SmartUrbanity

Project Deliverable

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Executive Summary

SmartUrbanity is an applied research and innovation project funded under the Driving Urban Transitions (DUT) Partnership, aiming to operationalize the 15-minute city paradigm through digital innovation, human-centred design, and citizen co-creation. The project responds to the pressing need for more equitable, inclusive, and perception-sensitive urban accessibility by developing a multi-component digital infrastructure capable of modelling, visualizing, and improving how different social groups experience and evaluate their access to urban services. With deployment across five diverse European urban contexts—Rome, Karlsruhe, İzmir, Lyon, and Thurgau—SmartUrbanity combines computational rigor with participatory methodology, making accessibility both measurable and actionable.

The project is structured around seven interlinked work packages (WPs), addressing conceptual development (WP2), digital tool architecture and implementation (WP3), pilot activation and iterative validation (WP4), policy scenario development (WP5), dissemination and gamified stakeholder engagement (WP6), and integration with the DUT Knowledge Hub (WP7), coordinated administratively by Sapienza University of Rome and technically by CTLup.

During the first six months (M1–M6), the project established its foundational structures and governance. Key outputs include the finalization of the draft conceptual framework based on a five-dimensional model of human-centered accessibility (proximity, time, opportunity, perception, and attitude); the development of initial user personas; and the architecture for the digital tools, including the Access Together App, the Access Lab WebGIS, the Decision Support System (DSS), and the Micro-Mobility Integration App (MIMA). Each tool operationalizes distinct aspects of accessibility, from crowdsourced perception reporting and route tracking to geospatial simulation and real-time travel option integration. The tools are developed with a modular backend and open standards (e.g., GTFS, GeoJSON APIs) to enable flexibility and scalability across city contexts.

The project's analytical core integrates a perceived effort–weighted and doubly-constrained routing-gravity model, enabling personalized accessibility scoring and spatial equity analysis. These models are calibrated using location datasets from like GPS trajectories, crowdsourced data, etc., subjective ratings, survey data, and quality reports. Validation is embedded via feedback loops within the pilot sites, ensuring empirical robustness and user relevance.

Governance mechanisms have been formalized, including the Project Board, WP Leaders, Ethics and Data Protection, and local Steering Units for each pilot. Communication platforms such as Slack, Nextcloud, and Teams are fully operational, with shared calendars, document repositories, and issue logs ensuring coordination. Risk management protocols have been initiated, and an initial Risk Register has identified critical challenges, such as user recruitment, data protection compliance, and tool interoperability—each with designated mitigation strategies.

From an ethics standpoint, SmartUrbanity operates under stringent GDPR compliance and transparency principles. Informed consent flows, privacy notices, and a draft Data Management Plan (DMP) have been developed, with oversight by a multidisciplinary committee. Specific mitigation strategies are tailored to each tool, addressing risks such as location data tracking, behavioural influence through gamification, and potential for user re-identification.

In dissemination and stakeholder engagement, the project launched branding activities, stakeholder mapping in pilot cities, and early communication campaigns. A gamified engagement strategy is being developed to support recruitment and retention during pilot phases. Dissemination channels—including the project website, social media, and scientific publication plans—have been defined. Project Ambassadors lead coordination with the DUT Knowledge Hub, aligning SmartUrbanity's outputs with wider European urban transition agendas.

Looking forward, the project will focus on finalizing the Concept Knowledge Report (D2.1), consolidating UX/UI for the Access Together app, developing MVP specifications (D3.1), launching local data gathering, and preparing stakeholder engagement formats across pilots. These actions are structured to ensure convergence between scientific modelling, technical readiness, and real-world applicability—core tenets of SmartUrbanity's mission to make accessibility not only a spatial attribute but also a socially shared, perceptually grounded, and digital experience.

1. Introduction

SmartUrbanity is a transdisciplinary research and innovation project funded under the Driving Urban Transitions (DUT) Partnership. The project is co-coordinated by Sapienza University of Rome (Administrative Coordinator) and CTLup (Technical Coordinator), supported by a consortium of research institutions, technology developers, municipalities, and mobility experts across Europe.

The project aims to operationalize the 15-minute city through inclusive, data-driven, and citizen-centred mobility strategies. SmartUrbanity focuses on developing and deploying a suite of digital tools that integrate user participation, accessibility modelling, and decision support to foster sustainable, equitable, and human-centric urban mobility solutions.

This Inception Report provides an overview of the initial activities carried out during the first six months of the project (Months 1–6). It establishes the foundation for coordinated action across the work packages (WPs), consolidates the conceptual and methodological framework, and outlines early deliverables and next steps. The report also documents the governance structure, stakeholder engagement approach, risk management strategy, and data protection protocols implemented at this early stage.

SmartUrbanity combines theoretical innovation and technological deployment with a strong emphasis on citizen engagement and real-world pilot applications. Pilots are planned in five diverse urban contexts—Rome, Karlsruhe, İzmir, Lyon, and Thurgau—each addressing different challenges such as walkability, rural public transport access, climate resilience, or safety. These pilot sites serve as testbeds for the tools and strategies developed by the consortium.

The digital infrastructure includes:

- Access Together, a citizen engagement app for tracking trips, reporting perceptions, and participating in gamified challenges;
- Access Lab, a web-based dashboard for analysing spatial accessibility and equity through a personalized lens;
- A Decision Support System (DSS) that simulates scenarios and evaluates the impact of interventions using integrated models such as Agent-Based Models, Machine Learning, and Human-AI hybrids;

Integration with external models (e.g., MATSim, mobiTopp, Visum) to scale the analysis to city-wide and systemic levels.

The project is guided by a shared vision: that equitable, efficient, and sustainable urban transitions must be co-designed with citizens and informed by a deep understanding of how people experience mobility—not just where they can go, but how it feels to get there.

This inception report reflects the project's commitment to transparency, methodological rigor, and effective coordination. It serves as a baseline reference for consortium members, stakeholders, and funders, and provides a roadmap for the work ahead.

2. Project Overview and Objectives

SmartUrbanity responds to the urgent need for more inclusive, resilient, and accessible urban environments by advancing the concept of the 15-minute city—a model where essential services can be accessed within a short walk, cycle, or public transit ride from one's home. The project is grounded in the recognition that accessibility is not only a matter of spatial proximity or transport infrastructure, but also shaped by perceptions, personal circumstances, and policy choices.

SmartUrbanity's core mission is to co-create digital, participatory tools that make urban accessibility more equitable and actionable. These tools are designed to capture how different user groups experience mobility—including physical, emotional, and attitudinal factors—and to support planning and decision-making through data-driven simulation and visualisation.

The overall objective is to empower citizens and decision-makers to collaboratively shape and evaluate urban mobility systems by making accessibility measurable, relatable, and responsive to diverse user needs.

Key Objectives

The specific objectives of the project are to:

1. Develop a human-centred conceptual framework that redefines accessibility based on physical, psychological, and experiential factors across diverse user profiles.
2. Design and deploy four interoperable digital tools:
    a. Access Together App – a gamified, mobile-based platform for trip tracking, spatial reporting, and engagement.

   b. Access Lab – a WebGIS-based platform offering visual and comparative analysis of accessibility, equity, and user experience.
   c. Decision Support System (DSS) – a simulation environment integrating mobility models (e.g. ABM, gravity models, ML/HAI) to forecast policy impacts.
   d. MIMA (Micro-Mobility App) – an integrated visual interface highlighting sustainable and accessible travel options dynamically.

3. Establish a multi-dimensional model of 'perceived effort' that accounts for mobility constraints, emotional burden, and infrastructure quality, enabling personalized accessibility simulation.
4. Co-create interventions with citizens and stakeholders through participatory features, such as crowdsourced reporting, voting on proposed urban changes, and gamification-based incentives.
5. Implement and test the tools in five pilot cities (Rome, Karlsruhe, İzmir, Lyon, Thurgau) with diverse urban, cultural, and infrastructural contexts to assess usability, adaptability, and impact.
6. Generate policy recommendations, guidelines, and roadmaps based on pilot learnings and simulation outputs to support the upscaling of inclusive mobility practices at local and national levels.
7. Contribute to the DUT Knowledge Hub by sharing data, metrics, use cases, and validated tools that can inform broader urban transitions and climate neutrality agendas.

SmartUrbanity's innovation lies in its fusion of digital intelligence and social inclusion, making the 15-minute city not just a spatial ideal, but a lived and measurable experience across all urban environments.

3. Project Methodology

The methodology underpinning SmartUrbanity is grounded in the development of an integrated ecosystem that combines participatory data collection, advanced modelling, and iterative tool development within real-world urban settings. It aligns closely with the project's aim to co-create and operationalize the "15-minute city" vision through citizen-centric, digitally enabled, and policy-relevant innovations. Rather than following a linear model, the project adopts a modular, multi-scalar

methodology that interweaves bottom-up engagement with top-down analytics. Core elements—such as user profiling, behavioural mapping, spatial equity analysis, and scenario-based simulation—are progressively layered through cross-cutting WPs. This iterative, deployment-oriented structure ensures that technical developments remain grounded in urban realities, and that each tool and model is calibrated for both local relevance and translatability across European contexts.

SmartUrbanity's methodology is grounded in a transdisciplinary research approach, integrating concepts from urban planning, behavioural science, human-centred design, geoinformatics, and transport modelling. The project combines qualitative and quantitative methods to redefine accessibility, model user experience, and develop digital tools for inclusive urban mobility transformation.

3.1. Theoretical Framework: Human-Centred Accessibility

At the heart of SmartUrbanity lies a redefinition of urban accessibility that transcends traditional metrics like distance or speed. The project embraces a human-centred accessibility framework that accounts for the subjective, emotional, and experiential dimensions of mobility, recognizing that perceived effort, comfort, and personal constraints are as important as physical proximity. This framework introduces a composite understanding of access as the interaction between five components: proximity, time, opportunity, perception, and attitude. By embedding user personas that integrate sociodemographic attributes with attitudinal and affective factors, SmartUrbanity enables a nuanced analysis of how different people experience access differently—even within the same physical environment. This theoretical shift is crucial for designing truly inclusive urban interventions and developing digital tools that reflect real user experiences, not just infrastructural conditions.

The project builds upon emerging discourses in urban studies and mobility justice that critique conventional accessibility metrics focused solely on spatial or temporal dimensions. SmartUrbanity reconceptualizes accessibility as a relational and experiential condition, integrating five dimensions:

- **Proximity** – the physical distance to services;
- **Time** – temporal availability and variation;
- **Opportunity** – the relevance and quality of accessible services;
- **Perception** – emotional and subjective experiences of movement (e.g., stress, comfort, safety);

- **Attitude** – individual preferences and behavioural dispositions (e.g., openness to active modes, risk aversion).

This framework is operationalized through the development of **multi-dimensional user personas**, combining sociodemographic profiles with perceptual and attitudinal indicators. These personas form the basis for user-specific simulations and personalized accessibility analyses.

3.2. Research Design and Multi-Method Approach

SmartUrbanity employs a robust, multi-method research design that merges qualitative, quantitative, and computational approaches to capture the multifaceted nature of urban accessibility. The project structure supports a phased research logic: foundational work on literature and stakeholder needs is followed by empirical data collection, model co-design, tool prototyping, and city-level deployment. Key methods include GPS-based mobility tracking, survey-based profiling, participatory reporting, and focus groups—each feeding into the calibration and refinement of platform models.

Complementary to this is a technical stream that applies agent-based modelling, spatial analysis, and AI-driven policy scanning. The multi-method approach ensures methodological triangulation, enabling validation and cross-verification across different data types, cities, and user groups.

SmartUrbanity adopts a **mixed-methods design** integrating:

- **Quantitative modelling** (routing, gravity models, agent-based simulation);
- **Qualitative insights** (perception mapping, survey responses);
- **Participatory processes** (citizen reporting, co-design labs, gamified engagement).

The research unfolds in iterative phases, combining inductive user engagement (to understand real-world mobility constraints and perceptions) with deductive model development (to simulate and evaluate planning scenarios). Each step is tested in pilot contexts, ensuring real-life validation and external validity.

3.3. Project Models and Techniques

The project's modelling framework is designed (WP2) to support both personalized and systemic understanding of accessibility dynamics. Two core models anchor this

approach: a perceived effort–weighted shortest path model that calculates user-specific accessibility scores, and a doubly-constrained gravity model that estimates demand flows between population zones and service destinations under varying constraints. These are enriched by agent-based simulations (WP3) and ML-based prediction tools that feed into the Decision Support System (DSS), supported by pilot sites. Additionally, user profiling models are developed from real-world data using GPS traces, trip diaries, and attitudinal surveys. Each model is designed not only to function independently, but also to interoperate within the Access Lab and DSS platforms, enabling scenario simulations, intervention modelling, and equity analysis.

3.3.1. SmartUrbanity User Personas

The SmartUrbanity User Personas / User Roles are designed as a methodological framework to ensure that the project's solutions reflect the needs, behaviours, and experiences of diverse population groups. Personas will act as representative profiles of citizens in the pilot cities, bridging the gap between data-driven modelling and real-life user perspectives. The purpose is to capture the diversity of urban users, including variations by age, gender, income, mobility needs, and social roles; and to highlight specific barriers and constraints (e.g., safety concerns, accessibility limitations, digital exclusion) faced by different groups. This provides an equity-sensitive lens for evaluating scenarios in the Access Lab and DSS and can support citizen engagement and gamification, allowing participants to identify with personas and contribute more meaningfully.

Methodological Approach

Data Sources: Personas will be built using a combination of quantitative data (surveys, mobility patterns, socio-demographics) and qualitative insights (focus groups, stakeholder workshops).

Segmentation: Clustering techniques and factor analysis will be applied to identify meaningful user groups, while participatory methods will ensure local relevance.

Template: Each persona will include demographic characteristics, mobility patterns, attitudes toward accessibility and safety, and key challenges in urban life.

Validation: Draft personas will be validated through workshops to ensure they reflect actual user experiences.

The User Personas will be fully integrated into the Access Lab DSS, enabling simulations of urban interventions from the perspective of different user groups and highlighting their differentiated impacts. They will also inform the design of gamification campaigns by tailoring incentives and engagement strategies to specific audiences, thus enhancing participation and relevance. In addition, the personas will support the formulation of policy recommendations, ensuring that inclusivity and equity are systematically embedded in the SmartUrbanity toolkit and guidelines.

Expected Outcomes

A set of standardised and validated user personas. A Persona Handbook describing the methodology, enabling replication by municipalities and other stakeholders. Stronger alignment between citizen perspectives and policy-making, ensuring that SmartUrbanity contributes to the development of inclusive, accessible, and sustainable 15-Minute Cities.

3.3.2. SmartUrbanity Access Lab

The SmartUrbanity Access Lab is conceived as a central platform for co-creation, simulation, and decision support, bringing together citizens, policymakers, researchers, and industry in a shared digital environment. It functions as the interface where data, models, and user perspectives converge to inform inclusive and sustainable urban planning aligned with the principles of the 15-Minute City.

The Access Lab aims to empower stakeholders to evaluate accessibility, test urban mobility scenarios, and co-design solutions that reflect citizens' needs. It provides a structured space for dialogue between technical experts and local communities, making complex data and modelling outputs understandable and actionable.

The Access Lab acts as the collaborative hub of the project, where local and European-level stakeholders converge to analyse accessibility challenges and explore solutions. It supports municipalities in making evidence-based decisions, enables citizens to see how their input informs policies, and fosters cross-pilot knowledge exchange. The expected outcomes are: A functional, user-friendly platform that integrates data, models, and participatory insights; A practical toolkit for policymakers to test and compare interventions before implementation; and Strengthened transparency and trust in planning processes by showing citizens the link between their input and final outcomes. Transferable guidelines for replicating the Access Lab approach in other European and global cities.

3.3.3. Perceived Effort–Weighted Shortest Path Routing Model

This model extends traditional shortest-path algorithms by integrating user-specific physical and psychological cost functions. Each edge in the mobility network is assigned a travel cost that reflects:

- Baseline travel time (τ)
- Physical effort modifiers (e.g., slope, surface quality)
- Subjective effort modifiers (e.g., lighting, perceived safety)

$$C_u(a) = \tau_a \cdot \alpha_u + \sum_i p_{i,a} \cdot (\beta_{u,i} + \gamma_{u,i})$$

The total perceived effort $C_u(a)$ for a user u over an arc a is modelled as:Where:

- α_u is the baseline ability modifier for user u
- $\beta_{u,i}$ and $\gamma_{u,i}$ represent user-specific sensitivities to infrastructure and emotional burden, respectively.
- $p_{i,a}$ denotes the presence or intensity of feature i on arc a

3.3.4. Accessibility Doubly-Constrained Gravity Model

To analyse zone-to-service accessibility, a doubly constrained gravity model is employed. It estimates the flow of users from residential zones to service destinations, subject to:

- Origin-specific demand constraints
- Destination-specific service capacity
- Generalized impedance functions incorporating perceived effort and service attractiveness

The model allows for comparative analysis of accessibility distribution and spatial equity under various user profiles and time scenarios.

3.3.5. Access Lab DSS

The Access Lab Decision Support System (DSS) is the analytical backbone of SmartUrbanity, designed to integrate accessibility modelling, participatory data, and scenario-based simulation into a single decision-support environment. By Month 30, the DSS has matured into a multi-layered platform that combines geospatial accessibility indicators, user persona modelling, and policy scenario evaluation.

Core Features (M30 status):

- Accessibility Simulation: The DSS integrates outputs from the Perceived Effort–Weighted Routing Model to generate accessibility maps and equity indicators at individual and neighbourhood scales.
- Scenario Testing: Decision-makers can evaluate the effects of planned interventions—such as new transport services, infrastructure upgrades, or pricing schemes—on accessibility outcomes across diverse user groups.
- User Personas: Personalized accessibility scores derived from citizen data (via the Access Together App) allow differentiated policy testing, highlighting distributional effects on vulnerable populations.

The DSS now supports multi-scenario comparison dashboards, enabling city planners to benchmark interventions across KPIs such as travel time, emissions reduction, safety perceptions, and social inclusion. A policy co-creation interface has been deployed in pilot cities, where stakeholders can input proposed measures and directly observe their simulated impacts.

Next Steps will work with consolidating outputs into policy guidelines and toolkits for replication in non-pilot cities, finalizing integration with the DUT Knowledge Hub, ensuring datasets, APIs, and simulation frameworks are FAIR-compliant, and delivering a comprehensive evaluation report comparing scenario outcomes across pilots, highlighting transferable insights for 15-Minute City implementation.

3.4. Digital Tool Architecture and Development Strategy

SmartUrbanity's digital ecosystem consists of four interlinked platforms—Access Together (citizen app), Access Lab (planning interface), DSS (simulation engine), and MIMA (micro-mobility integration app)—designed to support end-to-end planning, monitoring, and citizen engagement. The development strategy adopts a modular, API-driven architecture to ensure scalability, interoperability, and adaptability across pilot cities. Tools are co-designed with users and stakeholders, built on open-source foundations, and developed using agile methodologies to allow iterative refinement based on deployment feedback. Each tool is mapped to specific-personas / users-roles and use cases, ensuring that features—such as gamification layers, participatory dashboards, and equity filters—reflect the project's human-centred logic. Integration across tools is achieved through shared data structures, centralized calibration modules, and platform-specific endpoints for data collection, visualization, and simulation.

The digital platform consists of modular components, each designed to operationalize methodological models:

i. **Access Together App** – Collects GPS data, user feedback, and post-trip perception ratings. It serves as both a data collection instrument and engagement platform through gamified participation.

ii. **Access Lab** – A WebGIS platform integrating the routing and gravity models to provide personalized accessibility visualizations at individual and city scales.

iii. **Decision Support System (DSS)** – A simulation environment enabling planners to evaluate the effects of interventions (e.g., new infrastructure, policy measures) on accessibility outcomes.

iv. **Micro-Mobility Integration App (MIMA)** – Supplements the platform with real-time accessibility analytics based on available active and shared modes.

All components share a unified data architecture and are developed through iterative prototyping and cross-site validation cycles. Interoperability is achieved via open standards and modular backend services.

3.5. Data Collection, Calibration, and Validation through Deployment

A central pillar of SmartUrbanity's methodology is its validation approach to data collection, calibration, and validation—carried out in real-life urban settings through pilot deployments. The project uses a mix of passive and active data collection strategies, including GPS traces, user-submitted reports, surveys, and participatory workshops. These inputs are not only used to generate descriptive insights but also serve to calibrate sensitivity coefficients in the project's accessibility models, ensuring they reflect diverse user experiences across cities. Validation follows a multi-level logic: technical validation (e.g., predictive accuracy), user validation (e.g., perceived relevance), and strategic validation (e.g., policy alignment). Through repeated testing cycles across cities with distinct urban morphologies and governance contexts, the project ensures its tools and models are robust, adaptable, and grounded in empirical realities.

A comprehensive **data collection protocol** supports both model calibration and user persona profiling. Data sources include:

- **Trip data**: Location trajectories recorded via Access Together, enriched with mode detection and timestamp metadata.

- **Subjective effort ratings**: Post-trip perception scales (e.g., "felt longer/shorter than expected") converted to time-equivalent measures.
- **Surveys**: Structured questionnaires capturing sociodemographic, attitudinal, and behavioural attributes.
- **Environmental ratings**: Crowdsourced reports on public space conditions (e.g., lighting, greenness, obstacles).
- **Service data**: Reports and ratings of local amenities submitted by users or collected from open databases.

The calibration of sensitivity parameters (α, β, γ) is conducted through multivariate regression on matched trip segments and UX attributes. Validation is performed through cross-validation of model outputs with ground-truth data, pilot feedback sessions, and usability testing of digital tools

3.6. Pilot Integration and Evaluation Logic

SmartUrbanity's pilot strategy is not limited to testing technical prototypes; it is structured to evaluate the full ecosystem—tools, models, engagement mechanisms, and policy impacts—across five diverse urban contexts. Each pilot city implements a tailored deployment that reflects its mobility challenges, data landscape, and institutional readiness. The evaluation logic follows a theory of change that connects platform outputs (e.g., access maps, user scores) to user behaviour shifts, planning decisions, and policy transformations. Evaluation criteria are grouped into technical performance (e.g., model accuracy, platform usability), behavioural outcomes (e.g., user engagement, mobility changes), and strategic alignment (e.g., contribution to 15-minute city goals). Comparative analysis across pilots will identify transferable practices and scalable features, informing the production of roadmaps, guidelines, and actionable policy recommendations.

Five pilot cities act as real-world laboratories, enabling localization of data collection and persona definitions, context-specific calibration of perceived effort models, and testing of interventions with diverse demographic and spatial conditions. Each pilot will implement the tools, run participatory workshops, and evaluate accessibility improvements, shifts in citizen perception and behaviour, and policy relevance and integration capacity. Evaluation will rely on pre/post measures, scenario simulation, and comparative analysis across pilots. Outcomes will inform final policy toolkits, transition roadmaps, and contributions to the DUT Knowledge Hub.

4. Work Plan and Progress Overview

The work plan of SmartUrbanity reflects a well-structured and integrated approach that coordinates research, development, and implementation across multiple domains and cities. It is organized around seven interdependent Work Packages (WPs) that guide the project from conceptualization through to deployment and evaluation. These WPs are strategically sequenced to ensure that early-stage research and stakeholder engagement directly inform the design of digital tools, which are then tested and refined through city-level pilots. This section outlines the project's internal structure, implementation timeline, and early progress, offering a snapshot of how theoretical ambitions and methodological strategies are being operationalized within the first six months of the project.

SmartUrbanity is structured into seven WPs, each contributing to a coherent research-to-innovation pathway: from conceptual development to tool deployment, policy guidance, and knowledge transfer. The project follows a multi-phase implementation plan, integrating scientific research, software development, participatory engagement, and pilot-based validation.

This section outlines the work structure, initial progress made during Months 0–6 (M0–M6), and a consolidated overview of the upcoming milestones and deliverables.

4.1. Project Work Package Structure

The project's implementation is anchored in a Work Package structure (Table 1) that reflects its interdisciplinary and impact-driven nature. Each of the seven WPs is designed to address a specific dimension of SmartUrbanity—from project coordination and research synthesis to tool development, policy strategy, and dissemination. The WPs are interconnected to ensure horizontal coherence across technical, social, and strategic components, while also allowing each to focus on clear deliverables. For instance, WP2 lays the research foundation that informs WP3's tool development, while WP4 handles real-world deployment and feeds evaluation insights into WP5's policy framework. This modular yet integrative structure supports both depth in technical innovation and agility in implementation across pilot contexts.

Table 1: SmartUrbanity WPs and Core Objectives

WP	Title	Lead Partner	Core Objective
WP1	Project Management	Sapienza	Administrative and ethical coordination, risk management
WP2	Research and Analysis	KIT	Development of the conceptual and methodological framework
WP3	Development of Digital Solutions	Movesion	Design and implementation of the digital platform components
WP4	Pilot Planning, Implementation, Evaluation	CTLup	Local testing, citizen engagement, and iterative validation
WP5	Policy Roadmaps and Strategy	ENTPE	Generation of actionable guidelines and transition strategies
WP6	Dissemination and Knowledge Sharing	ZHAW	Communication, stakeholder outreach, and gamified engagement
WP7	SmartUrbanity & DUT Knowledge Hub	Sapienza	Coordination with DUT, knowledge transfer and upscaling

4.2. Project Implementation Phases

SmartUrbanity follows a phased implementation strategy, segmented into three overarching periods: groundwork and development (Months 1–12), pilot deployment and iterative refinement (Months 13–30), and validation, scale-up, and policy translation (Months 31–36). Each phase has distinct goals and outputs, ensuring that the project progresses from foundational research through to applied impact. The initial phase focuses on co-creating the theoretical framework, gathering user insights, and prototyping digital tools. This is followed by hands-on deployment across five cities, where tools are tested, data is collected, and feedback loops are activated. The final phase synthesizes lessons learned, evaluates outcomes, and supports uptake through roadmaps, knowledge products, and contributions to the DUT Partnership Knowledge Hub.

SmartUrbanity is organized into **six methodological phases** aligned across WPs, as shown in Table 2.

Table 2: SmartUrbanity methodological phases

Phase	Months	Description
S1	M1–M6	Conceptual framework definition; persona design; data governance
S2	M4–M12	Tool architecture definition; preliminary interface prototyping
S3	M10–M20	MVP development of digital tools (CE App, WebGIS, DSS)
S4	M16–M28	Pilot deployment, participatory activities, data collection
S5	M24–M30	Simulation, policy co-design, roadmaps and DSS validation
S6	M30–M36	Impact assessment, final toolkit delivery, knowledge transfer

4.3. Initial Progress (M1–M6)

The first six months of the project (M1–M6) have been dedicated to laying the analytical, technical, and operational groundwork required for successful implementation.

Key accomplishments include the formation of governance structures, finalization of data management and ethics protocols, and the development of the human-centred accessibility framework. Work Package 2 has led the research stream, producing early outputs on user personas, mobility dimensions, and data calibration strategy. Parallel efforts in WP3 and WP6 have begun the iterative design of the Access Together and Access Lab platforms, including stakeholder co-design activities. Across all activities, emphasis has been placed on ensuring alignment with pilot city needs, consortium capabilities, and DUT objectives.

The first half of the project was dedicated to the setup of scientific, administrative, and technical foundations. Progress per work package is summarized below:

WP1 – Project Management (Lead: Sapienza)

- Project Kick-Off Meeting conducted in January 2025
- Roles and responsibilities confirmed across partners
- Reporting templates and consortium-wide document management system established
- Internal Ethics Committee formed; DPOs identified per partner
- Preliminary Data Management Plan initiated

WP2 – Research and Analysis (Lead: KIT)

- Draft conceptual model finalized (v0.1) and shared with consortium
- Accessibility dimensions formalized into measurable constructs
- Initial set of user personas defined using a typological matrix
- Coordination with WP3 on parameter needs for model implementation
- Drafted initial survey instruments for persona profiling and user attitudes

WP3 – Digital Solutions (Lead: Movesion)

- Architecture draft for Access Together and Access Lab completed
- GIS engine options reviewed for WebGIS component (OpenLayers)
- API design initiated for tool interoperability
- Back-end specification outline prepared for secure data storage and flow

WP4 – Pilots (Lead: CTLup)

- Coordination workshops conducted with pilot city leads (Rome, Karlsruhe)
- Pilot contexts analysed for key accessibility challenges
- Local stakeholder mapping initiated
- Draft deployment calendar outlined for beta testing (Rome to lead MVP trial)

WP5 – Policy and Strategy (Lead: ENTPE)

- Reviewed accessibility-related urban policies across pilot cities
- Initiated text mining analysis to compare planning language
- Preliminary framework for scenario analysis developed
- Engagement plan aligned with DSS outputs

WP6 – Dissemination and Engagement (Lead: ZHAW)

- Branding and visual identity options created
- Domain and hosting setup for project website
- Communication plan outline developed (D6.1 preparation underway)
- First gamification campaign brainstormed (linked to Rome pilot)

WP7 – DUT Knowledge Hub (Lead: Sapienza & CTLup)

- Liaison with DUT Coordination Office initiated
- Protocols prepared for contribution to Knowledge Hub Repository
- Draft outline of project's knowledge outputs catalogued

4.4. Key Milestones and Deliverables (M1–M6)

During the initial six-month period, SmartUrbanity reached several critical milestones that ensure the project remains on track. These include the delivery of the Inception Report (D1.0), the Conceptual Framework (D2.1), and the establishment of the project's internal governance mechanisms. Additionally, initial versions of the Access Together app and supporting data workflows have been prototyped, and the first stakeholder engagement events have been held in pilot cities.

Milestones also reflect back-end progress: the identification of data sources for model calibration, draft designs for digital architecture, and a harmonized calendar for pilot deployments. These outputs lay the foundation for upcoming technical integration and field testing.

4.5. Coordination Across Work Packages

Coordination across Work Packages is a central aspect of SmartUrbanity's management and execution strategy, ensuring that insights, data, and development processes flow smoothly between research, technical, and implementation teams. A shared calendar of milestones and cross-WP meetings facilitates horizontal collaboration, while lead institutions act as integration nodes for specific thematic areas—e.g., Sapienza for accessibility modelling, KIT for theoretical framing, and Movesion for tool development.

Additionally, coordination mechanisms are reinforced by the project's modular tool architecture, which enables data and models developed in one WP to be seamlessly integrated into others. This collaborative structure not only supports coherence but also ensures that city-specific adaptations remain aligned with the overall project logic.

Coordination across SmartUrbanity's Work Packages is maintained through structured, recurring mechanisms that ensure coherence, timely progress, and alignment between technical development and real-world application. Monthly cross-WP coordination meetings serve as the primary forum for information exchange, task synchronization, and issue resolution. These are supported by shared calendars and centralized document repositories, which facilitate milestone tracking and version control. WP1 plays a central oversight role, managing the project's issue logs and regularly updating the risk register to reflect evolving challenges and mitigation strategies.

To strengthen the integration between research, tool development, and pilot implementation, a dedicated "Pilot Integration Taskforce" has been established, bringing together representatives from WP2, WP3, and WP4. This taskforce ensures that data models, app functionalities, and city-specific deployment strategies are developed in a mutually informed and context-sensitive manner, as well as data sharing will be able to access the common repositories/resources in order to support the coordination and data management as whole.

5. Governance Structure and Consortium Coordination

SmartUrbanity's governance framework is designed to ensure strong coordination across a multidisciplinary and geographically distributed consortium, while remaining agile enough to respond to the demands of co-creation, piloting, and multi-city deployment.

The project's governance model balances centralized oversight with distributed leadership across thematic areas, aligning technical development with stakeholder engagement, research integrity, and policy relevance. Structured communication flows, clear decision-making protocols, and responsive risk management mechanisms ensure that the consortium operates effectively and transparently throughout the project lifecycle.

This section details the coordination architecture that enables SmartUrbanity to maintain project coherence while navigating complex interdependencies across Work Packages, pilot cities, and digital toolchains.

SmartUrbanity is managed through a dual coordination structure that reflects the project's dual emphasis on administrative rigor and technical innovation. The governance model is designed to ensure transparent decision-making, effective risk management, and fluid collaboration across partners and disciplines.

5.1. Dual Coordination Structure

The project is guided by a dual coordination model that distinguishes between scientific-technical leadership and administrative-financial management. This bifurcated structure allows for specialization in managing different dimensions of the project: Sapienza leads on administrative coordination, ensuring alignment with conceptual models, budget tracking, and methodological coherence, while CTLup handles day-to-day project technical management, including research goals, deliverable timelines, and partner reporting.

This arrangement ensures that innovation and compliance are both adequately supported, while maintaining a clear division of responsibilities that promotes efficiency and accountability across the consortium.

The project is jointly coordinated by:

- **Administrative Coordinator: Sapienza University of Rome.** Responsible for contractual obligations, financial administration, ethics compliance, and reporting to the DUT Partnership.
- **Technical Coordinator: CTLup.** Oversees the scientific and technical implementation, ensuring coherence between conceptual framework, tool development, pilot execution, and evaluation.

This structure allows separation of concerns and specialization, while maintaining close communication between managerial and implementation domains.

5.2. Project Governance Bodies

SmartUrbanity is supported by a multi-tiered governance architecture composed of interlocking bodies, each with a distinct function in project oversight, quality assurance, and strategic decision-making.

- The General Assembly serves as the ultimate decision-making body, composed of one representative per partner.
- The Executive Board, chaired by the scientific coordinator, handles day-to-day implementation, while the Quality Assurance and Ethics Committee oversees compliance with ethical and data management standards.
- A City Advisory Panel, comprising representatives from pilot cities, ensures that local priorities are reflected in tool development and deployment planning.

This structured arrangement enables the consortium to combine strategic vision with operational control, while anchoring innovation in real-world relevance.

The internal governance structure comprises the following bodies:

a. Project Board (PB)

- Composition: One representative per partner institution.
- Role: Strategic oversight, major decision-making, conflict resolution.
- Frequency: Meets quarterly (or as needed).

b. Coordination Team

- Members: Administrative Coordinator (Sapienza), Technical Coordinator (CTLup), WP Leaders.
- Role: Day-to-day project management, progress monitoring, risk mitigation.
- Frequency: Biweekly virtual meetings (monthly in later phases).

c. Work Package Leaders Group

- Role: Manages task-level coordination, inter-WP integration, deliverable quality.
- Each WP Lead is responsible for: Monitoring progress against milestones, Coordinating tasks and subtasks, and Managing internal WP communication

d. Pilot City Steering Units

- City-specific actors comprising local researchers, municipal staff, and stakeholders.
- Role: Local planning, stakeholder engagement, validation, and reporting.
- Report to WP4 and feed insights to WP5 and WP6.

e. Ethics and Data Protection Committee

- Independent advisory body composed of internal and external ethics advisors.
- Monitors compliance with GDPR, informed consent, and ethical research principles.
- Approves all survey tools, app modules, and public-facing data activities.

5.3. Communication and Collaboration Protocols

Effective internal communication is essential in a project as complex and distributed as SmartUrbanity. The consortium relies on a set of structured collaboration protocols, including monthly cross-WP coordination calls, work package-specific meetings, and periodic consortium-wide assemblies. A central document repository and shared calendar facilitate version control and task tracking, while a set of internal reporting templates ensures consistency in monitoring progress. Direct channels between WP leads support responsive problem-solving and alignment on technical dependencies. These protocols are designed to foster transparency, minimize duplication, and support timely execution of deliverables, even across varying time zones and institutional cultures.

To ensure effective coordination across disciplines and geographies, the following communication protocols have been established:

- **Slack** and **Microsoft Teams** for daily team communication and discussions.
- **MS Teams** repository for shared project documentation, deliverables, and administrative records.
- **Specific institutional repositories** for digital tool development (Access Together, Access Lab).
- **Monthly cross-WP meetings**, chaired alternately by administrative and technical coordinators.
- **Standardized reporting templates** (progress reports, meeting minutes, deliverable outlines).

All key project decisions are logged in a shared **decision register** maintained by WP1, which includes rationale, status, and responsible parties.

5.4. Risk Management and Issue Resolution

Proactive risk management is embedded into SmartUrbanity's governance structure through a formalized framework for identifying, monitoring, and responding to potential issues. WP1 maintains a dynamic risk register and issue log, updated in collaboration with all WP leads and reviewed during monthly coordination meetings.

Risks are categorized by thematic area (e.g., technical, data, ethics, engagement) and assigned mitigation strategies and owners. In case of escalated issues, the Executive Board serves as the primary resolution body, with the General Assembly stepping in for structural or contractual concerns. This structured approach ensures that challenges are identified early and addressed through predefined, transparent procedures.

The project implements a multi-level risk management strategy:

- **Risk Register**: Maintained by WP1, updated quarterly; includes technical, organizational, ethical, and data risks.
- **Contingency Protocols**: Identified for each WP based on dependency analysis.
- **Issue Escalation Path**: First WP Leader resolves internally; Second Coordination Team; and Fina: Project Board decision.

A dedicated coordination sub-group (Sapienza, CTLup, WP3, WP4) monitors cross-WP risks related to **tool integration**, **pilot readiness**, and **data collection reliability**.

5.5. Integration with the DUT Knowledge Hub

SmartUrbanity contributes actively to the DUT Knowledge Hub, positioning its outputs not just as stand-alone innovations, but as part of a shared European knowledge infrastructure. The project's integration strategy includes tagging and curating knowledge assets—such as frameworks, models, data specifications, and policy briefs—for upload to the DUT platform. WP7 specifically ensures that the conceptual, methodological, and technical lessons learned are formatted for interoperability with the Knowledge Hub's metadata standards and dissemination pipelines. By aligning internal documentation with DUT's strategic priorities, SmartUrbanity supports cross-project learning, transferability of tools, and long-term uptake by cities and researchers beyond the project consortium.

SmartUrbanity is committed to contributing to and benefiting from the **DUT Knowledge Hub**. For this purpose:

- A **Knowledge Exchange Liaison** has been designated (from Sapienza).
- Outputs such as KPIs, datasets, dashboards, and visualizations are catalogued for sharing.
- A roadmap for periodic updates to the Hub has been drafted, aligned with WP7 timelines.

Coordination with DUT will follow principles of FAIR data sharing (Findable, Accessible, Interoperable, Reusable), subject to GDPR constraints.

6. Ethics and Data Protection Strategy

Ethical integrity and data protection are foundational to SmartUrbanity's mission of designing inclusive, human-centred digital solutions for urban mobility and accessibility. Given the project's reliance on sensitive mobility data, subjective perceptions, and user-generated inputs across diverse cities, a rigorous and anticipatory ethics and data strategy is essential. The approach taken by SmartUrbanity extends beyond regulatory compliance to embed principles of fairness, transparency, and co-responsibility into every layer of data collection, model development, and platform deployment. This section outlines the ethical principles guiding the project, the legal and operational structures in place to ensure GDPR compliance, and the safeguards applied at both the technical and governance levels.

SmartUrbanity involves extensive interaction with human subjects, collection of geospatial and behavioral data, and deployment of digital platforms in real-world urban environments. Ensuring the ethical integrity of the project and the full compliance with applicable data protection regulations — particularly the General Data Protection Regulation (GDPR) (EU) 2016/679 — is a core operational and legal requirement.

6.1. Ethical Principles and Commitments

SmartUrbanity's ethical stance is rooted in the protection of individual autonomy, inclusiveness, and public value. The project explicitly prioritizes the responsible treatment of personal data, respect for diverse mobility needs, and equitable access to participation. These principles are reflected in the project's commitment to voluntary and informed consent, data minimization, non-discrimination, and the right to withdraw participation at any stage. Ethical reflection is embedded throughout the project lifecycle, from design and co-creation to deployment and evaluation, ensuring that digital tools are not only functional but also aligned with the values of the communities they aim to serve.

SmartUrbanity adheres to the following overarching ethical commitments:

- **Informed Consent**: No data is collected from participants without clear, explicit, and documented consent, tailored to the purpose of each tool or study activity.
- **Respect for Autonomy**: Participants have the right to withdraw at any time and to control what personal data they share.
- **Inclusion and Accessibility**: Ensuring participation opportunities for vulnerable and underrepresented groups, including persons with disabilities and non-digital users.
- **Non-maleficence**: Project activities are designed to minimize any risk of harm, distress, or exploitation.
- **Transparency and Accountability**: All processing purposes, data usage, and feedback mechanisms are clearly communicated to users and stakeholders.

6.2. GDPR Compliance and Legal Foundations

Compliance with the General Data Protection Regulation (GDPR) is a central pillar of SmartUrbanity's data strategy. The project adheres to GDPR principles of lawfulness, fairness, transparency, purpose limitation, data minimization, accuracy, storage limitation, integrity, and accountability.

Legal roles and responsibilities—such as data controllers, processors, and sub-processors—are clearly assigned, and Data Protection Impact Assessments (DPIAs) are being prepared for each relevant tool and activity. Consent mechanisms are designed to be granular and dynamic, particularly in the mobile application, where users can opt into or out of specific data-sharing features. Special attention is given to managing geolocation data, health-related insights, and feedback involving vulnerable populations.

SmartUrbanity processes a range of personal data types, including:

- Geolocation data (GPS traces from user devices),
- Socio-demographic information (e.g., age, gender, household structure),
- Perception and attitude data (e.g., mobility comfort, safety feelings), and
- Service ratings and open-ended user feedback.

To comply with GDPR, the project implements the following legal safeguards:

a. Legal Basis for Processing

- Primary basis: Article 6(1)(a) – Consent of the data subject
- Additional basis for scientific research: Article 9(2)(j) – Processing for scientific or statistical purposes with appropriate safeguards

b. Data Minimization and Purpose Limitation

- Only data strictly necessary for the stated objectives is collected
- Data are pseudonymized or aggregated wherever individual-level granularity is not essential.

c. Rights of Data Subjects

Participants can:

- Access, correct, or delete their personal data
- Withdraw consent at any time
- Request information on the purpose and scope of data use

These rights are enforced via clearly defined interfaces in the Access Together App and Access Lab web platform.

6.3. Data Management Framework

The project's data management framework structures how data is collected, processed, stored, shared, and deleted across the lifecycle of each tool and platform.

It includes detailed procedures for data anonymization, pseudonymization, access control, encryption, and secure transfer protocols. All datasets are stored on secure servers compliant with EU data protection standards, and data flow diagrams are maintained to document every instance of data handling. Metadata standards are used to ensure traceability and interoperability, particularly for outputs to be shared through the DUT Knowledge Hub. The framework also governs third-party data usage, including open data sources and APIs integrated into the SmartUrbanity platforms.

A **Data Management Plan (DMP)** is under development and will be submitted by Month 6. The DMP outlines:

- Data categories and sensitivity levels
- Storage protocols (secure, encrypted, European-hosted servers)
- Access controls (role-based, logged access by consortium members)
- Archiving procedures (retention, deletion, anonymization timelines)
- Sharing policies (open data under FAIR principles where applicable)

Data collected during the pilot phase will be stored in secure databases managed by CTLup and Movesion, with central coordination by Sapienza's DPO in collaboration with local Data Protection from each partner.

6.4. Ethics Oversight Mechanisms

Ethics oversight is led by the Quality Assurance and Ethics Committee, which includes both internal experts and external advisors to ensure independence and accountability. This body monitors compliance with ethical and legal standards across all WPs, reviews consent forms and data workflows, and provides feedback on high-risk activities.

Ethics deliverables, including D1.3 (Ethics Protocol) and D1.4 (DPIAs), are produced and updated collaboratively. The committee meets regularly and is empowered to recommend design adjustments or temporary suspensions if ethical risks are identified. Oversight also includes continuous consultation with city-level stakeholders and data protection officers, ensuring that local contexts are reflected in ethical risk assessments.

SmartUrbanity has established an internal Ethics and Data Protection Committee (EDPC), which includes: representatives from Sapienza, CTLup, and KIT; legal experts on GDPR and data ethics; and external advisor(s) to ensure impartiality.

The EDPC responsibilities include: review and approval of all data collection instruments (e.g., surveys, app forms); monitoring of consent processes and information materials; periodic audits of data practices; and advising on issues involving vulnerable groups or unintended risks

A Preliminary Ethics Checklist was completed in M2 to identify and mitigate early-stage risks, such as use of geolocation data and potential re-identification, inclusion of minors or legally dependent populations (currently excluded), or handling of sensitive perceptions (e.g., fear, stress)

6.5. Specific Measures by Tool

Each digital tool within SmartUrbanity incorporates tailored safeguards to protect user rights and data integrity. Access Together app includes in-app consent prompts, local data processing where feasible, and the ability for users to view and delete their data. Access Lab platform employs anonymized inputs and excludes any personally identifiable information from its public-facing dashboards. The Decision Support System (DSS) aggregates data at the system level, preventing reverse identification through spatial patterns. For the MIMA app, particular attention is given to route-level data sensitivity and third-party service integration. These differentiated safeguards reflect the varying data exposure and usage profiles of each tool.

Tool	Ethical Concern	Mitigation Measure
Access Together App	Continuous location tracking	Consent screen with pause/resume option, minimal data retention
Web surveys	Disclosure of personal attitudes	Option to skip sensitive questions, separate consent for open responses
Gamification	Behavioral influence, manipulation	Transparent rules, ethical framing of incentives (e.g., sustainability)
WebGIS / Access Lab	Public display of aggregated data	Spatial aggregation, removal of identifiers, visual privacy filters

6.6. Future Actions (M4–M12)

In the next project phase (M4–M12), SmartUrbanity will operationalize its ethics and data protection strategies through concrete deliverables and system refinements. This includes the completion of DPIAs for each tool, the rollout of final consent forms, and user interface adjustments based on early feedback.

Training sessions on GDPR and ethical data practices will be held for consortium partners, especially those involved in data handling and citizen engagement. Technical audits will be conducted to verify encryption protocols and storage policies. Additionally, as pilots begin, local ethics approvals will be secured where required, and any context-specific ethical considerations will be documented in coordination with city partners.

During the next implementation phase (Months 4 to 12), SmartUrbanity will prioritize the operational rollout of its ethics and data governance protocols to ensure compliance, transparency, and trust across all user-facing tools and pilot activities. Key actions include the finalization and submission of the full Data Management Plan (D1.3), which will align with both DUT Partnership standards and relevant national data protection regulations. In preparation for real-world deployment, consent flows and onboarding procedures will be pre-tested in each pilot city to verify usability, clarity, and legal adequacy.

To support informed participation, each tool will be accompanied by public-facing Privacy Notices and Data Use FAQs that explain in plain language how data is collected, used, and protected. The consortium will coordinate closely with pilot city authorities to ensure local compliance requirements—such as municipal guidelines or ethics approvals—are fully met.

In parallel, technical development will include the integration of opt-out mechanisms and robust data erasure procedures, enabling users to revoke consent and exercise their data rights at any time. These actions collectively reinforce SmartUrbanity's commitment to ethical digital innovation and responsible data stewardship.

7. Risk Management and Mitigation

Given the scope and complexity of SmartUrbanity—spanning multiple cities, digital platforms, data-sensitive environments, and interdisciplinary research—robust risk management is essential to ensure project resilience, accountability, and success. The project embeds risk thinking into both its governance model and its operational workflows, enabling early identification, mitigation, and resolution of potential issues. This section outlines the overarching risk management framework adopted by the consortium, details initial critical risks identified during the project's early phase, and presents the measures already taken or planned to prevent disruptions and safeguard project outcomes.

It also emphasizes a forward-looking approach that treats risk not only as a compliance necessity but as a strategic tool for adaptive project delivery.

Risk management in SmartUrbanity is a continuous and integrated process embedded in both project coordination and individual work package execution. Given the interdisciplinary and implementation-oriented nature of the project—spanning digital tool development, human subject research, urban interventions, and multi-site deployment—the consortium has adopted a proactive risk identification, classification, and response strategy.

This section outlines the risk management framework, identifies key risks and their mitigation measures, and presents early actions taken during the first reporting period (M0–M3).

7.1. Risk Management Framework

SmartUrbanity's risk management framework is designed to be proactive, structured, and integrated into the project's overall coordination strategy. It combines centralized tracking mechanisms—such as a shared risk register and issue log—with distributed monitoring responsibilities held by Work Package leads. The framework follows a classic risk lifecycle: identification, assessment, mitigation planning, response, and monitoring. Each identified risk is evaluated based on its likelihood and potential impact, categorized by theme (technical, legal, ethical, coordination, etc.), and assigned an owner responsible for mitigation actions. WP1 maintains oversight and ensures that risk reporting is embedded into monthly cross-WP coordination routines. The framework is dynamic, allowing new risks to be added and priorities adjusted as the project evolves.

The project follows a structured process aligned with best practices for research and innovation projects:

- **Risk Identification**: Partners regularly report emerging technical, ethical, and operational risks via monthly WP coordination meetings.
- **Risk Classification**: Each risk is assessed based on **Likelihood (L)** and **Impact (I)** using a 3-point scale (Low, Medium, High). Priority is determined by L × I.
- **Mitigation Planning**: Each identified risk is assigned a lead responsible party and a set of mitigation actions.
- **Monitoring and Updating**: A **centralized Risk Register** is maintained by WP1 (Sapienza), with quarterly updates and on-demand revisions as risks evolve.

7.2. Risk Categories and Key Issues

Risks within SmartUrbanity are categorized to reflect the multifaceted nature of the project, including technical development, data privacy, stakeholder engagement, pilot implementation, and inter-partner coordination.

Key issues identified at the outset include potential delays in tool development due to integration complexity, data protection challenges in pilots, difficulties in maintaining sustained engagement, and variable levels of readiness among pilot cities.

Strategic risks also exist around interoperability with external systems, managing expectations from authorities, and aligning with evolving contexts. This categorical structuring allows for more targeted mitigation strategies and ensures that risks are monitored from multiple perspectives—technical, legal, social, and operational.

Risks are grouped into five main categories:

1. **Technical Risks.** Concerns related to tool development, data integration, interoperability, and software stability.
2. **Methodological and Scientific Risks.** Issues in model calibration, validation, and user-centered metric operationalization.
3. **Engagement and Pilot Deployment Risks.** Risks associated with citizen recruitment, participatory activity uptake, and local authority coordination.
4. **Ethical, Legal, and Data Protection Risks.** Potential non-compliance with GDPR or insufficient ethical safeguards.
5. **Organizational and Coordination Risks.** Delays in deliverables, internal communication breakdowns, or resource bottlenecks.

7.3. Risk Register – Initial Critical Risks and Mitigations

The initial risk register compiled during the project's launch phase highlights several critical risks requiring early attention. These include delays in data availability for model calibration, difficulties in establishing local GDPR compliance protocols, and potential misalignments between user needs and early tool prototypes. Each risk entry is accompanied by a mitigation plan, responsible entity, and contingency measures. For example, to address tool-readiness concerns, parallel development streams have been initiated to allow staggered testing and feedback integration. The register is reviewed monthly and updated dynamically to reflect the emergence of new risks or the resolution of existing ones, ensuring that the consortium remains responsive and well-prepared.

ID	Risk Description	WP	L	I	Mitigation Strategy	Responsible
R1	Low user uptake of Access Together App during pilot phase	WP4	M	H	Gamified engagement; local campaigns; hybrid data collection (e.g., paper/postcards); flexible onboarding	CTLup, Pilot Leads
R2	Difficulty in calibrating perceived effort models due to noisy or incomplete subjective data	WP2	M	M	Use of statistical smoothing, fallback parameters from literature, robust regression methods, integration of open UX data (e.g., OSM tags)	KIT
R3	Technical integration failure between app, GIS platform, and DSS	WP3	M	H	Modular architecture with API standardization; early MVP testing; dedicated integration sprints	Movesion, CTLup
R4	GDPR non-compliance due to unexpected data combinations or re-identification risk	WP1, WP6	L	H	Privacy impact assessments, ethical review of data flows, anonymization and aggregation strategies, DPO involvement in design	Sapienza, EDPC
R5	Divergent regulatory or infrastructural contexts across pilot cities slow down implementation	WP4	M	M	City-specific adaptations of tools; buffer in deployment calendar; stakeholder pre-engagement	CTLup, ENTPE
R6	Delays in developing minimum viable products (MVPs) of digital tools	WP3	M	M	Agile development schedule; use of off-the-shelf components; focus on core functions in first iteration	Movesion
R7	Dissemination activities do not reach target audiences effectively	WP6	L	M	Multilingual materials; platform diversity (social media, workshops, printed materials); partner-based outreach	ZHAW

7.4. Early Actions Taken (M1–M6)

During the first three months of the project, several mitigation actions were initiated in response to early-stage risks. These include the establishment of a centralized ethics and data compliance workflow, the creation of the Pilot Integration Taskforce to bridge WPs 2, 3, and 4, and the pre-definition of fallback strategies for technical dependencies in tool development. Additionally, project management tools were deployed early to support milestone tracking, document sharing, and task assignments, minimizing the likelihood of coordination-related delays. These actions reflect SmartUrbanity's emphasis on early intervention and adaptive management, ensuring that foundational challenges are addressed before they escalate.

During the initial phase of the project, a series of targeted actions were undertaken to address key risks and lay the foundation for ongoing mitigation. A version 0.1 of the project's Risk Register was created and circulated among all WP leads to initiate structured tracking and ensure ownership of identified risks.

To manage integration-related challenges—particularly the alignment between conceptual modelling, tool development, and pilot deployment—a series of joint coordination meetings were held between WP2, WP3, and WP4. In parallel, the Ethics and Data Protection Committee conducted early reviews of data protection pre-assessments to flag any legal or procedural concerns before data collection begins.

Recognizing the potential risk of low user engagement, a preliminary concept for the gamification campaign was drafted to help incentivize sustained participation. Additionally, open communication channels were established with each pilot city lead to detect and respond to regulatory, linguistic, or infrastructural mismatches at an early stage, ensuring smoother implementation during upcoming deployment phases.

7.5. Future Risk Monitoring Plan

Moving forward, SmartUrbanity will continue to apply a structured and iterative approach to risk monitoring. WP1 will lead quarterly risk reviews, supported by real-time updates through the shared risk register and monthly WP check-ins. Specific focus will be placed on high-risk areas such as user engagement sustainability, data interoperability across tools, and localized ethics compliance in pilot cities.

A red-flag escalation protocol is in place to address high-impact or cross-cutting risks rapidly, ensuring they are resolved. As new project phases begin—especially tool deployment and large-scale data collection—the risk management plan will evolve to include stress-testing procedures and scenario planning to enhance project resilience.

Activity	Frequency	Responsible
Risk Register review	Quarterly	WP1
WP-level risk checks	Monthly WP meetings	WP Leads
Ethics & data review	At each tool release	EDPC
Pilot-specific risk review	Bi-monthly (pilots)	CTLup + Local Teams
Coordination-level escalation	As needed	Coordination Team (Sapienza + CTLup)

The risk management will remain a living system, updated regularly to reflect the dynamic nature of SmartUrbanity's research, innovation, and engagement activities.

8. Dissemination, Communication, and Stakeholder Engagement

Dissemination, communication, and stakeholder engagement are central to SmartUrbanity's mission to deliver impactful, user-driven innovation. The project is designed not only to develop tools and models but to foster active dialogue among citizens, planners, policymakers, and researchers around the future of inclusive urban mobility. Communication activities are strategically integrated across the work plan to maximize outreach, co-creation, and policy influence. This section outlines the project's overarching approach to dissemination, the mix of tools and formats it employs, how stakeholder groups are identified and engaged, and how communication is tailored to the specific needs and realities of each pilot city. It also details how success will be monitored and how the project contributes knowledge outputs to the DUT Partnership ecosystem.

Effective dissemination, communication, and stakeholder engagement are essential to SmartUrbanity's mission of co-creating inclusive mobility solutions and promoting systemic change toward 15-minute city principles. The strategy in this area is structured around three complementary objectives:

1. Disseminate scientific and technical knowledge to academia and experts,
2. Communicate project results and tools to the general public, civil society, and policymakers, and
3. Engage local stakeholders and citizens in participatory processes that inform tool design, validation, and policy uptake.

This section outlines the overarching strategy, early progress (M0–M3), and specific mechanisms designed for outreach and engagement.

8.1. Strategic Approach

SmartUrbanity adopts a multi-layered communication and dissemination strategy aimed at amplifying impact at both local and European levels. The approach is built around three key objectives: enabling broad public engagement with project tools and findings, supporting policy dialogue and urban planning uptake, and fostering knowledge exchange within and beyond the consortium. Communication is viewed not as a peripheral task but as a cross-cutting function that shapes the design of the digital tools, guides pilot interactions, and informs long-term scalability. The strategy distinguishes between general outreach, technical dissemination, and strategic influence, each with tailored channels, audiences, and messages.

The project's dissemination and communication plan is guided by the following principles:

- **Audience-specific tailoring**: Messages and channels are adapted to different groups (researchers, city authorities, citizens, mobility providers, NGOs, etc.)
- **Multilingual and inclusive access**: Materials are produced in multiple languages (EN + pilot city languages); attention is given to accessibility formats
- **Gamification for engagement**: Use of rewards, challenges, and playful tasks to motivate citizen participation
- **Openness and transparency**: Frequent updates through open channels; clear explanations of data use and project goals
- **Two-way dialogue**: Stakeholders are not passive recipients but active co-creators, particularly through pilots and workshops

8.2. Dissemination Plan and Channels

The dissemination plan combines traditional and digital media, interactive formats, and multilingual content to ensure accessibility and relevance across contexts. Key channels include the project website, social media platforms, policy briefs, academic publications, conference presentations, and visual dashboards. Dissemination materials are developed to match different audience needs—from local community updates and app tutorials to technical white papers and simulation outputs. Events such as urban labs, webinars, and pilot city showcases will create real-time opportunities for feedback and visibility. The plan also includes internal templates and branding guidelines to maintain consistency across materials and partners.

A full Dissemination and Communication Plan (D6.1) is due by Month 6. Early-stage dissemination focuses on visibility and branding, including:

Channel / Output	Description	Status
Project Website	Central hub with project description, tools, deliverables, and blog/news section	Domain secured, launch planned M4
Visual Identity Toolkit	Logo, fonts, color palette, slide templates, posters	Drafted in M3, partner feedback ongoing
Social Media Accounts	Twitter/X, LinkedIn, YouTube for tool demos and updates	Set up by ZHAW, first campaign planned for test
Scientific Dissemination	Conference abstracts, journal article pipeline, method workshops	Abstract submitted to target journals in urban planning and mobility science
Open Access Repository	Publications, deliverables, metadata shared via DUT Hub	Structure defined, to be populated starting M6

8.3. Stakeholder Mapping and Engagement Framework

Stakeholder engagement in SmartUrbanity is grounded in a dynamic and participatory mapping process that distinguishes between primary users (e.g., citizens, mobility-impaired groups), institutional actors (e.g., municipal planners, transport agencies), and knowledge intermediaries (e.g., NGOs, academic partners).

Each group is linked to specific project activities and engagement mechanisms, ensuring that communication is purpose-driven and context-sensitive. The engagement framework supports both bottom-up inputs—such as spatial perceptions, user feedback, and intervention proposals—and top-down validation of planning priorities. Engagement methods range from co-design workshops and interviews to gamified participation and digital voting, all designed to reflect the values of inclusivity and co-creation. Stakeholder mapping has been initiated in all pilot cities using a standardized template, grouped into four functional categories:

1. **Urban authorities**: planners, mobility agencies, technical departments,
2. **Citizen groups**: neighbourhood associations, youth groups, accessibility advocacy organizations,
3. **Mobility actors**: public and private providers, micro-mobility operators, and
4. **Researchers and civil society**: universities, think tanks, NGOs.

Engagement activities planned (and in some cases already launched) include:

- **Beta recruitment**: Identification of early users to test the Access Together app (Rome & Karlsruhe first)
- **Stakeholder workshops**: Scenario co-design, map validation, and feedback sessions (beginning M6)
- **Citizen surveys**: Distribution of mobility and perception surveys through multiple formats (digital + printed)
- **Postcard campaigns**: Inclusive outreach to digitally excluded users with QR-linked participation.

8.4. Pilot-Centred Communication Activities

Each pilot city develops a localized communication and engagement plan tailored to its specific institutional, social, and linguistic context. These plans leverage local networks, events, and media to promote awareness, build trust, and encourage participation in tool testing and data collection. Activities may include launch events, stakeholder roundtables, public exhibitions, or collaborations with schools and civil society organizations. Messaging is adapted to reflect local priorities—such as pedestrian safety in İzmir or rural transit accessibility in Thurgau—while maintaining consistency with the overall SmartUrbanity brand and ethical guidelines. This decentralized model ensures that communication is both locally grounded and strategically aligned.

Pilot cities will each adapt communication and outreach strategies to their context:

- **Rome**: Focus on caregiving and perceived safety. Gamified campaign around "invisible efforts of everyday trips."
- **Karlsruhe**: Emphasis on multi-modal integration and digital trust. Workshops in educational settings.
- **İzmir**: Accessibility equity across income groups. Integration with municipal platforms.
- **Lyon**: Use of digital twins in climate resilience. Coordination with local mobility labs.
- **Thurgau**: Rural accessibility challenges. Physical surveys and community gatherings prioritized.

ZHAW coordinates overall coherence but allows pilots to localize language, tone, and media formats.

8.5. Monitoring and Evaluation

To assess the reach and effectiveness of dissemination and engagement activities, SmartUrbanity incorporates a structured monitoring and evaluation (M&E) system. Quantitative metrics—such as website visits, downloads, event attendance, and social media interactions—are tracked alongside qualitative feedback from stakeholders and pilot city partners. Periodic reviews are conducted to assess what types of content and formats are most effective, allowing for course correction. Each WP contributes to this evaluation by reporting on communication outputs and stakeholder interactions within their scope. A set of KPIs for dissemination and engagement is under development and will be tracked across the project lifecycle. These include:

Indicator	Target	Measurement
Website visits	≥ 5,000/year	Google Analytics
Social media engagement	≥ 1,000 followers	Platform analytics
Survey responses (all pilots)	≥ 1,500	Database logs
Gamified app users	≥ 1,000 users	App backend
Stakeholders engaged	≥ 100	Attendance and feedback
Open access deliverables	100%	Zenodo / DUT Hub

8.6. Contributions to the DUT Knowledge Hub

SmartUrbanity is committed to contributing structured, high-quality knowledge assets to the DUT Knowledge Hub, reinforcing its value as a shared resource for urban transformation across Europe. Contributions include curated datasets, transferable models, user personas, policy briefs, and evaluation frameworks—each tagged with metadata to ensure findability and interoperability.

WP7 oversees the alignment of SmartUrbanity outputs with the thematic priorities and technical standards of the DUT Hub. In doing so, the project strengthens its role within the wider Driving Urban Transitions community and supports the long-term scaling and replication of its tools, insights, and strategies. SmartUrbanity contributes to the DUT Knowledge Hub by:

- Sharing **validated metrics and visualizations**
- Contributing **urban stories** and **pilot outcomes**
- Making tools **interoperable** with external datasets and simulations

The consortium has established a Knowledge Hub Liaison (from Sapienza) and will contribute structured content starting from Month 9.

9. Next Steps and Upcoming Deliverables

As SmartUrbanity transitions from foundational setup to full-scale implementation, the coming months are critical for consolidating research outputs, finalizing core platform components, and preparing for pilot deployment. This section outlines the immediate next steps and key deliverables planned across the short, medium, and long term. Emphasis is placed on translating conceptual work into functional systems, validating tools through pre-testing, and deepening stakeholder engagement across pilot cities. The roadmap of activities and outputs reflects the interdependency of work streams, ensuring that progress in one area directly enables advancements in others. A summary of key milestones and deliverables offers a forward-looking view of the project's evolution through to completion.

Following the successful completion of the setup phase (Months 1–6), As SmartUrbanity enters its core development and implementation phases, the project will transition from conceptual consolidation and early-stage prototyping to full-scale piloting, iterative tool refinement, cross-city evaluation, and policy integration. Between Months 6 and 36, the consortium will focus on delivering high-impact outcomes through progressive tool deployment, active stakeholder engagement, and robust performance monitoring.

During Months 6–18, the primary focus will be the release and testing of the Minimum Viable Products (MVPs) for the Access Together and Access Lab platforms in pilot cities. These tools will undergo field validation, supported by participatory workshops and gamified user engagement campaigns. Concurrently, model calibration using real-world data—including GPS traces, persona profiling, and participatory feedback—will be finalized to support the accessibility analysis and demand modeling systems. Development of the Decision Support System (DSS) will advance in this period, integrating AI-driven policy simulations and enabling multi-scenario planning.

From Months 18–30, SmartUrbanity will intensify pilot-based deployments in all five cities. Each city will tailor tool functionalities and engagement strategies based on its mobility challenges and demographic context. Continuous monitoring, iterative updates to digital platforms, and the deployment of the Micro-Mobility Integration Module (MIMA) will take place. These efforts will be complemented by the launch of city-specific communication campaigns and ongoing data collection to assess usage patterns and behavioral changes.

Simultaneously, the project will initiate policy analysis and digital twin simulations, identifying system-level impacts and producing transferable insights for urban planning.

In the final phase (Months 30–36), emphasis will shift toward cross-city synthesis, policy recommendations, and long-term uptake. Deliverables during this period include the final evaluation reports, the strategic roadmap for the replication of tools in non-pilot contexts, and comprehensive documentation for the DUT Knowledge Hub.

SmartUrbanity will also deliver a suite of policy briefs, toolkits, and user guidelines, ensuring that the project's digital innovations are aligned with real-world governance needs and institutional capacities. Final dissemination events, including public showcases and policy dialogues, will promote visibility and knowledge transfer at local, national, and European levels.

9.1. Key Activities

SmartUrbanity's lifecycle is structured around phased, interdependent activities spanning foundational research, digital development, deployment, and strategic scaling. While Months 1 to 9 focused on conceptual consolidation, prototyping, and pre-pilot coordination, the remaining period (M10–M36) will center on full pilot implementation, iterative tool improvement, data-driven policy insights, and long-term knowledge integration. This section outlines the major actions across all project phases and Work Packages.

A. Methodological Finalization and Framework Consolidation (WP2)

- M1–M9: Finalization of the human-centred accessibility model and persona framework. Calibration of perceived effort parameters using secondary data and app-based pilot feedback. Submission of D2.1: Concept Knowledge Report (M6), detailing mobility needs, attitudes, and barriers.
- M10–M24: Enrichment of personas using live user data from pilots. Deployment of full accessibility model in pilot environments. Validation of effort-based and gravity models using field data (e.g., GPS, surveys). Ongoing co-creation sessions to refine framework in light of user feedback.
- M25–M36: Cross-city comparative analysis to test transferability of framework. Delivery of synthesis reports aligning local findings with EU-scale policy relevance.

B. Digital Tools Prototyping and MVP Architecture (WP3)

- M1–M9: UX/UI development for Access Together App and Access Lab. Completion of architecture and back-end infrastructure. Submission of D3.1: App Architecture & Specification Report (M6).
- M10–M24: MVP rollouts of the Access Together App and Access Lab in all pilot cities. Development and integration of the DSS with agent-based models. Early testing and feedback cycles for the MIMA module (Micro-Mobility Integration App). API updates for seamless data flow across platforms and cities.
- M25–M36: Refinement of tools based on evaluation metrics and stakeholder input. Consolidation of versions, complete with documentation and user support materials. Contribution of toolkits and assets to DUT Knowledge Hub.

C. Pilot Preparation, Deployment, and Evaluation (WP4, WP6)

- M1–M9: Stakeholder mapping and user recruitment in pilot cities. Scenario planning sessions and co-design formats (e.g., labs, mobile kiosks).
- M10–M24: Full-scale pilot launches across all cities. Rollout of gamified engagement campaigns (Green Points, Yellow Points). Mid-phase evaluation workshops and technical adjustments based on pilot data. Deployment of personalized accessibility metrics and route-based insights via the Access Lab.
- M25–M36: Final pilot evaluations, including equity assessments and mobility outcome tracking. Local policy co-development sessions to translate findings into implementation strategies. Delivery of city-specific evaluation reports and contribution to cross-site synthesis.

D. Communication, Dissemination, and Ethics Oversight (WP1, WP6)

- M1–M9: Launch of the SmartUrbanity website, visual identity, and outreach templates. Approval of GDPR and consent protocols. Submission of D6.1: Dissemination and Communication Plan (M6).
- M10–M24: Publication of multilingual communication materials tailored to pilot city audiences. Regular engagement via social media, blog updates, and newsletters. Ethics and DPIA updates prior to and during pilot phases. Tracking of engagement metrics and participation diversity.
- M25–M36: Public dissemination events, including final pilot showcases and policy forums. Submission of final deliverables related to communication impact and ethics reporting. Production of public-facing documentation (e.g., “How to Use” guides, FAQs, tool brochures).

E. DUT Liaison and Knowledge Structuring (WP7)

- M1–M9: Initial cataloguing of project assets and structured contribution to the DUT Knowledge Hub.
- M10–M24: Progressive submission of models, personas, use cases, and platform outputs to the DUT repository. Internal knowledge sharing across DUT projects via shared webinars and working groups.
- M25–M36: Preparation of transferability roadmaps and replication guidelines. Final documentation of project insights and integration into DUT thematic clusters. Delivery of concluding synthesis contributions for the DUT Knowledge Hub.

9.2. Deliverables Overview (Months 1–36)

SmartUrbanity is structured around a timeline of 36 months with carefully sequenced deliverables that reflect the project's research, technical, and deployment trajectory.

Early deliverables include the Inception Report (D1.0), Conceptual Framework (D2.1), and Data Management Plan (D1.3), setting the groundwork for design and development. Mid-phase deliverables (M10–M24) will focus on tool releases, pilot results, and stakeholder feedback reports, while final-stage deliverables (M30–M36) will include policy roadmaps, evaluation reports, and synthesis publications.

Each deliverable is linked to defined Work Package objectives and reviewed internally to ensure quality, relevance, and alignment with DUT priorities.

Deliverables by Delivery-Month Periods (with Due Months)

No	**Deliverable name**	**WP**	**Due date**
D1.1	Technical and Financial Day-to-Day Management Strategy *(CTLup)*	1	M3
D1.2	Communication and Engagement Strategy *(Sapienza)*	1	M6
D1.3	Data Management and Risk Mitigation *(CTLup)*	1	M6
D1.4	Monitoring, Quality and Control, and Ethics *(Sapienza)*	1	M9
D6.1	Dissemination Materials Package *(ZHAW)*	6	M9
D2.1	Concept Knowledge Report *(KIT)*	2	M12
D2.3	Model and Data Management System *(ZHAW)*	2	M12

D2.2	Framework Blueprint *(SZTAKI)*	2	M15
D2.4	User Insights and Design Recommendations *(ENTPE)*	2	M15
D7.1	First Report & Strategy on DUT Knowledge Hub & SmartUrbanity *(Project Ambassadors)*	7	M18
D3.1	Citizen Engagement App Prototype *(Movesion)*	3	M20
D3.2	Accessibility Analysis Platform Prototype *(Sapienza)*	3	M20
D6.3	Online Knowledge Repository *(KIT)*	6	M20
D6.4	Gamification Toolkit *(EGE)*	6	M20
D3.3	DSS Platform MVP and Scale-Up *(CTLup)*	3	M30
D4.1	Pilot Deployment Report *(CTLup)*	4	M30
D4.2	User Training Materials and Support Documentation *(ENTPE)*	4	M30
D5.1	Policy Assessment Report *(ENTPE)*	5	M30
D5.2	Virtual Reality Digital Twinning Platform *(ZHAW)*	5	M33
D6.2	Stakeholder Engagement Event Summaries *(EGE)*	6	M33
D4.3	Evaluation and Feedback Analysis Report *(CTLup)*	4	M36
D5.3	SmartUrbanity Roadmaps, Guidelines, and Policy Recommendations *(ENTPE)*	5	M36
D5.4	Policy Tracking System *(SZTAKI)*	5	M36
D7.2	Final Report & Outcomes on DUT Knowledge Hub & SmartUrbanity *(Project Ambassadors)*	7	M36

9.3. Milestone Summary (M1–M36)

Across the full project lifecycle, SmartUrbanity has defined strategic milestones to monitor progress, ensure alignment, and enable timely course correction. Early milestones include the establishment of the project governance structure (M2), the completion of the conceptual framework (M4), and initial tool prototypes (M6). Mid-term milestones include the launch of pilots (M12), full tool integration (M18), and completion of mid-phase evaluations (M24). Final milestones (M30–M36) cover the finalization of policy deliverables, cross-city impact assessments, and contributions to the DUT Knowledge Hub. These milestones not only mark technical progress but also serve as coordination points for stakeholder engagement and strategic communication.

No	Milestone name	WP(s)	Due date
MS1	Pilots' readiness for kick-off *(CTLup)*	4	M18
MS2	Impact Assessment Framework and KPIs *(CTLup)*	4	M24
MS3	Initial version of Solutions Design and Development Strategy *(Movesion)*	3	M18
MS4	Final version of Solutions Design and Development *(Movesion)*	3	M24
MS5	Initial version of Policy and Guidelines Analysis *(ENTPE)*	5	M22
MS6	Active Engagement and Participation Tools and Strategy Desing *(ZHAW)*	6	M15
MS7	Play-Game and Workshops are organized *(EGE)*	6	M24
MS8	Digital-Twin Desing and Planning *(ZHAW)*	5	M22

9.4. Forthcoming Priorities

Key priorities moving forward include completing the calibration of accessibility models using real-world user data, finalizing the MVPs of the Access Together and Access Lab platforms, and ensuring regulatory alignment in all pilot cities. Enhancing communication strategies, especially around user onboarding and gamified participation, is another urgent priority as pilots approach. The integration of feedback loops—both digital and in-person—will be essential to refine the platforms before full-scale deployment. Additionally, attention will be given to fostering interoperability across tools and preparing consortium partners for training, testing, and evaluation activities scheduled in the next implementation phase.

1. **Validation of core methodological assumptions** through literature comparison, expert review, and early data collection.
2. **Ethical clearance and localized consent flows** to be adapted and translated per pilot city.
3. **Coordination of technical development timelines** between CE tools (WP3) and pilot readiness (WP4).
4. **Early engagement pilots launched in Rome and Karlsruhe** to ensure iterative tool feedback and community traction.
5. **Alignment with DUT reporting, visual ID, and KPIs** to ensure visibility and contribution to the broader partnership.