, efficiency, and sustainability. The Project prioritizes transparency and accountability by integrating AI analytics with cloud-edge computing and adhering to ethical standards. A solid data management framework ensures compliance with regulations such as the General Data Protection Regulation (EU 2016/679) and the EU Data Act. Emphasizing a human-centric approach, SMARTIN promotes gender equality, diversity, and ethical responsibility throughout all operational phases. By aligning technological advancements with European values, the Project contributes to the European Green Deal and the Sustainable and Smart Mobility Strategy, aiming to foster a resilient and equitable transport ecosystem across Europe.

1.1 PURPOSE AND STRUCTURE OF THE DELIVERABLE

The primary purpose of this deliverable is to establish a comprehensive framework for the management, governance, and ethical oversight of all data collected, generated, or processed within the SMARTIN Project. This framework outlines specific procedures and principles that ensure comprehensive handling of research data, guaranteeing adherence to established standards and legal requirements while supporting the Project's objectives of delivering innovative solutions within the multi-layer architectural framework of the Cooperative, Connected, Automated Mobility (CCAM) ecosystem.

By definition, the Data Management and Ethics Plan serves as a living document that will be regularly updated throughout the Project's lifecycle. Aligned with this mission, two additional versions of this plan will be produced: an interim Data Management and Ethics Plan will be included in the periodic report, due in month 18 (D1.4), and a final deliverable version, due in month 36 (D1.6).

This deliverable guides the consortium in achieving transparent, secure, and ethically responsible data management, emphasizing scientific integrity, accountability, and social trust among stakeholders. It establishes clear roles and responsibilities for data stewards, who play a crucial role in managing data throughout the Project. Additionally, the document defines quality assurance mechanisms to ensure high standards in data management practices, alongside integrating ethical safeguards necessary for AI-enabled analytics in compliance with the Ethics Guidelines for Trustworthy AI (European Commission, 2019).

The successful realization of the Project necessitates the integration of data provided by Project partners and stakeholders, ensuring that the highest levels of adaptation for these technologies are

achieved. The aim of this deliverable is to cultivate trust among stakeholders, support informed decision-making, and ensure that Project outcomes align with societal values and ethical standards, especially in the context of urban mobility and traffic management.

Overall, this structured approach not only supports smart transport initiatives but also adheres to relevant EU directives and standards, thereby contributing to the broader objectives of the European Union in promoting sustainable and ethical digital transformation within transport ecosystems.

The **structure of this Data Management and Ethics Plan** is briefly described as follows:

- **Section 1** presents the Project context, the purpose and objectives of this document, and defines its scope, intended audience, and interrelations with other SMARTIN tasks.
- **Section 2** provides a summary of all data handled in SMARTIN, detailing their type, origin (e.g., secondary sources, Project partners, primary data from surveys, workshops, and pilot activities), formats, and the processes through which they are generated. It explains their role in implementing the SMARTIN work plan (e.g., feeding AI models, simulations, and analytics) and their utilisation across pilot locations and demonstrators, including their expected re-use potential.
- **Section 3** describes the measures ensuring that SMARTIN's research data comply with the FAIR data principles. This includes strategies for naming conventions, version control, metadata standards, access provisions, interoperability through shared vocabularies, and actions enhancing data re-usability.
- **Section 4** presents the data-security and protection mechanisms, including classification, encryption, secure access control, backup strategies, and incident-response procedures, all aligned with relevant EU regulations and recognised cybersecurity best practices.
- **Section 5** addresses the ethical and legal compliance framework governing SMARTIN activities, including informed-consent processes, data-protection compliance under GDPR, fairness and bias prevention in AI systems, inclusivity measures, and adherence to the Do No Significant Harm (DNSH) principle.
- **Section 6** provides the concluding remarks and outlines future updates of the Data Management and Ethics Plan.

1.2 INTENDED AUDIENCE

This **Data Management and Ethics Plan** is relevant for multiple stakeholder groups within and beyond the **SMARTIN** consortium. It defines the responsibilities and compliance mechanisms that ensure ethical, legal, and transparent handling of all Project-related data.

- **The EC CINEA:** To verify that SMARTIN complies with **Horizon Europe** requirements on **FAIR data**, **Open Science**, **ethics**, and **data protection**. The Commission and CINEA review this plan to ensure that all Project activities are aligned with EU regulations and best practices (European Commission, 2025).

- **Consortium** **Partners:**
  To ensure that all beneficiaries understand their roles and obligations in handling, protecting, and sharing data throughout the research lifecycle. This includes applying ethical standards during pilot demonstrations, surveys, stakeholder engagement, and AI development activities across **Work Packages (WP) 2–6**. Each partner must follow this document procedures on metadata, anonymisation, access control, and FAIR compliance.

- **Project management and oversight bodies:** These include the **Project Coordinator (ERTICO – ITS Europe)**, responsible for the overall administrative and technical coordination of the consortium, and the **Task 1.5 leader (FRONT)**, who serves as the **Ethics and Data Protection Officer**. Together with the partner **Data Protection Officers (DPOs)** that each individual consortium partner will appoint internally, they will constitute the entities that will ensure compliance with ethical standards, GDPR provisions, and **Responsible Research and Innovation (RRI)** practices within SMARTIN. Oversight is further supported by the **Transport Infrastructure Performance Advisory Board (TIPAB)**, which provides independent ethical and governance monitoring.

- **National and local authorities and pilot stakeholders:** Particularly those engaged in the four SMARTIN pilot sites, who require assurance that robust data-governance, privacy, and ethical safeguards are applied during real-world demonstrations:
  - **Pilot #1 (Barcelona, Spain)** – coordinated by **Factual** (Pilot Coordinator, consulting firm specialised in EU Projects and mobility pilots), in collaboration with **CERTH** (Centre for Research and Technology Hellas), **UPC** (Universitat Politècnica de Catalunya), and the **Barcelona City Council**, representing the municipal public authority.
  - **Pilot #2 (Turin, Italy)** – led by **Fondazione LINKS** (research foundation), with **5T** (publicly owned regional mobility agency) and **GTT** (Turin's public transport operator), in cooperation with local public authorities.
  - **Pilot #3 (Budapest, Hungary – Inland Waterways)** – coordinated by the BME Research Foundation (Budapest University of Technology and Economics) and supported by HFIP(Hungarian Federation of Danube Ports), focusing on increasing the efficiency and safety of inland-waterway transport through digital monitoring and predictive analytics, under the oversight of competent national and local transport authorities.
  - **Pilot #4 (Latvia)** – coordinated by WEAREDOTS (Pilot Coordinator, IT company implementing smart solutions in the entire Baltic region) in collaboration with ATD (Latvian State Road Transport Administration) and local mobility authorities, addressing urban multimodal infrastructure monitoring, traffic management, and data-driven decision support services.

- **External stakeholders:** Such as researchers, industry actors, infrastructure operators, and policymakers who may access or reuse SMARTIN's open-data assets, AI models, and research outputs for replication, further analysis, or policy development. Publicly released datasets and documentation will be available through open-access repositories (e.g., **Zenodo**, **OpenAIRE**) in line with Horizon Europe's Open Science policy.

By clearly delineating responsibilities and compliance expectations for each stakeholder group, this deliverable provides a unified reference framework that reinforces trust, transparency, and accountability throughout SMARTIN's implementation and data-management lifecycle.

1.3 INTERRELATIONS

Task 1.5 – Data Management, Ethics and Open Science, under WP 1, is a transversal activity that supports and governs all data-related processes within SMARTIN. This deliverable, D1.2 – Data Management and Ethics Plan, is directly linked to Task T2.5 – Infrastructure Assessment Data Space and New Robustness Meta-Modelling, led by Fondazione LINKS, where the Project's core data-space architecture and modelling framework are developed. This document establishes the standards, access rules, and ethical procedures that underpin the data-space design, ensuring that the exchange of

infrastructure and mobility data within WP2 follows consistent FAIR-compliant and privacy-preserving principles.

2 DATA CREATION AND COLLECTION

2.1 INTRODUCTION

This section presents the approach adopted in SMARTIN for data creation and collection, which forms the basis for the development, testing, and validation of the Project's infrastructure performance assessment framework, digital orchestration platform, and associated tools and services. Data within SMARTIN are collected and generated to support the measurement and improvement of transport infrastructure efficiency, safety, robustness, accessibility, and environmental performance. The Project's data come from a mix of primary and secondary sources. Primary data are collected through pilot demonstrations, field testing, surveys, and stakeholder engagement at the four SMARTIN pilot sites, providing real-world insights into traffic operations, infrastructure conditions, and user experiences. Secondary data are obtained from Project partners, public authorities, open-access repositories, and external providers, offering contextual information such as network characteristics, historical mobility trends, safety records, and environmental indicators. Together, these data sources support the calibration and validation of SMARTIN's digital-twin and predictive-modelling tools, enabling advanced analytics for infrastructure monitoring, multimodal orchestration, and decision support.

2.2 PROCESSING AND ANALYSIS

Data collected in SMARTIN—from transport-infrastructure sensors, connected vehicles, Internet-of-Things (IoT) devices, environmental monitoring systems, and stakeholder engagement activities—are processed to ensure quality, consistency, and analytical usability. Processing involves data cleaning, validation, harmonisation, and aggregation of heterogeneous sources within the SMARTIN federated data space, enabling the development and testing of predictive and orchestration models. Advanced artificial-intelligence (AI) and simulation techniques are applied to generate insights on infrastructure performance, dynamic lane management, traffic behaviour, and maintenance needs. These tools support predictive analytics, infrastructure-robustness assessment, and multimodal orchestration.

All data-processing activities strictly comply with the **General Data Protection Regulation (EU 2016/679)** and apply the principles of **data minimisation, pseudonymisation, and purpose limitation**. Personal or sensitive information is anonymised before analysis or sharing, and only aggregated results are disseminated beyond the consortium.

In line with the Horizon Europe Open Science policy, validated datasets, models, and documentation are disseminated through trusted platforms such as **Zenodo**, **GitHub**, and **OpenAIRE-compliant repositories**. Additional outputs, such as policy briefs, training materials, and demonstration results, are shared with relevant stakeholders, including cities, operators, and regulators, to promote re-use and knowledge transfer.

For storage and preservation, SMARTIN uses **secure EU-based partner servers** protected by encryption, controlled access, and regular backups, while **Microsoft SharePoint and Teams** support controlled internal exchange. Long-term archiving is ensured via **Zenodo**, where anonymised datasets and orchestration models will remain available after Project completion as **reusable resources** for further research, policy formulation, and industrial innovation.

2.3 DATA CATEGORIES AND RELATION TO PROJECT

2.3.1 PRIMARY AND SECONDARY DATA SOURCES

Primary data in SMARTIN are directly generated through Project activities, tools, and pilot demonstrations. They are collected to support the development and validation of the SMARTIN infrastructure-performance assessment framework, digital-twin models, and multimodal orchestration tools. Examples include:

- Pilot demonstration data, such as real-time measurements of traffic flow, infrastructure conditions, vehicle telemetry, and user interaction from the 4 pilot sites.
- Outputs from SMARTIN's predictive analytics and optimisation models, including robustness indicators, dynamic lane management results, and multimodal coordination metrics.
- Responses and insights from stakeholder engagement, workshops, and surveys capturing mobility behaviour, technology acceptance, and inclusiveness aspects.
- Simulated datasets produced by digital-twin and meta-modelling tools developed in WP2–WP5, representing realistic operational scenarios.

Secondary data refer to pre-existing datasets obtained from Project partners, public authorities, open-access repositories, or licensed external providers. These data are used for baseline establishment, model calibration, and performance validation. Examples include:

- Geospatial and infrastructure data
- Traffic, safety, and accident statistics, including historical datasets from national authorities, Eurostat, Community Road Accident Database (CARE), and European Road Safety Observatory (ERSO).
- Environmental and meteorological data from Copernicus, EEA, or local monitoring stations.
- Operational and mobility records including public transport schedules, traffic control data, and monitoring results.

2.3.2 DATA SUBCATEGORIES

To ensure proper handling, security, and compliance with ethical and legal standards, all primary and secondary datasets used in SMARTIN are classified into the following subcategories:

- **Personal and Sensitive Data**: Limited data elements that may directly or indirectly identify participants (e.g., demographic attributes or contact details).
- **Technical and Infrastructure Data**: Quantitative information describing the condition, operation, and performance of transport infrastructure, such as data from sensors, IoT devices, connected vehicles, and control systems (e.g., traffic counts, speed, positioning, and robustness indicators).
- **Operational Data**: Data related to transport-system operations, including public-transport schedules, vehicle trajectories, maintenance logs, and aggregated travel-demand patterns.
- **Environmental Data**: Information on environmental conditions affecting mobility and infrastructure performance (e.g., air quality, temperature, rainfall, and noise levels).
- **Socio-technical Data**: Qualitative and quantitative data collected through surveys, workshops, and stakeholder engagement activities (e.g., user perceptions, accessibility, inclusiveness, and acceptance of digital solutions).

An initial mapping of the Project's objectives and the relevant data categories can be seen in Table 1 below.

Table 1: Data relation to the Project's objectives.

OBJECTIVES	Data category
O1: Develop a multi-layered passenger and freight infrastructure performance assessment and digitalisation road-mapping framework, integrated into a federated mobility data space, capable of dynamically generating baseline indicators, scoring infrastructure performance criteria and quantifying infrastructure efficiency, safety, environmental friendliness, robustness and accessibility Key Performance Indicators (KPIs) by (a) designing an evolutionary knowledge base navigator of infrastructure digitalisation approaches and solutions, (b) capitalising on intelligence generated through advanced infrastructure monitoring technologies, (c) understanding unexplored correlations between KPIs and digitalisation readiness of infrastructures through data-driven knowledge discovery and semantic data transformations, (d) and considering the impact of digitalisation interventions on the improvement of road infrastructures.	**Primary:** Technical, Operational, Environmental, Socio-technical (sensor and pilot data, workshop inputs) **Secondary:** Technical, Operational, Environmental (infrastructure condition data, GIS layers, historical mobility and safety records)
O2: Facilitate holistic monitoring of multimodal freight and passenger infrastructures and services through the deployment of a constellation of interconnected services and tools that can (a) fuse heterogeneous data from digitalised infrastructure and for the construction of dynamic digital twins that can support transport operations from maintenance to network management; (b) detect infrastructure deterioration and distress conditions for all road users and at different geospatial resolutions; (c) enhance transport infrastructure maintenance operations through the construction of advanced diagnosis and prognosis roadmaps based on predictive analytics services; (d) offer real time infrastructure health monitoring and control services.	**Primary:** Technical, Operational, Environmental (sensor, IoT, CAV, predictive-maintenance and digital-twin data) **Secondary:** Technical, Operational, Environmental (historical infrastructure monitoring, maintenance records, and open environmental datasets)
O3: Offer an integrated infrastructure and mobility management platform supported by a collection of dynamic services for (a) early detection of incidents and analysis of their propagation; (b) prediction of the performance of various mobility services; (c) dynamic optimisation of infrastructure elements; (d) optimisation of resources utilisation and vehicle fleets; (e) proactive generation of response plans as part of collaborative network management.	**Primary:** Technical, Operational, Socio-technical (pilot traffic-control data, orchestration model outputs, stakeholder inputs) **Secondary:** Technical, Operational, Environmental (historical performance, network data, and contextual environmental baselines)

OBJECTIVES	Data category
O4: Promote multimodality and fair allocation of transport spaces through the realisation of dynamic and user-centric solutions capitalising on demand prediction and ensuring inclusiveness by facilitating the uptake of digital solutions by all users.	**Primary:** Personal, Sensitive, Socio-technical (survey and workshop data on accessibility, inclusiveness, and digital-solution uptake)
O5: Deploy and validate the effectiveness of the SMARTIN solutions in 4 representative cities and areas, covering varying EU transportation contexts, infrastructure quality levels and social conditions, through the analysis of qualitative and quantitative results.	**Primary:** Personal, Sensitive, Socio-technical (survey and workshop data on accessibility, inclusiveness, and digital-solution uptake) **Secondary:** Operational, Environmental, Technical (contextual mobility, infrastructure, and accessibility indicators from public datasets)
O6: Accelerate the large take-up of SMARTIN' innovations through continuous impact creation activities and harmonisation with EU-wide initiatives that assure the exploitation and standardisation of the proposed solutions and provide policy recommendations documenting the lessons learnt.	**Secondary:** Technical, Operational, Environmental (reference standards, open EU datasets, and results from previous EU Projects)

2.4 DATA TYPES AND FORMATS

This section summarises the types and formats of datasets identified so far by the SMARTIN consortium Partners. These datasets cover both primary data, generated through SMARTIN's own research activities, and secondary data, obtained from existing external sources and Project partners. As the Project advances and new components, pilots, and analytical tools are developed, additional datasets will be identified and incorporated. Thus, the Data Management and Ethics Plan will be updated with this information accordingly.

2.4.1 PRIMARY DATA FROM SMARTIN SURVEYS, WORKSHOPS, AND STAKEHOLDER ENGAGEMENT ACTIVITIES

SMARTIN's pilot locations serve as real-world environments for testing and validating the Project's solutions. Within these sites, end users, public authorities, and transport operators actively contribute to the validation of results by providing first-hand feedback, survey responses, and operational insights.

Throughout the Project, a series of surveys, interviews, and co-creation workshops are organised to collect qualitative and quantitative data. These activities capture information on mobility behaviour, safety perception, accessibility, inclusiveness, and technology acceptance, ensuring that SMARTIN solutions address real user needs and social contexts. Stakeholders such as local transport agencies,

city administrations, operators, research organisations, and citizens participate in these activities, helping define detailed use cases and co-design pilot implementation strategies. The resulting datasets provide essential input for assessing the social, operational, and behavioural impact of SMARTIN solutions across the demonstration sites.

2.4.2 PRIMARY DATA GENERATED BY SMARTIN FRAMEWORK COMPONENTS

The datasets produced by SMARTIN framework components are generated internally through the Project's digital orchestration platform, infrastructure-assessment tools, predictive-analytics modules, and digital-twin models. These data are a key part of SMARTIN's technical work and are used to validate, test and improve the models created in WP2-WP5. An overview of these datasets is provided in Table 2 of the Annex, based on input from Project partners; this table will be regularly updated as the framework evolves, and additional outputs are produced.

For example, in the Turin pilot, the Decision Support System (DSS) for Dynamic Lane Management (DLM) and the associated Digital Twin (DT) of the city's road network generate datasets on lane usage, vehicle trajectories, travel times, and congestion levels, derived from microsimulation models integrated with reinforcement-learning algorithms. These also include public-transport operational data provided by GTT, such as vehicle positions, service punctuality, and passenger boarding or alighting figures, along with traffic-signal and priority-management data collected by 5T, including communication messages exchanged through Cooperative Intelligent Transport Systems (C-ITS), such as Variable Message Signs (VMS) and virtual VMS.

Similar model-generated datasets will be produced in the Barcelona and Budapest Inland Waterways pilots through infrastructure monitoring systems, predictive analytics, and performance assessment tools, supporting the orchestration and evaluation of diverse transport services.

2.4.3 SECONDARY DATA FROM EXISTING DATA SOURCES, OPEN ACCESS DATA, AND EXTERNAL PROVIDERS

Secondary data in SMARTIN refers to pre-existing datasets obtained from public authorities, research organisations, open-access repositories, and trusted external providers that support the Project's modelling and validation activities. These datasets complement primary data collected or generated during pilot demonstrations and are critical for baseline development, calibration, and cross-validation of SMARTIN models and services.

Typical sources include OpenStreetMap, INSPIRE Geoportal, EU Open Data Portal, Copernicus, and European Environment Agency (EEA) services, providing geospatial, environmental, and infrastructure data. Additional data are acquired from national and municipal transport authorities, covering road-network configurations, accident statistics, and environmental conditions. Where relevant, licensed datasets (e.g., telematics, weather records, or mobility analytics) may also be accessed under data-sharing agreements.

The content of **Table Y (Annex)** summarises the identified sources and their relevance to SMARTIN's analytical framework. This table will also be regularly updated and refined as new data sources become available throughout the Project.

2.4.4 SECONDARY DATA FROM PROJECT PARTNERS

In addition to external open-access data, SMARTIN also uses secondary datasets provided by Project partners. These datasets originate from existing Projects, monitoring systems, and operational databases managed by the pilot-site partners, technical partners and associated stakeholders. They are used to enrich the data pool for model calibration, scenario testing, and impact evaluation. The acquisition of secondary data and the identification of additional sources of secondary data will be an ongoing process throughout the Project. A structured data collection and validation form has been distributed among all pilot partners to document available datasets and their formats. A summary of these results is included in Table 3 of the Annex, which will be periodically updated as new partner data become available. All partner-provided secondary datasets are integrated into the SMARTIN data space and processed in accordance with the Project's ethical and legal framework.

2.5 DATA VOLUME AND EXPECTED GROWTH OVER THE PROJECT LIFECYCLE

The amount of data generated in SMARTIN will grow steadily as the Project progresses.

- **Initial Phase (Months 1–8):** During the initial phase, data collection activities are mainly exploratory, supporting the establishment of technical, operational, and social baselines. The data volume remains relatively low and consists primarily of qualitative and descriptive datasets gathered through surveys, workshops, interviews, and stakeholder engagement. Small-scale technical measurements and preparatory studies are also performed to define use cases, data requirements, and KPIs that will guide the pilots and analytical work in subsequent phases.
- **Mid-Project Phase (Months 9–18):** As technical development accelerates, the volume and complexity of data increase significantly. Traffic monitoring systems, IoT-based infrastructure sensors, and orchestration tools begin producing continuous data streams, generating operational, technical, and environmental datasets. Simultaneously, the first versions of SMARTIN's predictive-analytics and digital-twin models are deployed and tested, producing large quantities of synthetic and simulated data. Broader stakeholder consultations and evaluation activities contribute additional socio-technical data, ensuring that model development aligns with real-world mobility needs.
- **Demonstration and Validation Phase (Months 19–36):** In the final phase, all pilot sites become fully operational, and data generation reaches its peak. This stage includes both the first and second rounds of pilot demonstrations, during which large, heterogeneous datasets are gathered from real-world trials. These datasets include real-time infrastructure and mobility data, environmental and safety indicators, and user feedback collected from field testing and co-creation activities. The resulting data support cross-pilot validation, performance evaluation, and impact assessment, ensuring comprehensive coverage of technical and societal dimensions.

By the end of the Project, SMARTIN will have produced a comprehensive repository of harmonised data across all sites, enabling robust evaluation and cross-site comparability while ensuring compliance with FAIR principles.

2.6 DATA RELEVANCE TO SMARTIN OBJECTIVES AND EXPECTED RE-USE

The data collected and generated within SMARTIN directly support the Project's main objectives, including improving infrastructure performance, enhancing safety and resilience, promoting multimodality and inclusiveness, and advancing environmental sustainability. Each dataset, whether quantitative or qualitative, contributes to the assessment and validation of the KPIs defined under Task 6.1 and measured across the four pilot sites.

Data on traffic flow, travel times, congestion, and public transport operations are used to measure how efficiently transport networks and orchestration systems perform. Safety data, such as accident reports and near-miss records, help evaluate how well SMARTIN solutions improve monitoring and reduce risks for all users. Environmental information, including emissions, air quality, energy use, and noise levels, is used to assess the Project's contribution to sustainability goals. Feedback collected through surveys, interviews, and workshops provides insight into user experience, accessibility, inclusiveness, and acceptance of digital solutions, ensuring that the results address real social needs.

The relevance of SMARTIN datasets extends well beyond the Project itself. By harmonising data from all pilot sites and documenting it according to FAIR principles, the Project ensures that the information can be easily found, accessed, and reused. The data will help refine CCAM-related indicators in European initiatives such as CCAM and CIVITAS, support local and regional authorities in developing mobility and safety policies, and enable researchers to carry out comparative studies and modelling activities that build on SMARTIN results.

This re-use serves multiple purposes:

- Supporting the refinement of CCAM-related KPIs within European partnerships such as CCAM[1] and CIVITAS[2].
- Providing reliable input for local and regional authorities to shape mobility, infrastructure, and safety policies.
- Enabling academic and research organisations to build on SMARTIN results through comparative studies, modelling activities, and policy evaluations.
- Facilitating knowledge transfer to industry and innovation ecosystems, providing validated reference data that can inform future CCAM technologies, services, and standardisation activities.

Through this approach, SMARTIN ensures that its harmonised and anonymised datasets remain valuable reference resources for future research, policy, and innovation supporting data-driven, sustainable, and inclusive mobility in Europe.

[1] https://www.ccam.eu/
[2] https://civitas.eu/

3 FAIR Data

3.1 MAKING DATA FINDABLE, INCLUDING PROVISIONS FOR METADATA

For each Project asset, a Digital Object Identifier (DOI) will be required to make the data discoverable. Each Project output will also have a metadata record created and stored in the data directory which will later include a set of keywords among other fields to make searches by third parties easier.

3.1.1 NAMING CONVENTION STRATEGY

In SMARTIN, each data source will be provided with a specific name that is composed of distinct parts, containing information about the pilot site country, data type or format using a naming structure as follows:

SOURCE_COUNTRY_ORG_LABEL_VERSION

- **SOURCE**: indicates whether the dataset is *primary* (generated within SMARTIN) or *secondary* (pre-existing).

- **COUNTRY**: identifies the pilot site or geographical origin using two-letter International Organization for Standardization (ISO) country codes:
    - ES for Spain (Barcelona Pilot)
    - IT for Italy (Turin Pilot)
    - HU for Hungary (Budapest Pilot)
    - LV for Latvia (Latvian Pilot)
    - GEN for datasets that are pilot-agnostic

- **ORG**: The abbreviation that Project partner uses.

- **LABEL**: A short, descriptive name of the dataset.

- **VERSION**: The version of the dataset, following a consistent versioning pattern.

3.1.2 VERSION NUMBERING STRATEGY

In SMARTIN we will apply a data versioning strategy similar to the software versioning two-part numbering rule: major.minor (e.g. V3.2). A major data revision will indicate a change in a dataset's structure, content, or processing approach that may affect its scope, context, or intended application. For instance, a major revision may include modifications to data access interfaces, improvements in data quality or completeness, or updates that expand or restrict the dataset's analytical usability within the SMARTIN framework.

More specifically a major revision can include:

- Changes in a data-generation or processing model within SMARTIN framework components.
- Changes in the format or schema of data items.
- Addition or removal of significant data elements or variables within a collection.
- Major updates or structural changes in upstream datasets provided by partners or external sources.
- Adjustments in data values caused by changes in temporal or spatial baselines.
- Introduction of additional metadata attributes or descriptors.

Minor revisions (for example, V3.1 to V3.2) will refer to smaller updates that do not alter the dataset's integrity or analytical interpretation. Version control will be maintained within the SMARTIN data space for infrastructure and mobility performance assessment, ensuring consistent documentation of all dataset updates throughout the Project.

3.1.3 METADATA STANDARDS & SEARCH KEYWORDS

Datasets that will be openly available will also be accompanied by detailed metadata to ensure that they are easily findable and properly described for third-party users. Search keywords will be defined and included in the related metadata for each dataset to improve visibility and facilitate external discovery. The Project consortium has agreed to use the Common European Research Information Format (CERIF) metadata format. However, during the course of the Project, they will continuously check and identify any other possible applicable formats.

3.2 MAKING DATA ACCESSIBLE

Datasets from previous studies and external providers will be made available for use in SMARTIN in accordance with partner agreements and the Project's data-management procedures. Some of these datasets are already publicly accessible, while others contain confidential or sensitive information. When private or proprietary data are processed and aggregated (for example, as part of model training or pilot analytics), permission will be obtained from the original provider before any derivative or anonymised version is shared publicly.

Certain results produced during specific Project phases will remain restricted to authorised users because of the nature of the data involved, while other results will be made openly available. All data-access and sharing activities will follow the General Data Protection Regulation (EU 2016/679), national data-protection laws, and the ethical framework defined in Task 1.5 (Data Management, Ethics and Open Science).

When privacy and confidentiality constraints allow, Project datasets will be made accessible through trusted open repositories such as Zenodo or other OpenAIRE-compliant platforms. These repositories provide persistent identifiers (DOIs) that enable data citation, traceability, and long-term availability for the research community. SMARTIN will ensure compliance with Horizon Europe's Open-Access requirements: all peer-reviewed publications will be deposited in OA repositories within six months of publication under Creative Commons Attribution International Public Licence (CC BY) or a licence with

equivalent rights and metadata will be released under CC0[3], maximising discoverability and re-use potential.

This tiered-access approach ensures that data and results are shared transparently and responsibly: open access for non-sensitive datasets, controlled access for restricted datasets under formal agreements, and no access to raw personal or highly sensitive data. Through this framework, SMARTIN balances openness and reproducibility with protection of privacy, confidentiality, and intellectual-property rights.

3.2.1 ACCESS PROCEDURES FOR CONSORTIUM PARTNERS

Access to SMARTIN results and datasets within the consortium is governed by internal arrangements established under the Consortium Agreement and the GA. These define access rights to background and results, confidentiality obligations, and responsibilities for data exchange. Only authorised partners listed in the GA will have direct access to restricted datasets required for technical or pilot-related work.

Secure data-sharing procedures include the use of encrypted connections, password-protected servers located within the EU/EEA, and access logs to ensure GDPR compliance. Access is granted only to partners with a legitimate technical or analytical role, ensuring full control over sensitive information while enabling collaboration across work packages and pilot sites.

3.2.2 EXTERNAL DATA ACCESS POLICIES (OPEN ACCESS VS. RESTRICTED)

SMARTIN follows Horizon Europe's Open-Access policy. All peer-reviewed scientific publications will be openly available through repositories such as Zenodo or Open Research Europe, under CC BY or CC 0 licences. Research datasets will also be made openly available whenever privacy, security, or intellectual-property constraints do not apply. Personal or sensitive information (for example, geolocation data, mobility patterns, or participant feedback) will be anonymised or aggregated before sharing. In cases where results include confidential information or data with commercial sensitivity, access will be granted only to authorised users under "fair and reasonable conditions", as defined in the GA. Exceptions to open access may apply if required to protect legitimate interests, public security, or EU strategic autonomy.

3.2.3 LICENSING AND INTELLECTUAL PROPERTY CONSIDERATIONS

SMARTIN complies with the Horizon Europe Intellectual Property Rights framework. All background data and results will be identified and used according to the terms set out in the Consortium Agreement. Results may be transferred or licensed provided that obligations under the GA are respected and that the interests of the European Union are not affected. Licensing will follow Open Science and Open-Access principles, applying licences such as CC BY or CC 0 whenever possible. In cases involving

[3] https://creativecommons.org/publicdomain/zero/1.0/

result exploitation, beneficiaries may grant licences or other usage rights under fair and reasonable conditions, provided these do not interfere with other partners' access rights. In line with Article 16.4 of the Horizon Europe Model GA, the Granting Authority retains the right to object to transfers or exclusive licences of results to entities in non-associated third countries when such transfers are considered contrary to EU interests.

3.3 MAKING DATA INTEROPERABLE

Within SMARTIN, all partners apply common data-management and formatting rules to guarantee interoperability between datasets produced in different work packages and pilot sites. Standard metadata vocabularies and controlled terminologies will be used wherever possible to maintain semantic consistency and facilitate the integration of heterogeneous data from pilots, models, and stakeholder activities.

Data collected across Project activities will rely on commonly accepted formats, including .docx, .pdf, .csv, .xlsx, .txt, .json, .jpg, .png, .mp3, and .mp4. Geospatial and mobility-related data will use standard formats such as GeoJSON, XML, and Shapefiles, as appropriate.

To ensure format harmonisation, internal guidelines will be established so that datasets collected at different pilot sites (Barcelona, Turin, Budapest, Latvia) follow a consistent structure. This consistency supports comparative analysis, model interoperability, and reproducibility of results across the consortium.

All relevant data will be stored on secure partner servers and collaborative platforms (e.g., Microsoft SharePoint and Teams) configured to meet Horizon Europe data-security requirements. This ensures controlled access for consortium partners while supporting interoperability through uniform file structures and standardised metadata.

3.4 INCREASE DATA RE-USE (LICENSING, DOCUMENTATION, QUALITY ASSURANCE MEASURES)

In SMARTIN, increasing the re-use of research data is a central principle, fully aligned with the Horizon Europe mandate that data must be managed "as open as possible, as closed as necessary". Beneficiaries ensure that data produced in the Project are reusable through clear licensing, comprehensive documentation, and rigorous quality-assurance procedures.

Licensing: All published datasets will include explicit licensing terms. In accordance with the GA, datasets made publicly available will use Creative Commons Attribution (CC BY[4]) or Public Domain (CC 0) licences, or equivalent. Where protection of intellectual property, confidentiality, or security restricts full open access, non-exclusive licences may be granted under fair and reasonable conditions.

[4] https://creativecommons.org/share-your-work/cclicenses/

Any transfer of ownership or exclusive licence will require notification to the Granting Authority, which may object if the transfer is deemed contrary to EU interests.

Documentation: Each dataset will be documented with open metadata compliant with the FAIR principles, ensuring findability, interoperability, and reusability. Metadata will include at least the dataset description, date of deposit, authors, licensing terms, persistent identifiers (DOIs, ORCIDs), Horizon Europe funding details, and links to related publications or tools. Metadata will be openly available under CC 0 to maximise usability and long-term access. Repositories such as Zenodo and Open Research Europe will be used for deposition of both data and documentation.

Quality-Assurance Measures: Data quality and reliability will be maintained through continuous monitoring, verification, and validation prior to publication. Internal reviews will ensure format consistency across partners and pilots, adherence to established standards, and compliance with GDPR and ethical requirements. Datasets supporting published results will be accompanied by the corresponding documentation to ensure transparency and scientific reproducibility.

4 Data Security

The SMARTIN consortium gives the highest priority to ensuring the security of all data generated, processed, or used during the Project. State-of-the-art technologies and procedures are applied for the secure storage, transmission, and access of information, along with strict management of user rights for the data collected or produced. These measures guarantee that only authorised individuals can access, modify, or distribute Project content. The consortium has adopted technical, procedural, and organisational safeguards that provide adequate levels of security in data processing, ensuring privacy, integrity, availability, and system resilience.

To achieve this, SMARTIN applies advanced encryption and communication-security standards, including Advanced Encryption Standard (AES) and Transport Layer Security (TLS) protocols. Role-Based Access Control (RBAC) mechanisms are implemented to manage user permissions and minimise the risk of unauthorised access or data manipulation. Security implementation is coordinated under Task 1.5 (Data Management, Ethics and Open Science), in close collaboration with the technical partners responsible for the Project's digital infrastructure and analytics framework.

Personal and sensitive data collected during SMARTIN are stored exclusively on secure servers located within the European Union and managed in compliance with the General Data Protection Regulation (EU 2016/679). Data storage, transmission, and long-term preservation strictly observe GDPR cross-border-transfer restrictions. Long-term preservation for open datasets is ensured through Zenodo, hosted by CERN, while restricted or confidential data remain stored within partner infrastructures equipped with encryption and access-control safeguards.

All datasets processed in SMARTIN undergo classification and sensitivity assessment. Data are categorised as *public*, *internal Project*, *confidential*, or *personal/sensitive*, according to their content and level of protection required. This classification determines the applicable safeguards, such as encryption level, access restrictions, and pseudonymisation requirements.

Each consortium partner is responsible for handling personal data collection and processing through its designated DPO and institutional IT systems. The partners' DPOs ensure adherence to national and EU data-protection laws and maintain documentation of compliance procedures. Secure storage and data-protection mechanisms are coordinated and monitored at consortium level under WP 1, guaranteeing alignment with Horizon Europe security standards and FAIR-data requirements.

Project partners also apply security measures to data collected through the SMARTIN website and online engagement activities. Detailed privacy notices and cookie policies are provided in accordance with EU data-protection law. Robust archiving and preservation procedures are implemented to maintain data availability for verification and re-use, including regular backups, version control, and documentation to support transparency and reproducibility.

To prevent misuse or accidental breaches, organisational safeguards such as access controls, user authentication, audit logging, and staff training on data protection and cybersecurity are in place.

Cybersecurity practices are aligned with the NIST Cybersecurity Framework[5], addressing identification, protection, detection, response, and recovery. The consortium also builds on best practices and outcomes from previous EU Projects in the CCAM domain, enhancing cyber-resilience and security awareness across the SMARTIN ecosystem.

A long-term data-preservation plan will be developed to ensure integrity and accessibility of datasets after Project completion. This plan defines strategies for maintaining data authenticity, ensuring future readability, and managing curation activities over time in compliance with FAIR and GDPR principles.

4.1 SENSITIVE INFORMATION

In the context of SMARTIN, “sensitive information” refers to any data, documents, or materials, in any form, that have been explicitly identified as sensitive in writing. Such information must be treated with strict confidentiality and handled in accordance with the provisions of the GA and Consortium Agreement, both during the Project implementation and for the confidentiality period specified in the GA’s data sheet. If requested by a beneficiary, the Granting Authority may agree to extend this confidentiality period.

Beyond contractual confidentiality obligations, SMARTIN also handles sensitive categories of research data, particularly those generated or collected during pilot site demonstrations, stakeholder engagement activities, and behavioural studies. When processing sensitive data, the protection of privacy is paramount. SMARTIN ensures that all personal and sensitive data are collected and processed lawfully, fairly, and transparently, in full compliance with the General Data Protection Regulation (EU 2016/679) and applicable national legislation.

Individuals provide informed consent before any personal data collection or processing, and such data are used exclusively for the stated purposes of the Project. To prevent the identification of individuals, pseudonymisation and anonymisation techniques are systematically applied prior to any data analysis, sharing, or publication. Sensitive personal information is stored securely, retained only for the Project’s duration, and deleted or anonymised after the Project ends. Data are protected through controlled access and strong authentication mechanisms, and only authorised partners can access them within their area of responsibility. Data sharing with external parties outside the SMARTIN consortium occurs only with the explicit consent of the data subject or when required under GDPR provisions. Any publication or reporting uses only aggregated and non-identifiable data, ensuring that individuals cannot be recognised. Each partner is responsible for securely managing the sensitive data it collects, maintaining full accountability for compliance with GDPR, ethical guidelines, and Project policies.

The SMARTIN consortium has also defined a robust framework for confidentiality and intellectual property (IP) management, aligned with the Consortium Agreement and Horizon Europe model terms. Background IP ownership and access rights are defined in the Consortium Agreement, while results (foreground) are owned by the partner that generates them. Jointly created results are subject to shared ownership among contributing partners.

The implementation of technical and organisational measures for protecting sensitive information is coordinated by ERTICO – ITS Europe, as Project Coordinator, together with partners leading the technical work packages. FRONT, as leader of Task 1.5 (Data Management, Ethics and Open Science),

[5] https://www.nist.gov/cyberframework

acts as the ethics and data-protection lead, ensuring compliance with GDPR, confidentiality obligations, and ethical standards across all Project phases.

4.2 DATA ACT (REGULATION (EU) 2023/2854)

The Data Act (Regulation (EU) 2023/2854), adopted on 13 December 2023, establishes harmonised rules on the fair access to and use of data across the European Union. It applies from 12 September 2025, forming a central pillar of the European Data Strategy and complementing the Data Governance Act (Regulation (EU) 2022/868), the Open Data Directive (Directive (EU) 2019/1024), and the GDPR, Regulation (EU) 2016/679. The Data Act introduces a legal framework designed to balance the interests of data holders and data users, ensuring fairness, transparency, and innovation in the sharing of industrial and IoT-generated data. Its main goal is to make more data available for economic and social benefit, while protecting key elements such as privacy and cybersecurity.

The SMARTIN Project supports the goals of the Data Act by creating a data-driven system that improves the performance and management of transport infrastructure. The Project generates and processes diverse datasets from connected infrastructure sensors, traffic simulations, digital twins, and environmental monitoring across four European pilot sites. While these datasets may not always contain personal information, they include high-value industrial and operational data, the sharing and reuse of which are addressed by the Data Act. In the context of SMARTIN, the Data Act provides a legal and ethical framework to guide several key aspects:

- Access and use of non-personal and industrial data produced by Project tools, models, and pilot activities.
- Fair and transparent data-sharing conditions between partners, including research centres, operators, authorities, and small and medium-sized enterprises (SMEs), as well as with authorized third parties.
- Protection of confidential and commercially sensitive information while enabling data-driven collaboration in the public interest.
- Interoperability with other EU data spaces, including the forthcoming Common European Mobility Data Space (EMDS).

Task 1.5 of SMARTIN focuses on Data Management, Ethics, and Open Science, ensuring that the consortium's data governance and sharing practices align with the fundamentals outlined in the Data Act. A key aspect of SMARTIN's framework is the commitment to fairness and non-discrimination in data sharing and reuse. All agreements regarding data exchange are established on fair, reasonable, and non-discriminatory (FRAND) terms. This guarantees that all partners and authorized third parties have equal access to the data essential for research, policy support, and demonstration activities.

Transparency is another critical principle within the framework. Conditions for accessing data, including permissible uses, retention periods, and rights related to attribution, are clearly defined in the metadata and contractual agreements associated with each dataset. Partners must specify the type of data shared, whether it is personal, non-personal, or industrial, along with any applicable restrictions in accordance with the Data Act. Data providers within SMARTIN, which may include municipalities, research institutions, and mobility operators, retain ownership of the data they generate while permitting

access for designated Project objectives. Users are responsible for ensuring that any reuse of data adheres to confidentiality requirements, ethical protocols, and data protection regulations.

SMARTIN's governance model also supports the reuse of non-personal datasets by public authorities, in line with the principles of the Data Act. This reuse enables these authorities to conduct analyses relevant to safety, environmental issues, and mobility policy, provided such activities are carried out under appropriate legal and proportional conditions. The Project emphasizes the protection of trade secrets and confidentiality as essential components of its data governance. To prevent unauthorized disclosures of sensitive information, SMARTIN incorporates technical safeguards such as encryption, controlled access, and pseudonymization, alongside contractual measures that comply with the Data Act.

Finally, the governance framework of SMARTIN incorporates provisions for portability and cloud switching, which are essential for the design of its IT infrastructure. This allows for secure transfers of datasets between servers or repositories, offering flexibility while preventing dependency on a single vendor. Furthermore, SMARTIN's data architecture is built in compliance with open technical specifications and metadata standards that align with the European Interoperability Framework (EIF) and the interoperability requirements established by the Data Act. This alignment ensures that the datasets generated can be seamlessly integrated into future European data spaces, thereby promoting a cohesive and interconnected data ecosystem. By embedding these principles within its data governance framework, SMARTIN aims to promote responsible data management practices, enhance collaboration among stakeholders, and build trust throughout the Project's lifecycle.

The provisions of the Data Act are implemented within SMARTIN through its Data Management Plan (DMP) and partner agreements, which ensure several critical aspects. These include the full traceability of data-sharing activities across pilot sites and the documentation of access requests and permissions in the Project's metadata catalogue. Additionally, privacy-by-design and security-by-default principles are applied in all data exchange mechanisms to protect sensitive information. The Ethics and Data Protection Lead, FRONT, continuously monitors compliance with EU legal updates and secondary legislation related to the Data Act. Furthermore, the consortium will adhere to the implementation guidance and secondary acts issued by the EC and the European Data Innovation Board, which encompass standard contractual clauses and model terms for business-to-business (B2B) and business-to-government (B2G) data-sharing agreements.

By aligning with the Data Act, SMARTIN enhances the EU's goal of creating a trusted mobility data ecosystem that fosters collaboration among research institutions, industry, and public administrations. This alignment significantly increases the Project's ability to contribute to key initiatives. Firstly, it supports the Common European Mobility Data Space (EMDS) initiative, facilitating interoperability with other data infrastructures funded by Horizon Europe and the Connecting Europe Facility (CEF). Secondly, it promotes evidence-based policymaking by improving data availability for crucial areas such as safety, sustainability, and infrastructure planning. Lastly, SMARTIN encourages innovation and competitiveness by enabling fair and secure reuse of industrial and environmental data generated through its pilot Projects. This integrated approach not only strengthens the Project's outcomes but also advances the overall transport and mobility landscape within Europe.

5 Ethical aspects

The SMARTIN Project has been designed to integrate ethical, social, and legal considerations into all its objectives, methodologies, and expected impacts, as outlined in the GA. This ensures that the solutions developed by SMARTIN are technically robust, socially acceptable, legally compliant, and environmentally sustainable.

The Project involves human participants both as researchers and as end users, and it includes the collection and processing of personal data during dissemination, surveys, workshops, and pilot demonstrations. A strong ethical framework therefore governs all related activities. The SMARTIN consortium has extensive experience in conducting ethically sound research in full compliance with national and EU legislation, international conventions, and institutional requirements.

Ethical compliance in SMARTIN is a shared responsibility among all consortium partners, each ensuring that the activities under their remit respect ethical principles and relevant legal frameworks. Oversight and coordination of ethics and data-protection matters are ensured through Task 1.5 (Data Management, Ethics and Open Science), led by FRONT, which provides operational guidance and monitors compliance. The Project Coordinator (ERTICO – ITS Europe) ensures that ethics-related deliverables and documentation are submitted to the Granting Authority in accordance with Horizon Europe obligations and the GA.

Research activities are carried out in compliance with EU and national data-protection and ethics legislation, as well as with international conventions and declarations relevant to research involving human participants, including:

- **Council of Europe, Committee of Ministers (1990).** *Council of Europe, Committee of Ministers, Recommendation No. R (90) 3 Concerning Medical Research on Human Beings (Feb. 6, 1990), reprinted in 41 International Digest of Health Legislation 461 (1990)*[6].
- **Council of Europe (1997).** Council of Europe, 1997, *Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine (Oviedo Convention)*[7].
- **UNESCO (2005).** *Universal Declaration on Bioethics and Human Rights.* Paris: United Nations Educational, Scientific and Cultural Organization (UNESCO)[8].
- **Charter of Fundamental Rights of the European Union (2000/C 364/01).** (Official Journal of the European Communities, C 364, 18.12.2000)[9].

[6] https://hrlibrary.umn.edu/instree/coerecr90-3.html
[7] https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&treatynum=164
[8] https://unesdoc.unesco.org/ark:/48223/pf0000146180
[9] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A12000C364%2F01

- Regulation (EU) 2016/679 (GDPR), ensuring the protection of natural persons with respect to the processing of personal data and the free movement of such data[10].

Ethical safeguards within SMARTIN include the preparation of participant-information sheets and consent forms, the application of anonymisation or pseudonymisation wherever possible, and strict adherence to transparency and accountability principles.

SMARTIN also addresses the ethical challenges associated with large-scale, real-time data collection from connected vehicles, IoT devices, and environmental sensors. These data are secured through encryption, secure-communication protocols, and controlled access. Artificial-intelligence components developed within SMARTIN follow the EU Ethics Guidelines for Trustworthy AI (High-Level Expert Group on AI, 2019), ensuring transparency, explainability, and avoidance of discriminatory bias.

In addition, the DNSH principle is systematically integrated into Project impact assessments to guarantee that all outcomes contribute to environmental sustainability and societal well-being.

SMARTIN is fully committed to compliance with European and national data-protection frameworks. The central reference is the GDPR, Regulation (EU) 2016/679[11], which sets out the principles of lawfulness, fairness, transparency, data minimisation, accuracy, storage limitation, integrity, and confidentiality for all processing of personal data (European Union, 2016[12]). These principles are embedded in all SMARTIN activities involving personal or sensitive information, including surveys, workshops, pilot demonstrations, and dissemination actions.

❖ **Data Protection by Design and by Default:** SMARTIN implements data protection through the principle of Data Protection by Design and by Default (Article 25 GDPR). Systems and processes are designed to ensure that only the minimum necessary data are processed and that privacy safeguards are integrated from the outset. Practical measures include:

- Pseudonymisation and anonymisation to reduce re-identification risk.
- Data minimisation in collection, access, sharing, and retention.
- Encryption and hashing of data in storage and transmission.
- Use of trusted, privacy-compliant services and repositories such as **Microsoft SharePoint** (for internal exchange) and **Zenodo** (for long-term preservation).
- Mechanisms allowing data subjects to exercise GDPR rights, including access, rectification, erasure, and withdrawal of consent.

❖ **Technical and Organisational Safeguards:** Each consortium partner applies technical and organisational measures proportionate to the sensitivity of the data handled, under the supervision of its **DPO**. Backup and recovery policies ensure data integrity and availability, including regular

[10] https://eur-lex.europa.eu/eli/reg/2016/679/oj
[11] https://eur-lex.europa.eu/eli/reg/2016/679/o
[12] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32016L0680

backups and secure replication. Zenodo (**CERN, 2024, Zenodo Repository**[13]) preserves open research outputs within CERN Data Centres located in the EU, ensuring long-term storage and distributed redundancy. Sensitive data are retained securely by the collecting partner, together with signed consent forms, in password-protected and access-controlled environments.

❖ **Informed Consent Procedures:** Informed consent is fundamental to the ethical framework of SMARTIN. Participants must clearly understand the purpose of the Project, the nature of their participation, and how their personal data will be used. Consent guarantees that participation is voluntary, informed, and based on an understanding of potential benefits and risks.
Participants receive a SMARTIN Participation Information Sheet (PIS) and a SMARTIN Consent Form (CF) written in clear, non-technical language. These documents specify:

- The types of data to be collected (e.g., demographic details, survey responses, sensor outputs).
- The collection methods (e.g., interviews, online surveys, automatic recording).
- The purpose and expected results of the activity.
- How data will be handled, stored, and anonymised.
- Who will have authorised access to the data.
- The rights of participants, including voluntary participation and the right to withdraw at any time without consequences.

SMARTIN partners responsible for organising workshops, surveys, focus groups, and pilot demonstrations will ensure that consent is sought prior to participation, and that individuals have sufficient time and opportunity to ask questions. Consent will be documented (either signed or digitally confirmed), securely stored, and monitored in accordance with Regulation (EU) 2016/679 (GDPR) as well as Horizon Europe ethics requirements.

- **Consent for Surveys, Workshops, and Pilot Demonstrations:** In SMARTIN, surveys, workshops, and pilot demonstrations are conducted across all four pilot sites to gather feedback from stakeholders, end users, and citizens. Before participation, individuals are informed about the objectives of the activity, the categories of data to be collected, and how the information contributes to Project evaluation. Written consent is then recorded either on paper or electronically. No participation occurs without prior explicit and traceable consent. Implementation of these procedures is ensured by the partner responsible for each pilot, under the coordination and oversight of Task 1.5 (Data Management, Ethics and Open Science). Personal and sensitive data collected through these activities are anonymised or pseudonymised before analysis, and results are reported only in aggregate form to prevent identification.

- **Long-Term Preservation:** SMARTIN ensures the long-term preservation of research data by depositing them in **Zenodo** or other **OpenAIRE-compliant repositories**. These repositories assign persistent identifiers (DOIs), maintain FAIR-compliant metadata, and guarantee that the

datasets remain accessible and reusable beyond the Project lifetime (CERN, 2024, *Zenodo Repository*[14]).

- **Sensitive and Classified Information:** If Project activities involve handling sensitive information subject to security requirements, beneficiaries will obtain all necessary approvals before starting such tasks and will comply with any restrictions imposed by the Granting Authority. Disclosure or dissemination of such information will only occur with prior written approval.
  If EU classified information is generated or used, it will be treated in strict compliance with the Security Classification Guide (SCG), the Security Aspect Letter (SAL), and the provisions of Commission Decision (EU, Euratom) 2015/444 on security rules for protecting EU classified information, until declassified (European Commission, 2015[15]). Tasks involving EU classified information may only be subcontracted with explicit written approval and only to entities established in EU Member States or in countries with an EU security of information agreement.

5.1 COMPLIANCE WITH ETHICAL PRINCIPLES AND LEGISLATIONS

Ethical oversight in **SMARTIN** ensures that all research, development, and demonstration activities are conducted responsibly and transparently, in full accordance with **Horizon Europe requirements**, **EU and national legislation**, and the commitments described in the **GA**. Ethics is treated as a cross-cutting responsibility that guides the Project's objectives, methodologies, and expected impacts.

5.1.1 ETHICAL REVIEW PROCEDURES

Any activity involving sensitive information or data with security implications must comply with additional requirements established by the Granting Authority. Before starting such tasks, beneficiaries must obtain all mandatory ethics approvals or supporting documentation required for implementation. These documents are retained by each partner and submitted to the Project Coordinator (ERTICO – ITS Europe) upon request for review or forwarding to the Granting Authority. Where documents are not available in English, they are accompanied by an English summary. Information subject to disclosure restrictions is handled in accordance with the recommendations of the Granting Authority and may be disseminated only after written approval. This requirement applies to a wide range of SMARTIN activities, including stakeholder engagement under WP1, data-collection and modelling work in WP2–WP5, and pilot demonstrations and evaluation under WP6. Ethics approvals guarantee that all actions respect fundamental rights and comply with relevant EU and national frameworks.

[14] https://zenodo.org
[15] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015D0444

5.1.2 COMPLIANCE MONITORING

Compliance with ethical principles and legislation in SMARTIN extends beyond the initial approvals and covers all Project activities and impacts. Each partner is responsible for ensuring that the tasks under its remit meet the applicable ethical and legal requirements, including securing and retaining all necessary approvals. The Project Coordinator (ERTICO – ITS Europe) holds overall responsibility for continuous monitoring of ethical performance, while Task 1.5 (Data Management, Ethics and Open Science), led by FRONT, provides the operational framework for ethics and data-protection management across the Project.

Human participants involved in SMARTIN activities will be adults who voluntarily participate and provide explicit informed consent after being fully briefed on the Project's purpose and any potential risks. Personal data will be protected in accordance with privacy standards, and participants retain the right to withdraw and request data deletion at any time. SMARTIN follows recognised international standards of good ethical practice, including the Declaration of Helsinki (World Medical Association, 2013), the European Group on Ethics in Science and New Technologies, and the Economic and Social Research Council Research Ethics Framework.

SMARTIN will ensure compliance with key legal standards, including:

- GDPR, Regulation (EU) 2016/679[16])
- Charter of Fundamental Rights of the EU (2000/C 364/01[17])
- Directive 2000/31/EC (Directive on Electronic Commerce[18])
- Directive 2002/58/EC (Directive on privacy and electronic communications[19])
- Convention No. 108 of the Council of Europe for the Protection of Individuals regarding Automatic Processing of Personal Data[20].
- Regulation (EU) 2019/2144 on Type-Approval Requirements for Motor Vehicles, protecting vehicle occupants and vulnerable road users[21].
- Directive (EU) 2016/680 (Law Enforcement Directive[22])
- Directive 2010/40/EU (ITS Directive) on the Framework for the Deployment of ITS[23].

The consortium also commits to submitting relevant documentation (e.g., ethics approvals, consent forms, compliance checks) to the Granting Authority or its appointed ethics reviewers upon request.

[16] https://eur-lex.europa.eu/eli/reg/2016/679/oj
[17] https://eur-lex.europa.eu/eli/treaty/char_2012/oj
[18] https://eur-lex.europa.eu/eli/dir/2000/31/oj
[19] https://eur-lex.europa.eu/eli/dir/2002/58/oj
[20] https://www.coe.int/en/web/data-protection/convention108-and-protocol
[21] https://eur-lex.europa.eu/eli/reg/2019/2144/oj
[22] https://eur-lex.europa.eu/eli/dir/2016/680/oj.
[23] https://eur-lex.europa.eu/eli/dir/2010/40/oj

Non-compliance or deviations are addressed through corrective actions coordinated by the Project management.

5.1.3 ETHICAL OVERSIGHT OF METHODOLOGIES AND IMPACTS

Ethical review and monitoring in SMARTIN extend beyond initial approvals, covering the broader dimension of the Project's methodologies, objectives, and expected impacts. Ethical oversight ensures that the design, development, and implementation of SMARTIN's framework, technologies, and pilot demonstrations respect fundamental rights, promote inclusiveness, and safeguard environmental and societal well-being. This includes:

- Stakeholder engagement: Under WP6, stakeholder consultations, governance models, and demonstration planning are designed to reflect societal needs and ethical considerations. Structured engagement and participatory workshops ensure that user perspectives, accessibility, and inclusiveness are incorporated into the co-creation and testing of SMARTIN solutions.
- AI ethics: AI and data-driven systems developed within WP3 and applied in WP4–WP6 are reviewed against the EU Ethics Guidelines for Trustworthy AI (European Commission, 2019[24]). The review process focuses on fairness, explainability, transparency, and bias prevention. AI applications in SMARTIN are limited to mobility, infrastructure performance, and traffic management, and do not involve high-risk domains or autonomous decision-making that could impact individual rights.
- Gender equality and inclusiveness: Ethical monitoring also addresses gender balance and inclusiveness in stakeholder engagement, data collection, and dissemination. Gender-sensitive indicators are integrated into the Project's monitoring and evaluation frameworks under WP6, ensuring that outcomes reflect diverse mobility needs and that no groups are excluded from participation or benefits.
- DNSH: In line with Horizon Europe's DNSH principle, environmental and social impacts are assessed throughout the demonstration and evaluation activities. The Project ensures that its innovations contribute to sustainable, low-emission, and resilient mobility without causing harm to the environment or society.

By combining ethics approvals, continuous monitoring, and structured oversight of methodological and societal impacts, SMARTIN guarantees that ethical and legal principles are embedded across all phases of the Project and regularly reviewed throughout its duration.

[24] https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai

3.1.1 CONSEQUENCES OF NON-COMPLIANCE

Non-compliance with ethical principles, legislation, or obligations can have serious consequences under the Horizon Europe GA. If a breach occurs, the Granting Authority (CINEA) may require the beneficiary to implement immediate corrective measures and may suspend payments or specific Project activities until full compliance is restored. In cases of serious or repeated non-compliance, the GA may be partially or fully terminated. Furthermore, the Granting Authority retains the right to recover funds already disbursed if activities are determined to violate ethical or legal requirements, including breaches of the GDPR, Regulation (EU) 2016/679), the Charter of Fundamental Rights of the European Union, or other relevant EU legislation.

Such oversight ensures that the consortium maintains the highest standards of ethical conduct, legal compliance, and accountability throughout the lifetime of SMARTIN.

5.2 AI ETHICS: BIAS PREVENTION, EXPLAINABILITY, AND ACCOUNTABILITY

AI plays a central role in SMARTIN, enabling data-driven decision-making for infrastructure performance assessment, multimodal orchestration, predictive maintenance, and traffic-management optimisation within the CCAM ecosystem. In accordance with the EU Ethics Guidelines for Trustworthy AI (European Commission, 2019[25]) and the GDPR, Regulation (EU) 2016/679[26], SMARTIN ensures that the design, development, and deployment of AI systems uphold the principles of lawfulness, fairness, transparency, human oversight, and accountability.

Ethical governance of AI within SMARTIN is guided by the Charter of Fundamental Rights of the European Union (2000/C 364/01) and aligned with the forthcoming EU AI Act (COM/2021/206), which categorises SMARTIN's AI components as limited-risk applications. Ethical and technical oversight is embedded throughout the Project lifecycle under Task 1.5 (Data Management, Ethics and Open Science), which monitors compliance with EU legal and ethical frameworks.

Bias Prevention and Fairness: A core ethical priority for SMARTIN is preventing bias within its AI models. To achieve this, the Project constructs diverse and representative datasets that capture a wide range of geographical, infrastructural, and behavioural contexts across its four pilot sites (Barcelona, Turin, Budapest and Latvia). This approach helps avoid under-representation of vulnerable road users, people with disabilities, and minority groups. Continuous evaluation accompanies model training and validation through statistical fairness tests and sensitivity analyses. SMARTIN applies an adaptive bias-mitigation methodology, allowing for periodic reassessment and refinement of fairness measures as data and models evolve. Whenever bias is detected, corrective techniques—such as re-sampling, feature-balancing, or weighted-loss

[25] https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai
[26] https://eur-lex.europa.eu/eli/reg/2016/679/oj

adjustments—are implemented according to context. This dynamic process reflects current best practices in responsible AI development and supports inclusion across mobility scenarios.

Explainability and Transparency: Explainability and transparency are integral to SMARTIN's ethical AI framework. By prioritizing interpretability, the Project ensures that stakeholders understand how automated recommendations are generated. For critical applications, SMARTIN favours interpretable models or employs Explainable AI (XAI) methods—such as feature-importance ranking, surrogate modelling, and visual attribution—to clarify relationships between inputs and predicted outcomes. The Project remains open to adopting evolving explainability techniques as AI research advances, consistent with the approach described in Lipton, Z. C. (2018). The Mythos of Model Interpretability. *CM Queue*, 16 (3)[27]. Each AI component is accompanied by comprehensive technical documentation, including its purpose, data sources, parameters, limitations, and validation metrics. This ensures accountability and transparency for all stakeholders.

Accountability and Human Oversight: Accountability within SMARTIN is guaranteed through rigorous documentation, audit trails, and human-in-the-loop supervision. AI modules act as decision-support tools, not autonomous agents. Human operators validate and approve AI-assisted outputs, ensuring that final decisions remain under human control. All AI decisions are logged with version identifiers, input datasets, and outcome summaries to ensure traceability. The Ethics and Data-Protection Lead (FRONT), together with the Project Coordinator (ERTICO – ITS Europe), conducts periodic internal audits to verify that AI applications comply with the principles of fairness, transparency, and accountability.

Continuous Monitoring and Improvement: SMARTIN establishes a continuous monitoring framework to ensure that AI systems remain reliable, transparent, and ethically aligned throughout their lifecycle. This framework reflects the ISO/IEC 23894:2023 AI – Guidance on Risk Management standard, incorporating both quantitative and qualitative evaluation methods. Monitoring covers model performance (accuracy, robustness, and fairness), adaptability to evolving datasets, and responsiveness to stakeholder feedback. It also integrates explainability metrics to balance model complexity with interpretability. Structured feedback channels allow end users, policymakers, and mobility operators to report insights that inform iterative model improvement. All AI development and operation within SMARTIN adhere to applicable EU legal and ethical frameworks, including the GDPR, the OECD Principles on AI (2019)[28], and forthcoming provisions of the EU AI Act.

By embedding bias prevention, explainability, and accountability into its AI governance, SMARTIN advances trustworthy and responsible AI for European mobility. This ethical approach ensures that AI-based decision-support systems remain fair, transparent, inclusive, and human-centric, reinforcing public trust and supporting the safe and equitable deployment of CCAM technologies across Europe.

[27] https://dl.acm.org/doi/10.1145/3236386.3241340
[28] https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449

5.3 GENDER EQUALITY AND INCLUSIVENESS CONSIDERATIONS IN DATA HANDLING

SMARTIN recognizes that gender equality and inclusiveness are essential components of ethical and responsible research and innovation. In line with the EC Gender Equality Strategy 2020–2025 (European Commission, COM/2020/152)[29] and the Horizon Europe Guidance on Gender Equality Plans (European Commission, 2021)[30], SMARTIN integrates gender balance, diversity, and inclusiveness across all dimensions of data collection, management, analysis, and dissemination. This approach ensures that Project outcomes contribute to equitable, accessible, and user-oriented mobility solutions that reflect the diversity of European societies.

5.3.1 INTEGRATING GENDER EQUALITY IN DATA DESIGN AND COLLECTION

At the core of SMARTIN's ethical framework lies a commitment to ensuring that data collection processes are free from bias and inclusive of diverse population groups. All surveys, stakeholder workshops, and citizen engagement activities are designed to achieve balanced participation across gender, age, and socio-economic backgrounds. When collecting personal or behavioural data, disaggregation by sex, age, and other relevant variables is systematically applied where appropriate, ensuring compliance with data protection principles and ethical standards. This practice aligns with recommendations from the European Institute for Gender Equality (EIGE), which highlights the necessity of sex-disaggregated data for analysing gendered patterns in mobility behaviour and transport safety (EIGE, 2023)[31]. To avoid gender bias in the composition of the data set, SMARTIN pays particular attention to ensuring the representation of vulnerable and underrepresented groups, such as women, older citizens, people with disabilities, and low-income commuters, whose mobility needs are often not adequately addressed in traditional transport planning. By directly involving these groups in surveys, co-creation activities, and validation exercises, SMARTIN ensures that the data used to develop models reflects real-world diversity and supports inclusive policy outcomes.

5.3.2 GENDER-SENSITIVE DATA ANALYSIS AND BIAS MITIGATION

Gender and inclusiveness considerations extend beyond data collection to all analytical stages. Data analysis pipelines incorporate fairness auditing mechanisms to identify and mitigate potential gender or demographic bias in algorithms and predictive models. This process is consistent with the OECD Toolkit for Mainstreaming and Implementing Gender Equality (OECD, 2023)[32] and the fairness principles of

[29] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0152
[30] Horizon Europe guidance on gender equality plans - Publications Office of the EU
[31] https://eige.europa.eu/
[32] https://www.oecd.org/gender/toolkit/

the EU Ethics Guidelines for Trustworthy AI (European Commission, 2019[33]). During model design and validation, SMARTIN will seek to integrate gender and inclusiveness considerations to ensure that analytical processes and algorithms remain fair and representative. The Project aims to explore the use of gender-disaggregated or inclusiveness-sensitive metrics where relevant, to help identify whether future tools or datasets might inadvertently disadvantage certain demographic groups. This intention aligns with recent research advocating for the inclusion of gender and intersectionality perspectives in the evaluation of AI and mobility systems (Criado-Perez, C., Invisible Women: Data Bias in a World Designed for Men, 2019[34]).

5.3.3 INCLUSIVENESS AND REPRESENTATION IN DATA GOVERNANCE

Inclusiveness in SMARTIN extends to the governance and ethical management of data. The consortium's governance model – coordinated through WP 1 – ensures that gender equality and diversity considerations are embedded in decision-making and ethical review processes. Task 1.5, which oversees ethics, gender, and data management, ensures that data handling practices comply with both the EU Gender Equality Strategy 2020–2025 and the Horizon Europe Gender Equality Plan (GEP) framework. Furthermore, gender equality and inclusiveness are treated as cross-cutting dimensions in stakeholder engagement, communication, and dissemination activities. This is achieved by ensuring gender balance in panels, expert groups, and public-facing Project events. Materials such as surveys, information sheets, and training content are written in inclusive and gender-neutral language, following best practices recommended in the European Institute for Gender Equality Guidelines on Gender-Sensitive Communication (EIGE, 2018)[35].

5.3.4 ETHICAL IMPACT AND LONG-TERM SUSTAINABILITY

The integration of gender equality and inclusiveness in SMARTIN is not limited to compliance but serves as a **driver of social innovation and sustainability**. By incorporating gender and inclusiveness perspectives throughout all phases of data handling—from design and collection to analysis and dissemination—the Project enhances the representativeness and social relevance of its outcomes.

This approach improves the reliability of SMARTIN's findings by accounting for gendered travel patterns, safety perceptions, and accessibility needs. It aligns with recent research showing that gender-responsive transport design leads to more equitable and sustainable mobility systems, such as **Priya Uteng & Turner (2019), *Gender and Mobility: A Critical Introduction*, Routledge[36]**.

By embedding gender and inclusiveness considerations across the entire research lifecycle, SMARTIN promotes fair, transparent, and people-centred CCAM solutions. This ensures that equality, diversity,

[33] https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai
[34] https://carolinecriadoperez.com/book/invisible-women/
[35] https://eige.europa.eu/publications/gender-sensitive-communication
[36] https://doi.org/10.4324/9780429053584

and inclusion remain fundamental principles in the twin digital and green transitions of the European transport sector.

6 CONCLUSIONS

The first version of the SMARTIN DMP and Ethics Plan aims to establish an initial unified framework on the best practices for responsible data handling across all Project activities. It defines clear procedures for processes like data creation, processing, storage, sharing and long-term preservation, that are fully aligned with the FAIR principles and all of the latest EU initiatives like GDPR, Data Act as well as with the Horizon Open Science requirements. It also embeds ethical by design principles across all stages of the Project addressing the most important aspects such as informed consent, sensitive data protection, AI ethics, bias prevention, transparency and inclusiveness. This way we are ensuring that the Project's technological innovations remain fully aligned with European societal values.

The DMP will serve as a living document that will continuously evolve alongside the technical developments and pilot deployments of the SMARTIN solutions. Future official reports (D1.4 and D1.6) will refine the data governance procedures based on actual pilot operations, emerging regulatory developments and feedback from consortium members or advisory bodies. This way, SMARTIN will ensure compliance, trust and reusability of its data assets all throughout the Project lifespan, while also strengthening its contribution to secure, ethical, and interoperable European mobility data ecosystem.

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ANNEX

SMARTIN PRIMARY DATA

Table 2 SMARTIN Primary Data v0.1

Output Name	Technical Provider	Related Pilot / Demo Site	Description	Associated Use Case / WP / Task	Data Type / Format	Purpose within SMARTIN	Expected Frequency / Update Rate	Expected Size (if known)
SUMO microsimulation results	LINKS Foundation	Turin pilot	All the results coming from SUMO simulations (e.g. vehicle speed, travel time, time to collision, vehicle consumption)	WP5 - T5.4: User-centric and dynamic transport spaces management WP6 - T6.2: Dynamic managment of infrastructure for susteinable and inclusive transport services (Turin Pilot)	CSV	To make decisions about dynamic lane activation; To estimate the project KPIs that cannot be calculated directly with real-environment tests	Per simulation run	< 1 MB per run
Pilot KPIs	LINKS Foundation	Turin pilot	KPIs defined in SMARTIN GA related to Turin Pilot	WP6 - T6.2: Dynamic managment of infrastructure for susteinable and inclusive transport services (Turin Pilot)	XLS	To asses Turin pilot tests	TBD	TBD
UAV-based Visual Data Capture for 2D/3D Reconstruction	CERTH-ITI	Budapest Pilot	Aerial images collected by UAVs operating through the Choosepath platform, intended for generating 2D/ 3D models of the target infrastructure or area of interest.	WP3 – T3.2 Multi-UAV Mission Planning & Data Acquisition for Infrastructure Monitoring	JPG	Provide high-resolution visual and spatial data that can enhance situational awareness and support the identification of structural issues or irregularities in the area of interest.	On-demand during scheduled UAV missions	5–20 GB per mission
Complex-Event Incident Detection & Collision Risk Signatures	Frontier Innovations / BME	Budapest Pilot	A structured dataset containing detected complex events, congestion triggers, and collision-risk signatures derived from AIS historical data and real-time AIS feeds. Includes: -time-stamped incident detections -vessel motion dynamics (speed profiles, acceleration, turning behaviour) -probabilistic collision risk metrics per vessel pair -severity classification of incidents and propagation patterns	WP4 – T4.1 Complex-Event Enabled Incident Detection and Propagation Analysis	e.g. JSON, CSV, GeoJSON	To enable downstream SMARTIN services (routing, decision support, risk prediction dashboards) to recognise and respond to developing risk situations. Provides model-derived patterns and early-warning indicators that support proactive network management and operational decision making	Real-time incident feed: every 1–5 minutes	1–5 MB per hour for real-time incident stream
Boat traffic simulation	CERTH-ITI	Budapest Pilot	Simulations of what-if scenarios taking into consideration the possible reduced number of mooring pontoons	WP4, Task 4.3: Dynamic optimisation of infrastructure elements	not known yet	visualisation	Per simulation run	not known yet
Pilot KPIs	BME	Budapest Pilot	KPIs defined in SMARTIN GA related to Budapest Pilot	WP6 - Task 6.5: Increasing the efficiency and safety of inland waterways (Budapest)	XLS	To asses Budapest pilot tests	To be defined	Not yet known

SMARTIN SECONDARY DATA

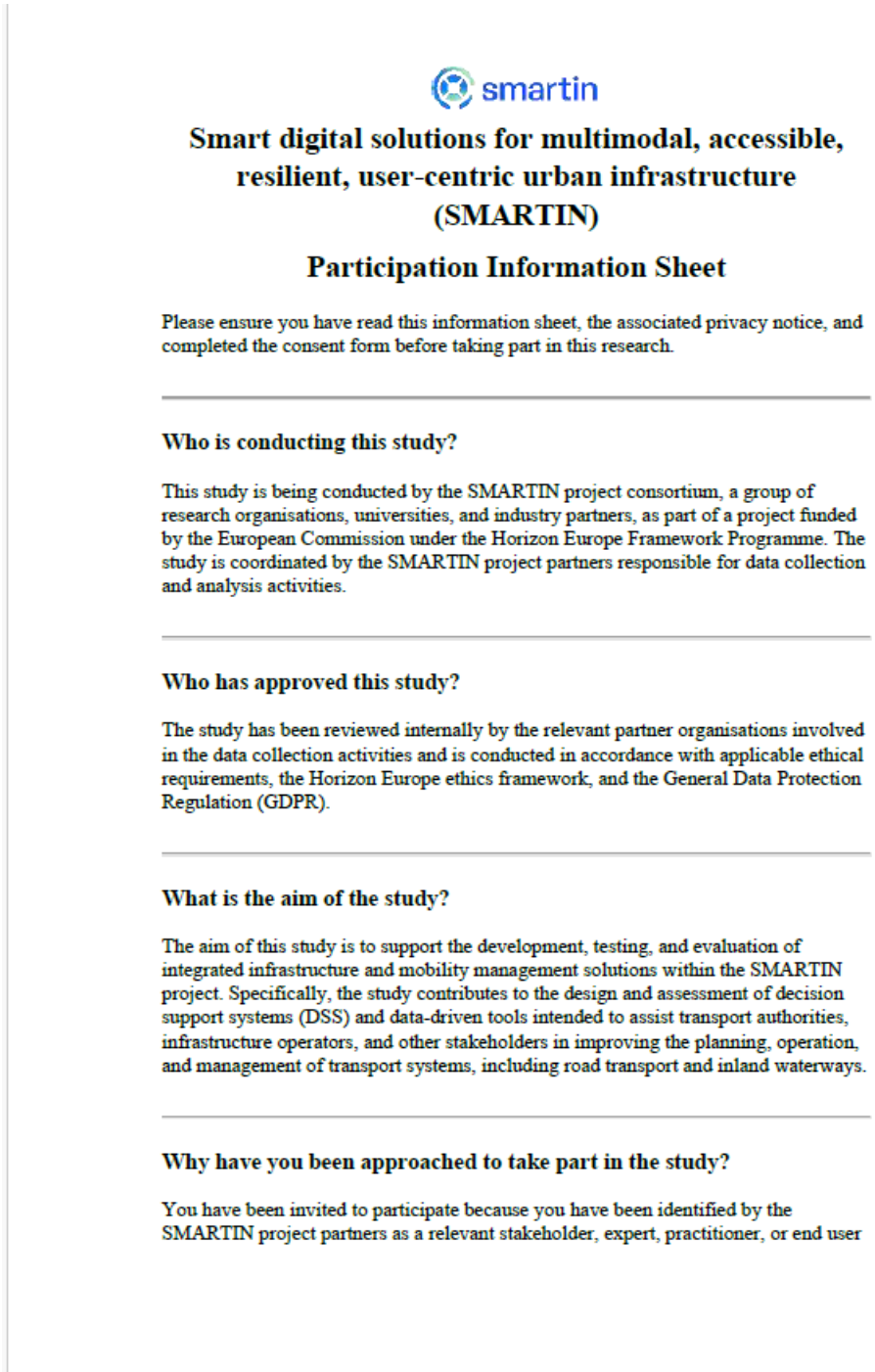
Table 3 SMARTIN Secondary Data

Dataset Name	Dataset Provider / Creator+ Contact	Data/Metadata Description	Purpose & WP/Task Link	Data Format	Data size	Data URL	Data Origin	Y/N	Personal Data (Y/N+ Type)	Ethics issues	Access & Sharing
Vehicle flows counts (real time)	LINKS Foundation. Dataset produced by 5T (LINKS's subcontractor). Giandomenico Gagliardi (giandomenico.gagliardi@5t.torino.it)	Real-time traffic counts (per single direction), over 5 minutes, from the detection points in the test area	To support reinforcement learning algorithms used to decide when activating for public transport the dynamic lane, in Turin Pilot. Specifically used in T6.2 "Dynamic managment of infrastructure for susteinable and inclusive transport services" (Turin Pilot)	TBD	TBD	N/A	Turin Traffic Control Center	Data collected directly from the network infrastructures present in the Turin Pilot area and managed by 5T	N	None	Close dataset. The data is made available by 5T to LINKS only for testing in the pilot area
Vehicle flows counts from cameras (real time)	LINKS Foundation. Dataset produced by LINKS	Real-time traffic countsand tracking, from the cameras installed ad hoc for SMARTIN in the test area	To support reinforcement learning algorithms used to decide when activating for public transport the dynamic lane, in Turin Pilot. Specifically used in T6.2 "Dynamic managment of infrastructure for susteinable and inclusive transport services" (Turin Pilot)	TBD	TBD	N/A	Digitan Twin developed in SMARTIN	Data collected directly from the cameras installed in the Turin Pilot area and managed by LINKS	N	None. Images will be used only to count the vehicles recorded and anonymously track them. All other video information will be obscured. A dedicated DPIA will be issued.	Closed dataset. The possibility of making it available to consortium partners may be assessed after appropriate GDPR checks
Geolocation of public transport vehicles	LINKS Foundation. Dataset produced by 5T (LINKS's subcontractor). Giandomenico Gagliardi (giandomenico.gagliardi@5t.torino.it)	Real-time location of public transport vehicles operating on lines passing through the Turin pilot test area	To support decisions on opening and closing the dynamic lane, dedicated to public transport. Specifically used in T6.2 "Dynamic managment of infrastructure for susteinable and inclusive transport services" (Turin Pilot)	TBD	TBD	N/A	Turin Traffic Control Center	Data collected directly from the localization systems on board the public transport vehicles	N	None	Close dataset. The data is made available by 5T to LINKS only for testing in the pilot area
GTFS	City of Turin (open data)	GTFS (General Transit Feed Specification) is a standardized format for sharing public transit schedules, routes, and associated geographic information. It allows transit agencies and developers to easily integrate this data into applications like Google Maps and other journey planning apps.	To calculate operational cost KPI. Specifically used in T6.2 "Dynamic managment of infrastructure for susteinable and inclusive transport services" (Turin Pilot)	TXT	0-12 MB	http://aperto.comune.torino.it/sv/dataset/feed-gtfs-trasporti-gtt	GTT	Data produced and published by GTT (SMARTIN partner) as part of their official transit information systems	N	None	Oped dataset
OD matrix	LINKS Foundation. Dataset produced by 5T (LINKS's subcontractor). Giandomenico Gagliardi (giandomenico.gagliardi@5t.torino.it)	OD matrix of test area trips (average weekday, 7-10 am)	To build the SUMO simulation environment of the test area. Specifically used in T6.2 "Dynamic managment of infrastructure for susteinable and inclusive transport services" (Turin Pilot)	CSV	TBD	N/A	Turin Traffic Control Center	Data estimated by 5T Traffic Supervisor in Turin Traffico Control Center	N	None	Close dataset. The data is made available by 5T to LINKS only for SUMO model
Open Street Map dataset	LINKS Foundation. Dataset produced by OpenStreetMap	Road network of the study area, with characteristics useful for microsillusion	To build the SUMO simulation environment of the test area. Specifically used in T6.2 "Dynamic managment of infrastructure for susteinable and inclusive transport services" (Turin Pilot)	XML	12 MB	N/A	Turin Traffic Control Center	Data estimated by 5T Traffic Supervisor in Turin Traffico Control Center	N	None	Close dataset. The data is made available by 5T to LINKS only for SUMO model
Vehicle flows counts (historical)	LINKS Foundation. Dataset produced by 5T (LINKS's subcontractor). Giandomenico Gagliardi (giandomenico.gagliardi@5t.torino.it)	Historica traffic counts (per single direction), over 5 minutes, from the detection points in the test area	To calibrate SUMO microsimulator used as reference of Turin pilot tests. Specifically used in T6.2 "Dynamic managment of infrastructure for susteinable and inclusive transport services" (Turin Pilot)	CSV	TBD	N/A	Turin Traffic Control Center	Data collected directly from the network infrastructures present in the Turin Pilot area and managed by 5T	N	None	Close dataset. The data is made available by 5T to LINKS only for SUMO model
Delivering-Data: A Real-World Dataset for Last-Mile Delivery Optimization	CERTH-ITI	Real-world last-mile delivery dataset from a pharmaceutical 3PL network, containing pairwise travel times (three scenarios) and distances for nine delivery days (60–85 locations each). Includes anonymized matrices suitable for VRP optimization, routing simulation, and uncertainty analysis.	To support the evaluation of routing algorithms under realistic variability and their integration into mobility-analytics work packages.	Excel/CSV (Zenodo)	424.4 MB	https://zenodo.org/records/15310106	CERTH-ITI	Real-world operational data from a pharmaceutical 3PL network.	N	None	Open dataset.
Vessel AIS data (archive)	BME (Ministry of Construction and Transport, csaba.bellyei@ekm.gov.hu)	AIS data of inland vessels are collected continously. For project purposes data for vessels moving between 1642,5-1655 river km are requested from the ministry for the period of 01.06.2025-31.08.2025. More archive data is available upon request.	Data is necessary for collision avoidance analysis and assessment for the Budapest Pilot. It serves as a basis for the development of real-time collision avoidance algorithms used by a dashboard tool for increasing the safety of navigation in Budapest area. Respective task: WP4, T4.1, T4.3 and obviously WP6, T6.5	1 txt file for each hour of the period given. For each day data is provided from 12.00 to 22.00 pm, hence 10 files per day. Must be decoded for further process. TXT files contain regular NMEA rows with time stamp	1.5 Mb for 1 txt file as an average, 1.4 Gb for the period mentioned.	Data is not OPEN	Ministry of Construction and Transport, as data owner	Data is collected by RSOE (National Association of Radio Distress Signalling and Infocommunications) via the base stations and the obligatory use of AIS transponders on each vessel Data frequency is normally couple of seconds.	Y	the original data contains the vessels name, and MMSI identifiers, that are not provided to BME by RSOE. Instead, MMSI numbers are replaced by fictive values	Data can be used by project partners for project purposes. No 3rd party access is granted.
Vessel AIS data (real-time)	BME (collected by BME with the permission of Ministry of Construction and Transport, csaba.bellyei@ekm.gov.hu)	real-time AIS data of inland vessels are planned to be collected during the pilot.	Data is necessary for the real-time collision avoidance alerts during the Budapest Pilot. The developed real-time collision avoidance algorithms use the data to provide information to boatmaster. Respective task: WP4, T4.1, T4.3 and obviously WP6, T6.5	as above. Sended by the AIS transponders, in form of regular NMEA messeges.	not known yet	Data is not OPEN	own equipment	by own equipment	Y	data contains the vessels name, and MMSI identifiers, that are sensitive values	Data can be used by project partners for project purposes. No 3rd party access is granted.
Tourist boat schedule data	BME	data regarding departure and type of boat excursions in Budapest by different service providers	creation of a common platform that is available for tourists, boat masters, travel agencies and can be connected to other data platforms	DOC or PDF, internet source	not known yet	To be provided	boat excursion service providers	collected directly from SPs	N	None.	Open dataset.
Lane type dataset	UPC (Responsible: ramon.morros@upc.edu)	videos recorded from an electric scooter and labeled with the lane type (road/sidewalk/bike lane) the vehicle is	Train/test the computer vision algorithms in T3.1	MP4, CSV	not known yet	N/A	Recorded by the UPC	Recorded using a camera on a electric scooter. Manually labeled	No	None (removed faces and License Plates that may appear)	Closed. Any interested partner may contact ramon.morros@upc.edu.
Lane defects dataset	UPC (Responsible: ramon.morros@upc.edu)	videos recorded from an electric scooter and labeled with the defects on the infrastructure	Train/test the computer vision algorithms in T3.1	MP4, CSV	not known yet (to be recorded during the project)	N/A	Recorded by the UPC	Recorded using a camera on a electric scooter. Manually labeled	No	None (removed faces and License Plates that may appear)	Closed. Any interested partner may contact ramon.morros@upc.edu.
Person density dataset	UPC (Responsible: ramon.morros@upc.edu)	videos recorded from an electric scooter and labeled with thedensity of people in front of the vehicle	Train/test the computer vision algorithms in T3.1	MP4, CSV	not known yet (to be recorded during the project)	N/A	Recorded by the UPC	Recorded using a camera on a electric scooter. Manually labeled	No	None (removed faces and License Plates that may appear)	Closed. Any interested partner may contact ramon.morros@upc.edu.
GTFS Barcelona	City of Barcelona	GTFS (General Transit Feed Specification) is a standardized format for sharing public transit schedules, routes, and associated geographic information. It allows transit agencies and developers to easily integrate this data into applications like Google Maps and other journey planning apps.	Integrate public transport services in the multifactor and dynamic nudging and routing service for the city of Barcelona	TXT	not known yet	N/A	public transport operator	communication with public transport operator	N	None	Data can be used by project partners for project purposes. No 3rd party access is granted.
GBFS Barcelona	City of Barcelona	GBFS (General Bikeshare Feed Specification), an open data standard for sharing real-time information about shared mobility services like bikes and scooters	Integrate bike-sharing services in the multifactor and dynamic nudging and routing service for the city of Barcelona	TXT	not known yet	N/A	bike-sharing operator	communication with bike-sharing operator	N	None	Data can be used by project partners for project purposes. No 3rd party access is granted.
Structural Health Monitoring (SHM) data from the openLAB research bridge	INLECOM (produced by TUD as part of the BIM4CE Interreg Project) (asimina.mertzani@inlecomsystems.com)	Near-real-world conditions data from fiber optic and electrical sensors capturing structural behavior and environment conditions of a research bridge in Bautzen, Germany.	To support the development of the AI engine that performes correlation analysis to achieve predictive assessment and maintainance.	CSV	1.01 GB	https://opara.zih.tu-dresden.de/items/8653124a-8659-40b8-817e-51250639c95b	TUD	Data is sourced from an electrical Gantner Instruments measurement system (Q.station 101T, with various Q.bloxx modules)	N	None	Open Dataset
UAV-based Visual Data Capture fo	CERTH-ITI	Aerial images collected by UAVs capturing bridge in Budapest allowing for 2D/3D reconstruction and predictive assessment.	To support defect detection and predictive maintainance as well as be demonstrated in infrastructural health monitoring system.	JPG	5-20 GB per mission (7MB/image)	N/A	CERTH-ITI	Data sampled from drones performing missions in the bridge of choice.	No	None	To be provided
GTFS Regional Bus Latvia	ATD	GTFS (General Transit Feed Specification) is a standardized format for sharing public transit schedules, routes, and associated geographic information. It allows transit agencies and developers to easily integrate this data into applications like Google Maps and other journey planning apps. We are going to use GTFS v.1	Data is collected to uset it into optimisation tool we are woring on in this project. This is to show the regional bus network on map. Data gathered into T5.1 and according to the provided requirements in T5.1 and will be used in Pilot in T6.4.	TXT (GTFS CSV files in ZIP)	~ 33 MB /weekly	https://www.atd.lv/sites/default/files/GTFS/gtfs-latvia-lv.zip	ATD official scheduling system	Extracted from operational transport systems and published in GTFS format weekly	N		None	Open
GTFS Train Latvia	ATD	GTFS (General Transit Feed Specification) is a standardized format for sharing public transit schedules, routes, and associated geographic information. It allows transit agencies and developers to easily integrate this data into applications like Google Maps and other journey planning apps. We are going to use GTFS v.1	Data is collected to uset it into optimisation tool we are woring on in this project. This is to show the regional bus network on map. Data gathered into T5.1 and according to the provided requirements in T5.1 and will be used in Pilot in T6.4.	TXT (GTFS CSV files in ZIP)	~ 5 MB/ monthly (this is estimation, because current package doesn't include all required data)	https://vivi.lv/uploads/GTFS.zip	AS Pasažieru vilciens official scheduling system	Extracted from operational transport systems and published in GTFS format monthly	N		None	Open
Vehicle and Ticketing Data Latvia	ATD	Includes ticket category (e.g., full fare, discount), origin and destination stops, timestamp of purchase/use, route ID and vehicle details (seat capacity, vehicle type, emissions class, fuel type).	Used for route optimization, occupancy percentage calculation, emissions impact analysis, and profitability evaluation in WP5 (Task 5.1) and pilot evaluation in WP6 (Task 6.4).	CSV	not specified yet	N/A	ATD ticketing system	Agregated by ATD from service providers and extracted weekly for project's needs	N		Commercial sensitivity: data cannot be shared publicly; must comply with ATD confidentiality requirements	Restricted access, to be clarified with ATD
Pilots KPIs and results	BAX with each of the 4 pilot leaders (LINKS, FACTUAL, DOTS, BME). And support from CERTH, UPC, GTT, FIT, ATD.	List of KPIs for each pilot and results for each KPI with explanations	T6.1 & T6.6 Pilot planning orchestration and assessment of multimodal infrastructure in each pilot	CSV, TBC	Not known	N/A	Recorded by each pilot, compiled by Bax	Each pilot will collect data differently. Conclusions will be shared in a common CSV file.	N		None. Ethical and legal issues should be addressed at pilot level	Open to consortium partners

Pedestrian Network	OpenStreetMap	Pedestrian and walkable-path network (footways, sidewalks, crossings, pedestrian-accessible segments).	Base network for pedestrian routing	GeoJSON / OSM XML / shapefile	20-50 MB (depending on bounding box)	OSM export / Overpass API	OpenStreetMap	The dataset is derived from OpenStreetMap by extracting pedestrian-accessible ways (footways, sidewalks, crossings, pedestrian streets) through standard OSM export and filtering procedures.	No	None	Open dataset
Elevation / DEM	Copernicus DEM	Digital Elevation Model raster dataset covering Barcelona can be used to compute slopes/elevation for pedestrian routing	To support "flattest route" or slope-aware pedestrian routing, improving accessibility and comfort	GeoTIFF / raster DEM	50–200 MB	https://browser.dataspace.copernicus.eu/	Copernicus / European Earth-observation data	The elevation data will be downloaded from publicly available EU-DEM or Copernicus DEM repositories and clipped to the Barcelona area for use in slope estimation.	No	None	Open (under Copernicus / public-domain / relevant licence)
Land-use & Amenities	OpenStreetMap/ Ajuntament de Barcelona – Open Data BCN	Geographic data on land-use zones, amenities (shops, parks, services, POIs), building use, public facilities, etc. Useful for routing that account for land-use diversity or destination attractiveness.	To enrich pedestrian routing with qualitative criteria	GeoJSON / OSM XML / shapefile	tens of MB	Overpass API/ https://datos.gob.es/en/catalogo/l01080193-usos-del-suelo-de-la-ciudad-de-barcelona?utm_source	OpenStreetMap/ Municipal land-use dataset from Ajuntament de Barcelona (Open Data BCN)	Land-use information is obtained from the official Barcelona open-data portal (Open Data BCN), while amenity and POI information is retrieved from OpenStreetMap exports. The combined dataset is produced by merging the official land-use polygons with OSM-derived amenities.	No	None	Open dataset (CC BY 4.0 licence for the municipal land-use map)
European Air Quality Index (EAQI) grid & station data	European Environment Agency (EEA) / EU – via EAQI portal	Hourly (and forecast) air quality index (AQI) values per 1 km × 1 km grid, plus station data, covering various pollutants ($PM_{2.5}$, PM_{10}, NO_2, O_3, SO_2). Useful as a layer for pollution-aware pedestrian routing to avoid polluted zones.	To support "pollution-aware routing" mode in pedestrian routing tool	Raster grid (GeoTIFF or JSON for grid), station data as CSV / JSON / API	tens to hundreds of MB	https://airindex.eea.europa.eu/AQI/index.html?utm_source	EEA / Copernicus-CAMS modelling	Air-quality data is sourced from the European Environment Agency's publicly available EAQI service, which provides modelled grid values and station measurements. The project will download the relevant data for the Barcelona region at the available temporal and spatial resolution.	No	None	Public / Open
Crowd source Data	City of Barcelona	The dataset may include counts or density estimations derived from municipal sensors, mobility services or other non-personal crowd-flow information, used to characterise relative crowding along pedestrian paths.	To support the "low-crowd route" functionality of the pedestrian routing tool by enabling avoidance of areas with relatively higher pedestrian density	JSON	not known yet	N/A	To be sourced from municipal open data services, pilot-provided sensor information, or other anonymised crowd-flow indicators available in the Barcelona urban ecosystem.	Aggregated and anonymised pedestrian-activity indicators will be provided through pilot-available sources such as municipal sensors, mobility services or other non-personal crowd-flow estimations. Data will be collected only at an aggregated level, depending on availability within the Barcelona pilot ecosystem.	No	None	Data can be used by project partners for project purposes. No 3rd party access is granted.

SMARTIN PARTICIPATION INFORMATION SHEET

Figure 1 SMARTIN Participation Information Sheet (PIS)



smartin

Smart digital solutions for multimodal, accessible, resilient, user-centric urban infrastructure (SMARTIN)

Participation Information Sheet

Please ensure you have read this information sheet, the associated privacy notice, and completed the consent form before taking part in this research.

Who is conducting this study?

This study is being conducted by the SMARTIN project consortium, a group of research organisations, universities, and industry partners, as part of a project funded by the European Commission under the Horizon Europe Framework Programme. The study is coordinated by the SMARTIN project partners responsible for data collection and analysis activities.

Who has approved this study?

The study has been reviewed internally by the relevant partner organisations involved in the data collection activities and is conducted in accordance with applicable ethical requirements, the Horizon Europe ethics framework, and the General Data Protection Regulation (GDPR).

What is the aim of the study?

The aim of this study is to support the development, testing, and evaluation of integrated infrastructure and mobility management solutions within the SMARTIN project. Specifically, the study contributes to the design and assessment of decision support systems (DSS) and data-driven tools intended to assist transport authorities, infrastructure operators, and other stakeholders in improving the planning, operation, and management of transport systems, including road transport and inland waterways.

Why have you been approached to take part in the study?

You have been invited to participate because you have been identified by the SMARTIN project partners as a relevant stakeholder, expert, practitioner, or end user

who may be willing and able to contribute valuable insights related to the objectives of the study.

Are there any risks in taking part?

There are no foreseeable risks associated with taking part in this study. You are not required to provide sensitive personal data, and you may choose not to answer any question that you do not feel comfortable responding to. If you have any concerns, you may contact the responsible research partner using the contact details provided below.

What will it involve?

You may be asked to participate in interviews, questionnaires, workshops, or other consultation activities. You are free to answer questions as broadly or as narrowly as you wish, and you may skip any question(s) you prefer not to answer.

How will the information given be kept and used?

Where applicable, interviews may be audio recorded for research purposes. Recordings will be transcribed and the audio files deleted thereafter. All information you provide will be treated confidentially and anonymised. You will not be asked to provide personal information that allows you to be directly identified.

The data collected will be stored securely and accessed only by authorised members of the SMARTIN research team. Anonymised and aggregated results may be used in project reports, deliverables, presentations, and scientific or technical publications. No individual participant will be identifiable in any dissemination activity.

Do I have to participate in the study and what if I change my mind?

Participation in this study is entirely voluntary. You are free to withdraw at any time, before, during, or after your participation, without providing a reason. If you decide at a later stage that you do not wish your contributions to be included in the study, you may request their removal by contacting the research team. Requests for withdrawal can be made up to two weeks after your participation.

What do I do if I have any queries?

If you have any questions about the study or your participation, you may contact the relevant SMARTIN project partner responsible for the activity, whose contact details will be provided separately.

SMARTIN CONSENT FORM

Figure 2 SMARTIN Consent Form (CF)

Smart digital solutions for multimodal, accessible, resilient, user-centric urban infrastructure (SMARTIN)

SMARTIN Consent Form

- I confirm that I have read and understood the Participant Information Sheet for the above-named study and that I have had the opportunity to ask questions.
- I understand that my participation is voluntary and that I am free to withdraw at any time, before, during, or after my involvement, without giving a reason and without any consequences. I also understand that I may request the removal of my contributions up to two weeks after my participation.
- I give permission for the SMARTIN project researchers to have access to my anonymised responses and for these to be stored and processed in accordance with applicable data protection legislation, including the General Data Protection Regulation (GDPR). I understand that no personally identifiable information will appear in the study findings and that anonymised data may be used in project reports, presentations, and/or publications.
- I agree to take part in the study.

Name (Printed):

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Signature:

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Date:

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Alternatively, consent may be provided electronically (e.g. by email or via an online form), in which case the participant's explicit confirmation will be recorded by the responsible SMARTIN project partner.