ACTION PLAN
MOBILITY DIGITAL TWIN (RĪGA)

EXECUTIVE SUMMARY

Overview:

Riga, the capital of Latvia, with a population of 609.5 thousand in the city and 860.1 thousand in the wider statistical region, faces key challenges as outlined in the Riga Development Programme (2022–2027). The city's municipal budget for 2024 consists of €1.545 billion in expenses and €1.354 billion in revenues. The programme defines strategic priorities aimed at addressing the city's growing needs in the areas of mobility, urban environment, climate resilience, housing, education, and governance.

Key priorities and challenges:

1. **Convenient and green mobility:** Riga aims to promote climate- and citizen-friendly mobility by increasing the number of cyclists by 50%, reducing the number of cars crossing city borders by 5%, and reducing CO_2 emissions from transport by 20% by 2027. The city aims to improve the use of public transport use and infrastructure, positioning mobility as a tool to improve the urban experience, health, and safety.
2. **Urban environment and climate resilience:** Riga focuses on creating a high-quality urban environment that supports a resilient ecosystem to mitigate climate change, improve air quality, and promote sustainable living spaces.
3. **Education, housing, and governance:** The city prioritizes the availability of high-quality education, diverse and affordable housing, and modern, open city governance to create a healthy, inclusive, and supportive environment for all residents.
4. **Innovative and competitive economy:** Riga aims to build a competitive economy driven by innovation, supported by diverse cultural experiences and a smart, digitally integrated infrastructure.

Digital Twin and Smart City vision: Although Riga's strategic documents do not yet position Digital Twin (DT) as a formal solution, several related projects are laying the path for its development, such as IoT networks, video surveillance improvements, and civil defense systems. DT technology has the potential to improve data management, mobility planning, and operational efficiency, supporting almost all the city's strategic goals. Challenges for DT implementation include securing consistent government support and overcoming market limitations.

Riga's long-term strategy is to ensure that the city remains a hub of opportunity, promoting sustainable growth, climate neutrality (53% CO_2 reduction by 2030), and the smart integration of innovative technologies for urban development.

Objectives: The project aims to develop a Mobility Digital Twin (MDT) that supports Riga's long-term urban mobility goals by enabling real-time, data-driven decision making and predictive analytics. This integrated and data-driven approach will improve the efficiency and adaptability of the transport system in Riga and its metropolitan area. The MDT will collect, aggregate, and analyze real-time data to improve urban and mobility planning, ensuring system interoperability and data standardization. Key outcomes include improved transport infrastructure, efficient public transport, real-time crisis

response, and optimization of traffic flow through solutions such as Park & Ride systems and low emission zones. By addressing current challenges such as data fragmentation and once built and inherited infrastructure, the project will streamline mobility management and support sustainable, people-centered urban planning.

Key stakeholders: The success of the MDT project will depend on the collaboration of a wide range of internal and external stakeholders who manage critical data sources. Key municipal stakeholders include local government departments and institutions responsible for infrastructure, mobility, urban planning, and civil defense. They will provide comprehensive data on road networks, public transport, traffic flows, public spaces, and emergency routes. In addition, utility companies will provide essential data on technical infrastructure and utilities, while external event organizers and city management will share information on public events that affect traffic.

External stakeholders such as road safety authorities and the Road Traffic Safety Directorate are expected to be able to provide key safety data, including traffic incidents and vehicle movement patterns. In addition, meteorological institutes and environmental agencies are expected to provide real-time weather and environmental data, including information on CO_2 emissions, noise, and air quality. These contributions will enable MDT to provide a comprehensive, data-driven foundation for real-time decision making, urban planning and mobility management in Riga.

CITY INFORMATION

Number of inhabitants:

- **609, 5** thousand in Riga city
- **860,1** thousand in Riga statistical region (2024)

294,1 thousand households with 2,03 an average size of a household

Municipal budget (annually, 2024):

- Expenses: **1 billion 545 million** (1,545 billion);
- Revenues: **1 billion 354 million** (1,354 billion)

Main city challenges:

Priorities set in **Riga Development Programme (2022- 2027):**

1) **Convenient and environmentally friendly mobility**
    a. Public transport
    b. Convenient and safe mobility
    c. Balanced mobility
    d. Hierarchy of mobility
    e. Cooperation in the Riga Metropolitan area

GOAL (2027): promote climate and citizen -friendly mobility by ensuring the availability of diverse modes of mobility and creating the necessary infrastructure:

- Increase the share of cyclists (by 50%)
- At least 5% fewer cars crossing the city border
- A higher share of public transport users

- A 20% reduction in co2 emissions from transport

Other priorities:

2) Urban environment that promotes quality of life
3) Good environmental quality and a resilient urban ecosystem to mitigate climate change
4) Accessible and high-quality education
5) Availability of diverse high-quality housing
6) Modern and open city management
7) A healthy, socially inclusive and supportive city
8) A competitive city with an innovative economy
9) Diverse and authentic cultural environment

Furthermore, Riga is one of the 100 cities in Climate Mission **EU Mission: 100 Climate-Neutral and Smart Cities by 2030.** Riga has developed The Climate City Agreement in the co-creation process of all involved parties, it is a comprehensive plan for all sectors - energy, building management, sustainable transport, waste management, circular economy, greening of the urban environment, etc. for the faster achievement of climate neutrality in the city of Riga.

The Climate City Agreement envisages achieving a 53% reduction in CO 2 emissions compared to 2019, which simultaneously means reducing CO 2 emissions in the city of Riga by 80% compared to 1990, as well as achieving climate neutrality in the municipal infrastructure. On the other hand, with the help of forest areas, it is planned to ensure constant capture of CO 2 until 2030 - in the amount of approximately 300 ktCO 2 /year, which will ensure a 16% reduction of CO 2 emissions from the total CO 2 emissions of 2019.

Overall role of digital twin in the city`s strategy:

Long term strategic goals:

Main documents:

1) **Riga 2030: Sustainable Development Strategy of Riga until 2030** – Strategy
    a. *Moto: Riga – the city of opportunities*
2) **Riga Development Programme (2022- 2027)-** Programme and Investment plan

So far there is no mentioning of DT and/or MDT as a strategic tool or solution in Strategy and Programme; however, the city`s priorities imply the need for solutions that would help to achieve the goals in the most efficient and innovative way. The strategic decision about the tools and solutions to be used and developed is left to municipal professionals.

In the Programme's Investment plan there are projects that will promote the development of DT, e.g. Pilot project of a unified internet of things network in Riga, Improvement to the video surveillance system in the city- expanding the network to cover entire city incl. using mobile CCTV cameras and video surveillance of unmanned aircraft, Development of Civil Defense Information system, Positive energy district planning and management with PED's digital twin etc.

DT/ MDT as an innovative tool provides support to almost all priorities set in Programme.

VISION

Challenges & opportunities for DT

Opportunities – Improve city`s performance in mobility planning and development, as well as achieve significant improvements at operational level. Create a comprehensive and effective data management within the municipality and the respective future infrastructure.

Challenges – Clear government support (local, national). Local government play a significant role in promoting and encouraging the implementation and usage of innovative technologies. The support should be clear, consistent, and long-term, allowing funding to be provided over a longer period for all product development stages. Lack of support can seriously jeopardize the success of the project.

Business capability in the market to deliver desired output. If the capability is not sufficient, it will significantly affect the price. (Some costs may vary from 89 thousand EUR to 1 million EUR).

Support for policies: high quality data and tools for decision making at different levels – political, strategical, operational. This data-driven approach will enhance the ability of leaders and stakeholders to make informed and timely decisions, ensuring that policies are not only informed but also responsive to real-world challenges.

Main users:

1) politicians – products from MDT, e.g. scenarios, models, analytics, statistics etc.
2) city planners – urban and mobility planners – as a tool &products.
3) maintenance units – road and street maintenance.
4) Rīga Municipality police and security institutions – safety, road closures, events etc.
5) Welfare department and social services – socially vulnerable groups of people, groups of disabled people etc. their wellbeing in the urban area, need for assistance and or help etc.,
6) Housing department and Riga Energy agency- air pollution monitoring etc.,
7) professionals, academia – data, analytics, statistics, products for studies, scientific work.
8) citizens – access to information, engagement in planning processes etc.

Implementation:

The implementation of a MDT mobility starts with the collection and integration of data from various mobility sources, including vehicles, infrastructure, and real-time sensors. The next step is to use the collected data and simulation technologies to create a detailed digital model that reflects real-world transport systems.

Expected outcomes include improved decision making, optimized mobility management and increased system efficiency through real-time insights and predictive modelling in long term.

Integration with existing systems:

There are already existing systems built with interoperability prerequisites in mind. Furthermore, over last 2 years extensive centralization of geospatial data maintenance has taken place, set maintenance and interoperability requirements, and creating a centralized infrastructure.

When planning and implementing new solutions in place of existing obsolete data maintenance solutions or creating a new one, it must be assumed that they must be able to support/ feed future DT/MDT future requirements of DT/MDT.

OBJECTIVES (PROJECT)

Problem description:

Business Goal:

To make it easier for decision makers to make data-driven decisions by ensuring the availability of innovative and effective tools and high-quality and up-to-date information about mobility and movement habits in Riga and the territory of the Riga Metropolitan area.

Business Need:

To establish a systemic and integrated approach to the management - collection and maintenance of high-quality mobility data to support real-time decision making and long-term urban planning according to the city's strategic goals.

Project Objective:

Develop a Mobility Digital Twin (MDT) (and related infrastructure) that allows effectively collect, combine, and use real-time data for urban and mobility planning and predictive analytics for decision making. The solution will ensure interoperability of data and systems, set the conditions for future data acquisition and requirements for infrastructure, thus providing a foundation for achieving the city`s goals outlined in Riga's Strategy and Programme.

One of the key challenges in the transport sector is the inability to respond quickly to changes in human mobility patterns and adapt infrastructure accordingly based on real-time data. While assumptions and isolated data sets are currently used to model the mobility situation, they often do not reflect the actual conditions and are static. This gap between modelled scenarios and real-world dynamics makes it difficult to make effective, data-driven decisions.

The problem is compounded by the involvement of multiple stakeholders and data interoperability issues. Integrating disparate data sources and aligning them with existing infrastructure is a significant hurdle. / A significant obstacle is the integration and alignment issues/problems of disparate data sources with the existing infrastructure. Many of the existing infrastructure elements, especially those from previous investment periods, are either incompatible or difficult to adapt to modern requirements.

We are currently witnessing a technological breakthrough that has the potential to address these challenges. However, to ensure that these advances translate into real improvements, legacy issues related to infrastructure, data integration and stakeholder coordination need to be overcome.

Expected output:

The project aims to deliver several key outputs that will significantly improve traffic and data management and urban mobility, particularly in Riga and the metropolitan area:

- **Unified and integrated data and IT infrastructure**: The project will ensure a homogeneous, integrated infrastructure with data transparency (within GDPR limits). Data format standardization and interoperability requirements will be implemented as part of a comprehensive data strategy, improving overall system compatibility and efficiency.
- **Streamlined mobility data flow**: Mobility information and data flow will be identified, listed, organized, supervised/monitored and standardized. This will primarily benefit Riga, but also the wider metropolitan region. A clear and organized view of mobility patterns will enable better planning and adaptability.
- **Data management and responsibilities:** Those responsible for data, data sets and infrastructure will be identified, imposing the obligation to ensure the flow and exchange of data in accordance with the requirements and the maintenance of the respective infrastructure.
- **Better use of data for other municipal processes:** A well-structured and organized data system will not only solve the current mobility challenges but will also benefit other municipal processes. Processes that previously suffered from unidentified data gaps will improve as a side effect of having better organized and transparent data.
- **Innovative solutions in data management:** innovative data processing solutions, e.g. AI.

- **Efficient transport connections**: With a people-centered approach and a focus on public transport and environmentally friendly mobility as a priority, transport systems will be adapted to reflect actual movement patterns and people's habits. This will ensure more efficient connections between modes, improve the overall user experience and plan environmentally friendly movement in the city.
- **Park & Ride integration and low emission zones**: Traffic flows will be managed in real time, considering actual movement data. Park & Ride systems and green zones will be optimized to improve mobility and reduce congestion.
- **Faster response in crisis situations**: The ability to quickly identify evacuation routes and make data-driven decisions during emergencies will be improved. By gaining real-time insight into current conditions, authorities will be able to respond more quickly and effectively in critical situations.

Target audience:

- **Decision makers**: Local government officials responsible for setting policies and making strategic decisions that affect urban development and transport systems.
- **Urban and mobility planners and transport system specialists**: Experts and planners tasked with designing and optimizing the city's transport infrastructure to meet the current and future needs of the population.
- **Data specialists**: Municipality specialists responsible for data management, systems integration and ensuring interoperability between different platforms within the city's operations.
- **Indirectly - Riga residents and visitors**: The general population of Riga, who will benefit from more efficient, people-centered transport solutions that improve mobility, reduce congestion, and enhance the overall quality of life.
- **Transport service providers**: Public and private sector organizations involved in the provision of transport services, including public transport operators and mobility service providers who need to adapt to real-time data and improved infrastructure.

- **Emergency Response Teams**: Authorities responsible for crisis management and emergency evacuation who need real-time data to respond quickly and effectively in critical situations.
- **Environmental and urban sustainability advocates**: Groups of citizens, NGO, academia focused on promoting sustainable urban mobility, reducing emissions, and creating more livable urban environments.

Data required and owners:

The successful implementation of the project will require a wide range of data from various data holders within the municipality, as well as external data holders, paying special attention to municipal data, transport infrastructure and real-time environmental inputs:

- **Municipal data (internal owner/holder: departments, institutions)**:
    - **Infrastructure data**: comprehensive 3D models of the buildings and infrastructure objects, e.g. bridges, overpasses etc., large scale data about utility networks (surface, underground), sensor grid, smart traffic lights, their locations etc.
    - **Mobility data:** public transportation networks, public transportation modes and routs, including bus, tram, and train; traffic flow directions, schedules etc.
    - **Road network and facilities**: Data about the road network, cycling infrastructure, bike rack locations, car parks, railway lines and road signs.
    - **Public spaces and ownership**: Information on the ownership and location of public facilities such as schools, hospitals, and cultural venues, e.g. concert halls.
    - **Urban development plans**: territory plans, local and thematic plans, maps of planned and ongoing construction projects, provided in real time to help make decisions about mobility in long- term.
    - **Civil Defense facilities and routs**: The most important locations for civil defense, including shelters, contact points/civil defense centers (CDCs) and emergency evacuation routes.
    - **Road Classifications**: Data about road categories, road widths, height restrictions, bridge capacities and other critical traffic management features.
- **Data on infrastructure/utility data (internal owner: municipality (large scale topographic information database (scale 1:500)); external owners: utility companies)**:
    - **Information on the availability of utilities**: for example, data on electricity network/power grid and its characteristics: structural loads and physical dimensions of infrastructure elements. These data are essential for assessing the potential to integrate new IoT networks or expand existing infrastructure.
- **Public event data (owned by external event organizers and city management):**
    - **Information on major public events** that may have an impact on traffic, including road closures and prediction of mass movements of people.
- **Traffic Safety Data (external owner: Road Safety Authorities):**
    - **Road traffic incident data (CSN data)**, including the number of accidents, locations, and details of traffic regulations.
    - **Vehicle data from the Road Traffic Safety Directorate (CSDD)** to understand vehicle use and movement patterns.
- **Meteorological and environmental data (owned by external meteorological institutes, environmental agencies):**

- **Real-time weather data** including wind speed, any data precipitation falling (snow, sleet, rain), fog, thawed, flooding and related flood risk zones, road icing etc.
- **Sensor data from IoT** devices monitoring CO_2 emissions, noise levels and air quality.

Funding:

At this stage, the potential costs of the project have not been calculated. However, it is important to recognize that the project budget will include not only the initial development and implementation costs, but also the ongoing maintenance and update costs.

A key consideration is that the creation of the MDT should be limited to processes where a clear return on investment (ROI) can be achieved or at least investments justified. This will ensure that the project is financially feasible and sustainable over time and delivers tangible benefits to main stakeholders.

It is crucial to develop a comprehensive financing plan that considers both short-term costs and long-term operational needs, ensuring the value and relevance of the project in the years to come.

Other stakeholders involved:

In addition to the municipality and the owners of the primary data, several other stakeholders need to be involved in different stages of the project to ensure successful implementation and development:

- **Mobile Network Operators** (MNOs) to provide insight into human movement patterns based on aggregated and anonymized mobile network data. Due to privacy concerns and the high costs associated with data processing and anonymization, MNOs are reluctant to share detailed location data. Negotiating access to this data will require addressing both legal and technical challenges, including compliance with GDPR regulations.
- **Electronic communications merchants and service providers**: data on the locations of infrastructure, i.e. mobile towers and base stations, network/service exposure, which is critical for understanding network coverage and potential integration of IoT infrastructure. Operators are typically reluctant to share precise base station location data because of security and competitors. Alternative approaches may be needed to overcome this limitation or to seek aggregated data that ensures privacy and security.

DIAGNOSIS: BOTTLENECKS & OBSTACLES

Vision:

So far there is no shared vison of city`s DT, nor the vision of MDT. There were several attempts to encourage political leaders to propose the elaboration of the concept of an overarching DT or at least guidelines for future projects that will include DT as an output, which would allow for significant milestones toward creation of an interoperable and targeted DT.

Currently there are fragmented solutions - DT that are not interoperable.

According to LORDIMAS (Local and Regional Digital Maturity Assessment) assessment Riga has an overall good digital maturity level (Digitally purposeful).

However, a generally good level of digital maturity most likely does not imply that users are early adopters of innovative solutions. Internally, there could be knowledge gaps even within a single institution, thus learning and training is crucial during implementation process of the project.

Additionally, it should be recognized that not all problems must be solved with the help of DT, as it is still a complex and expensive solution. Therefore, the focus must be put on the most challenging areas or segment, where innovative impactful solutions are needed due to the complexity of the challenge, e.g. large amounts of dynamic and real-time data, need to make quick data-based decision, decision affect large numbers of users or citizens.

Digital twin governance:

1) Political level: a political decision that we will seek innovative solutions to the problems.

- Chairman of the Riga City Council
- 60 councilors
- City Development Committee

2) Strategic level:

- Executive director
- City Development department
- Riga Digital Agency
- Traffic/ transport department
- Riga Energy Agency
- Transport company municipal Ltd. "Rīgas satiksme"

3) External partnerships:

- Academia (RTU Trasporta fakultāte, LU)
- Industry

Embedment into policymaking process:

Funding:

Until there is substantial government support for the idea, allocation of the funding is problematic. At the same time, cities deal with many and various everyday issues that affect people at a specific moment, which means that money is mainly allocated for solving current problems, but projects whose benefit is not so visible or not immediate are evaluated and assessed with great caution.

However, funding is allocated to smaller individual DT projects, which is promising, because it allows demonstrating the benefits of the solution for the specific problem and encourages the municipality to invest in similar, now larger, projects. Gradual implementation of DT reduces resistance toward innovative solutions as they become familiar to users.

- There is differentiation of sources as the municipality provides its own funding and is involved in EU projects/pilot projects, as well as additionally seeks other financial support mechanisms and instruments provided by the industry and the state.
- Funding is not always sufficient, especially if the project is long. Duration can have a significant impact on costs - they will most likely increase. Growth is affected by both

complexity and changes in market demand for such or similar work, as well as changes in solution`s functionality that may occur over time. Risks must be considered.

- The solution must be developed and improved over time. There is no guarantee that money will be provided for the development and/or improvements. Continuity of funding over time could be a significant problem.

Local IT infrastructure – basic needs should be financed with municipal funding, although financing of physical infrastructure can be solved through public private partnership.

Data:

Despite the existing extensive infrastructure, it is not sufficient for the future solutions, both due to software updates, rapid wear and tear of hard infrastructure, and rapidly increasing volumes of data transmission and processing. When developing the solution, continuous improvement of the infrastructure and review of capacities should be provided.

There is no uniform policy in software provision, as the costs are both for proprietary software and programming costs in the case of open solutions.

With open-solutions, apparently would seem to be able to respond faster to requests for changes in systems, modules, etc., because proprietary solutions are sometimes inflexible, rigid - changes are difficult to implement and sometimes affect several functionalities or updates are enormous - affecting almost the entire system.

At the same time, the market offer - knowledge, capacities, and costs - should be evaluated to choose only in-house programming or only open solutions. A hybrid, modular solution is probably better.

Data problems:

The data problem is big. The most important features – the data must be of high quality, that is, up-to-date, accurate and reliable (depending on the specifics of the data – the highest reliability); compatible and maximally processed already at the stage of data collection/aggregation, where possible.

The biggest investment is and will be in the creation of data collection solutions (preferably automated), data maintenance and maintenance of related infrastructure and/or solutions, data transmission - infrastructure capacity and throughput, as well as ensuring the interoperability of data and data sets.

Data ownership & governance:

An internal overarching regulation of data circulation is needed, defining specific competences for the resource (data) holder (business owner, industry) and technical resource (ICT solutions, architecture, interoperability requirements, etc.) holder. From the technological aspect, know-how should be at the holder of the technical resources, recommending the best solutions & defining the mandatory interoperability requirements of the solutions.

DT/MDT will also affect decision-making and day-to-day processes, forcing changes in habits. Accordingly, it should be envisaged as a process of changes - changes in the organization, including both user training and competence enhancement, knowledge acquisition. Aim for the solution to be used and developed.

Regulations & legal considerations:

So far, Riga is very open but does not exaggerate. In internal processes, employees have wide access to data, but it is granted only after ongoing procedures, no one gets to the data without sufficient reason and necessity.

Data that, in the opinion of the city, have restrictions on their opening, are not opened. Minor problems are at the national level - sometimes the requirements of different ministries and authorities for data resolution of specific objects differ. It would be good to have a single policy for all data holders and distributors.

Riga coordinates the opening of data, e.g. geospatial, with military and security structures to avoid misunderstandings.

City values privacy and personal data protection, therefore, minimizes the processing of personal and sensitive data as much as possible – unless specifically stipulated by law or other regulatory acts. The need for personal data processing is evaluated in each solution development process. There are restrictions, but they are not disproportionate, unless someone thinks to expand the legal norms - to interpret them more broadly - this is the biggest legal problem among lawyers of various "stripes".

Procurement:

It is necessary to procure and simultaneously build internal competence in data processing and IT to be able to perform part of the work in-house, as well as to increase the bargaining power with the supplier. Plus, it would reduce the bad effect of the lack of market supply - part of the work can be done promptly by the municipality itself. The acquired knowledge and expertise can be scaled and transferred to other cities, which is a nationally important initiative. Proportions - it is hard to say now, but city must be aware and ensure that shifts in the market do not significantly affect the solution in the long term.

STRATEGIC ACTIONS & TIMELINE

Goal /Objective	Tasks	Action	Timeline
Shared vison of DTwin in the municipality	1) Establish a Data Governance Council to oversee data-related policies and initiatives. 2) Develop a data governance framework	1) Define council roles, responsibilities, and membership. Ensure cross-departmental representation and leadership buy-in. 2) Align the framework with existing policies and regulations. Focus on addressing top data challenges, priority areas, and risk mitigation strategies. Define key roles, responsibilities, and enforcement mechanisms.	Q2 2025 – Q2 2026

Data strategy	1) Conduct a data maturity assessment across the municipality according to the methodology. 2) Implement an operational data strategy based on the insights from the data maturity assessment. 3) Develop a Unified City Data Policy document outlining a clear vision and guiding principles. 4) Ensure alignment with data governance policies and regulations 5) Re-evaluate results after operational strategy implementation and develop a long-term data strategy.	1) Define key maturity indicators, assessment criteria, and scoring methodology. 2) Identify immediate priorities, set measurable objectives, and define actionable steps for improving data management and utilization. 3) Define a high-level strategic direction for data analytics, data governance, digital twin, and AI initiatives. Ensure policy consistency across city departments and regulatory bodies.	Q4 2025 – Q4 2026
IoT Sensors Guidelines	1) Define IoT sensors specifications for various areas	1) Develop technical guidelines for sensor deployment and data collection 2) Standardize integration with mobility platforms	Q2 – Q3 2025
Project Portfolio	1) Map ongoing and planned DTw projects 2) Assess project contributions to strategic goals	1) Establish a centralized DTw project registry 2) Define KPIs to evaluate project impact 3) Mobility digital twin ecosystem mapping	Q3 2025 – Q2 2026
Data Architecture	1) Redesign data architecture to ensure seamless integration across platforms.	1) Design a scalable framework for data and system interoperability.	Q2 2025 – Q4 2026
Business process redesign	1) Analyze existing business processes	1) Create process digitalization plan that supports effective future data circulation	Q3 2025 – Q2 2026

3D Reality Model of surface engineering infrastructure	1) Expand real-time urban environment modeling capabilities	1) Create detailed 3D models of engineering infrastructure 2) Integrate real-time sensors data into the digital twin	Q4 2025
Pilotproject of one use case	1) Define the mobility pollution use case and establish a monitoring approach 2) Implement and evaluate the pilot solution	1) Deploy and test the selected solution in a real environment	Q1 – Q4 2026