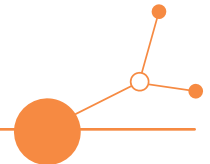


SUSTANCE

D.2.5.1. Long term sustainability guidelines for solution n. 5 (PA5) Developing new ICT service for Maas in Istria - Mobility Plus



Version 1
022025





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Abbreviations

AF	Application Form
WP	Work Package
PT	Public Transport



1 Overview

Mobility Plus provides an integrated digital mobility planning and service integration model that supports the deployment of Mobility-as-a-Service (MaaS) ecosystems by integrating public transport, bike-sharing and other shared mobility services within a single digital environment. The solution combines interoperable ICT architecture, real-time multimodal information, journey planning, ticketing functionalities and a governance model that enables cooperation between public authorities, transport operators and mobility providers. Designed as a scalable and modular approach, it supports the digitalisation of regional mobility systems and can be replicated in other Central European regions seeking to improve multimodal accessibility, sustainable tourism and low-carbon mobility.

The solution was validated through Pilot Action 5 in the Istria Region (Croatia), where the Mobility Plus application was developed and tested as a proof of concept. The pilot demonstrated the practical integration of bus, rail and micromobility services within a single digital platform, enabling residents and visitors to access real-time travel information, multimodal journey planning and integrated mobility services. Implemented in close cooperation with the Istrian Development Agency (IDA), the Region of Istria, HŽ Putnički prijevoz (HŽPP), Pulapromet and other regional stakeholders, the pilot confirmed the technical feasibility, operational reliability and institutional applicability of the solution. The modular architecture, delegated content management system and compliance with European transport data standards provide the basis for its long-term sustainability, mainstreaming into regional mobility policies and replication beyond the pilot area

Key objectives of the SUSTANCE long-term sustainability guidelines for solutions are:

- Definition of the pilot action long-term capitalization/replicability/exploitation strategy;
- Definition of replicability factors (in the pilot area and beyond the pilot area).

2 The Sustance solution based on pilot SWOT analysis and technical measures adopted to overcome the main threats

Implementation of a solution Developing new ICT service for MaaS in Istria (PA5) faced many challenges, but on the other hand revealed many possibilities for improving this service. The forthcoming SWOT analysis provides a synthetic overview of lesson learned derived from the pilot action no. 5 (PA5) implementation in terms of Strengths (S), Weaknesses (W), Opportunities (O) and Threats (T) of the new ICT service.

Table 1: SWOT analysis of pilot action No 5 (PA5): “Developing new ICT service for MaaS in Istria”

Strengths	Weaknesses
• The pilot’s main strengths lie in its intuitive user interface, comprehensive coverage of multiple transport modes, and integration of real-time tracking, journey planning,	• Nonetheless, the application’s current visibility among end-users remains limited, primarily due to the recent launch and the lack of a large-scale promotional campaign.



and ticket purchasing functionalities. The application includes a back-end content management system (CMS) that empowers public authorities or transport operators to autonomously update routes, timetables, and service data. Cooperation with key transport operators (Pulapromet, HŽPP) provided the necessary operational alignment.

In addition, the need for continuous data updates and technical maintenance represents a long-term operational challenge, especially if clear responsibilities and financing mechanisms are not established.

Opportunities

- There are significant opportunities for expanding the solution's functionality and impact. The modular structure allows for future integration of Park & Ride systems, seasonal services, and additional transport providers. The solution is well aligned with EU strategic priorities such as the Digital Europe Programme, the EU Green Deal, and regional Smart City initiatives, creating clear potential for follow-up funding.

Threats

- Key external threats include the continued reliance on private cars by residents and tourists, the existence of competing commercial mobility apps, and potential resource constraints for long-term system support. To mitigate these risks, technical countermeasures were introduced, such as a lightweight, maintainable architecture, modular components, and adherence to open data standards (e.g., GTFS, NeTEx). These features ensure scalability, future-proofing, and ease of integration with national and EU-level systems.

3 The pilot solution long-term sustainability goals and strategies

Ensuring the long-term sustainability of the MaaS solution developed under Pilot Action 5 requires the implementation of a structured set of institutional, technical, and financial measures. The application, having proven functional and effective during the pilot phase, is now ready for transition into permanent operational use. Several critical elements must be addressed to support this transition.

First and foremost, the solution must be institutionalised within the governance and operational frameworks of the region. This entails formal assignment of responsibilities for technical maintenance, data accuracy, and content updates to a designated public authority or local transport operator. A cooperation agreement should be established to clearly define the role of each involved party, including obligations related to real-time data sharing, integration of new services, and responsiveness to user feedback.

The shift from pilot to full implementation also requires a sound financial model. The most appropriate approach is to integrate the system's operational costs such as server hosting, CMS support, and basic maintenance into the regional or municipal budgets, ensuring stability and predictability. These public resources should be complemented by strategic applications for EU funding, particularly within programmes supporting digital public services, sustainable mobility, and data interoperability (e.g. Digital Europe



Programme, CEF, Interreg NEXT). In parallel, the region may consider engaging private service providers through limited partnership models to support technical upgrades or joint promotional efforts.

From a strategic planning perspective, the modular and scalable design of the MaaS platform represents one of its core advantages. It allows for phased expansion, including the future integration of services such as Park & Ride, seasonal tourism lines, municipal shuttle systems, and other shared mobility providers. This flexibility enables the application to grow organically in step with the region's evolving mobility landscape, without requiring fundamental redevelopment or additional infrastructure investments.

Stakeholder engagement is a key pillar of sustainability. Strong collaboration must be maintained with municipalities throughout Istria, regional development institutions, tourism boards, and private transport operators. Their continuous involvement ensures that the application responds to real user needs, supports tourism and environmental policy objectives, and aligns with the region's broader Smart Mobility strategies and Sustainable Urban Mobility Plans. Additionally, stakeholder commitment is critical for ensuring data quality and service coordination, particularly in a region with significant seasonal fluctuations in transport demand.

The solution provides a replicable implementation model for the deployment of MaaS ecosystems in regions characterised by a combination of urban, rural and tourism-related mobility needs. The pilot validated the technical feasibility, governance arrangements and operational performance of the model, confirming its transferability to other Central European territories. Regions with similar characteristics i.e. a mix of urban, rural, and touristic environment can adopt the core structure of the MaaS solution with minimal adaptation. Key transferability factors include the modular back-end architecture, use of EU-compliant data formats (GTFS, NeTEx), a centralised CMS for content updates, and a front end application that can be easily localised for other geographic areas. Furthermore, the inclusion of intermodal elements (bus, rail, micromobility) makes the system attractive to regions seeking to promote low emission transport alternatives.

The results achieved during the pilot have met the initial expectations. The application has been successfully developed and is technically stable, user-friendly, and fully operational. Key functionalities including journey planning, real-time tracking, and ticketing were delivered as planned. However, in retrospect, one aspect that could have been strengthened was the early involvement of end users during the codesign phase, especially regarding interface usability and promotional strategy. These insights will inform future iterations or replication processes.

At the time of reporting, discussions are ongoing with the Region of Istria, Pulapromet and HŽ regarding the formalisation of governance and maintenance arrangements. While a binding agreement is not yet in place, all stakeholders have expressed strong interest in sustaining the solution beyond the project lifetime, recognising its strategic relevance for regional mobility planning and digital service provision.

In summary, the transition of the Istrian MaaS platform from pilot to long-term solution is both realistic and desirable. With clear institutional anchoring, financial planning, and ongoing stakeholder collaboration, the service can become a permanent feature of the regional mobility ecosystem and a model for other Central European regions seeking to implement smart, user-focused, and sustainable transport solutions.

4 Financial indications related to the long-term sustainability of the solution

The long-term sustainability of the developed ICT solution is intrinsically linked to the availability of stable and diversified funding sources. While its initial development was co-financed under the Interreg CENTRAL



EUROPE 2021-2027 programme, ensuring continuity of operations beyond the project lifetime requires strategic financial planning. Key operational costs such as server hosting, CMS administration, content management, system upgrades, and ongoing user support are relatively modest but recurrent. These will be addressed through structured integration into regional and local public budgets, notably municipalities directly benefiting from the service.

In addition to public funding at the regional or national level (e.g. sustainable mobility or digitalisation programmes), future financial support may be sourced through targeted EU instruments aligned with the European Green Deal and Digital Europe strategies. The ICT platform aligns well with the objectives of upcoming programmes such as Digital Europe, CEF Transport (especially under ITS and MaaS actions), and Interreg NEXT.

Moreover, public-private partnerships (PPPs) will be actively explored. Entities such as micromobility providers, regional tourism boards, and transport operators may benefit from platform integration for service promotion and customer engagement. Their involvement could contribute to co-financing specific functionalities, e.g. booking modules or data integration services, thereby reducing reliance solely on public sources.

A cost-benefit analysis carried out during the pilot phase demonstrated that the platform's annual operational costs are modest when compared to the socio-economic benefits generated. These include measurable improvements in public transport accessibility, reduction of CO₂ emissions through modal shift, increased transparency of services, and better user experience. Such positive externalities strongly justify continued investment in the platform as a strategic public digital asset. Furthermore, the ICT tool has been designed for scalability and transferability, enabling future integration with additional regions and services, in line with the project's long-term governance roadmap and action plans.

Finally, the ICT solution will be maintained within the framework of the SUSTANCE Transnational Cooperation Network established under WP3, ensuring not only knowledge exchange and political support at cross-border level but also institutional commitment for the long-term sustainability and development of digital mobility services in Central Europe.

The long-term sustainability of Solution 5 relies on the establishment of a robust institutional, financial and governance framework that enables its integration into regional mobility policies and digital public services. By combining stable public funding with complementary EU programmes and public-private partnerships, the solution provides a sustainable model for the deployment and continuous improvement of integrated MaaS ecosystems. Its modular, interoperable and scalable architecture ensures that new mobility services, operators and territories can be progressively integrated without requiring fundamental system redesign, while its alignment with European standards and policy frameworks facilitates mainstreaming into regional and national digitalisation and sustainable mobility strategies.

5 Recommended solution governance schemes

The governance model based on the the ICT-based MaaS platform in the Istrian region is structured around a public-public cooperation framework, ensuring institutional alignment, legal robustness, and administrative sustainability. The model envisages close collaboration between the Istrian Development Agency (IDA), regional and county-level transport authorities and key public transport operators, such as Pulapromet and HŽ Putnički prijevoz.

Daily operational responsibilities including real-time data validation, timetable and tariff updates, incident management, and customer support should be delegated to a competent public operator or agency. In the



current institutional landscape, Pulapromet or HŽPP represent logical candidates, alternatively through a jointly delegated operational unit, acting under the strategic oversight of the County's transport department. This clear delineation of roles will help prevent operational fragmentation, ensure service quality, and streamline user communication.

This governance setup ensures that the MaaS platform remains adaptable to changing user behaviours, policy priorities (e.g. climate action, tourism seasonality), and technological innovations (e.g. integration of micromobility or DRT services). It also supports the platform's alignment with regional strategies such as the Istria County Sustainable Urban Mobility Plan (SUMP), digitalisation policies, and future funding opportunities through EU instruments.

Finally, embedding the governance structure within the SUSTANCE Transnational Cooperation Network reinforces transnational coordination and facilitates transferability of good practices, while supporting long-term scalability and policy advocacy at Central European level.

The governance model proposed for Solution 5 provides a robust and scalable institutional framework for the long-term deployment of integrated Mobility-as-a-Service (MaaS) ecosystems. By clearly allocating strategic, operational and technical responsibilities among public authorities, transport operators and mobility service providers, the solution ensures service continuity, data quality, interoperability and adaptability to evolving mobility needs and technological developments. Its integration into regional mobility and digitalisation strategies, supported by stable governance arrangements, diversified funding mechanisms and continuous stakeholder cooperation, enables the solution to become a permanent component of sustainable public transport systems rather than a stand-alone digital application.

The solution has strong replication potential and can be adopted by other regions seeking to develop integrated digital mobility services. Successful replication should be based on the establishment of a dedicated governance structure, the use of open and interoperable European data standards, the integration of multiple mobility services within a common digital environment, and alignment with regional Sustainable Urban Mobility Plans (SUMPs) and digital transformation strategies. Adapting the modular architecture to local mobility characteristics and ensuring early involvement of transport authorities, operators and mobility providers will facilitate the deployment of interoperable MaaS ecosystems, improve multimodal accessibility and contribute to the wider uptake of sustainable, user-centred and low-carbon mobility solutions across Central Europe

6 Recommendations and suggestions for the mainstreaming of pilot lessons learned with solution for territories beyond the pilot action area

Mobility Plus provides an integrated digital mobility planning and service integration model that supports the deployment of Mobility-as-a-Service (MaaS) ecosystems by integrating public transport, bike-sharing and other shared mobility services within a single digital environment. Building on the experience gained in the Istria Region (Croatia), the solution combines interoperable ICT architecture, real-time multimodal information, journey planning, ticketing functionalities and bike-sharing integration with a governance model that promotes cooperation between regional authorities, transport operators and mobility providers. It is based on common European transport data standards (GTFS, NeTEx and SIRI), a modular and scalable



system architecture, and a shared content management framework, ensuring interoperability, adaptability and long-term sustainability. The solution also provides practical guidance on governance, financing, stakeholder engagement and system maintenance, facilitating its integration into Sustainable Urban Mobility Plans (SUMP), regional digitalisation strategies and future MaaS ecosystems. As such, it represents a replicable implementation model for Central European regions seeking to digitalise multimodal mobility services, improve first- and last-mile connectivity, promote sustainable tourism and accelerate the transition towards integrated, user-centred and low-carbon mobility systems.

Based on the outcomes and operational experience gained through Pilot Action 5 in the Istrian region, several key recommendations can be formulated for other regions planning to implement similar ICT-based Mobility as a Service (MaaS) platforms.

The technical design of a MaaS solution should be firmly grounded in the principles of modularity, scalability, and interoperability. Modular architecture allows for the stepwise integration of new services (e.g., micromobility, demand-responsive transport, intercity buses) without major system overhauls, while interoperability ensures seamless data exchange with external systems. Alignment with EU transport data standards such as NeTEx, SIRI, and GTFS is essential to facilitate potential integration into national or transnational mobility data hubs and European multimodal platforms (e.g. CEF-supported National Access Points).

Successful MaaS implementation requires early, structured, and continuous engagement of key local stakeholders: public and private transport operators, municipalities, regional authorities, and end-users. Their involvement in the co-design and testing phases ensures that the platform's functionalities respond to real needs, avoid duplication with existing apps or booking systems, and enhance institutional ownership. Mechanisms for institutional consultation and citizen feedback such as surveys, public workshops, or usability testing should be embedded throughout the lifecycle of the platform.

The platform should include built-in data analytics capabilities to monitor usage patterns, service reliability, and user satisfaction. This data-driven approach allows operators and authorities to adjust services in real time, identify emerging mobility trends, and improve functionalities based on evidence. Feedback mechanisms (e.g. in-app reporting, user satisfaction prompts) should be designed to be intuitive and accessible.

Governance and financing arrangements must be defined well before the operational phase. A clearly articulated ownership and maintenance model such as a public-public governance structure is crucial to ensure long-term continuity. Likewise, a diversified financing model that combines public funding (e.g. regional budgets, national mobility programmes) with potential revenue streams (e.g. advertising, premium services, or public-private partnerships) enhances sustainability and reduces dependence on project-based funding.

No matter how advanced the technology, user uptake will be limited without proactive communication and onboarding strategies. A comprehensive promotional campaign tailored to different user segments should accompany the platform launch. This includes online and offline visibility, partnerships with tourism offices or event organizers, clear value propositions for users, and hands-on training or demo sessions in public spaces. Accessibility, multilingual interfaces, and trust-building (e.g. privacy guarantees, data protection) are additional key enablers for public adoption.

Finally, MaaS deployment should be integrated within broader regional mobility and digitalisation strategies (e.g. SUMP, digital transformation plans), ensuring policy coherence, institutional support, and alignment with EU priorities such as the Green Deal, Urban Mobility Framework, and the Digital Europe Programme.

In summary, the experience from Istria confirms that ICT-based MaaS solutions can significantly enhance multimodal integration and user experience provided they are developed with strong institutional coordination, user-centred design, and a clear long-term vision.



7. Conclusion. Sustance jointly developed solution to be taken up and/or to be up-scaled

Category	Description
Sustance Solution (number): Title	Solution n. 5 - Integrated digital mobility planning and service integration model - ICT tool -based MaaS service for Istria (Mobility Plus)
Solution typology	Tool / Service (ICT application, content management system, MaaS platform)
Final users / target groups	• Local residents of Istria region • Tourists and visitors • Public transport operators (Pulapromet, HŽPP) • Local and regional authorities (Region of Istria, municipalities)
Final user needs addressed	• Access to integrated and real-time multimodal transport information (bus, rail, micromobility) • Simplified journey planning, booking and ticketing • Improved regional and cross-border connectivity • Support for eco-friendly mobility choices and CO₂ reduction.
Co-design process (involved partners and countries involved)	• Lead: Istrian Development Agency - IDA (HR) • Cooperation with HŽPP (HR), Pulapromet (HR) and Region of Istria (AO3) • Peer review and methodological support from project partners in IT (ITL, Eurac), SI (PIL, SZPP) and HU (GYSEV) during three transnational peer review events and WP2 activities.
Taken up strategy	• Formalisation of governance and maintenance agreements with regional authorities and operators (IDA, Region of Istria, HŽPP, Pulapromet) • Integration of operational costs into local and regional budgets • Alignment with EU open data standards (GTFS, NeTEx) to ensure interoperability and potential inclusion into national/EU mobility platforms • Continuous stakeholder engagement to maintain data quality and visibility.
Up-scaling strategy	• Replication in other Central European regions with similar urban-rural-touristic characteristics • Expansion of functionalities (Park & Ride, seasonal lines, shuttle services, integration of micromobility providers) • Connection with transnational SUSTANCE cooperation network for knowledge transfer and policy support • Progressive extension of geographical coverage and user base, contributing to the programme's long-term objective of improved connectivity and sustainable passenger mobility in CE.