Interreg CENTRAL EUROPE

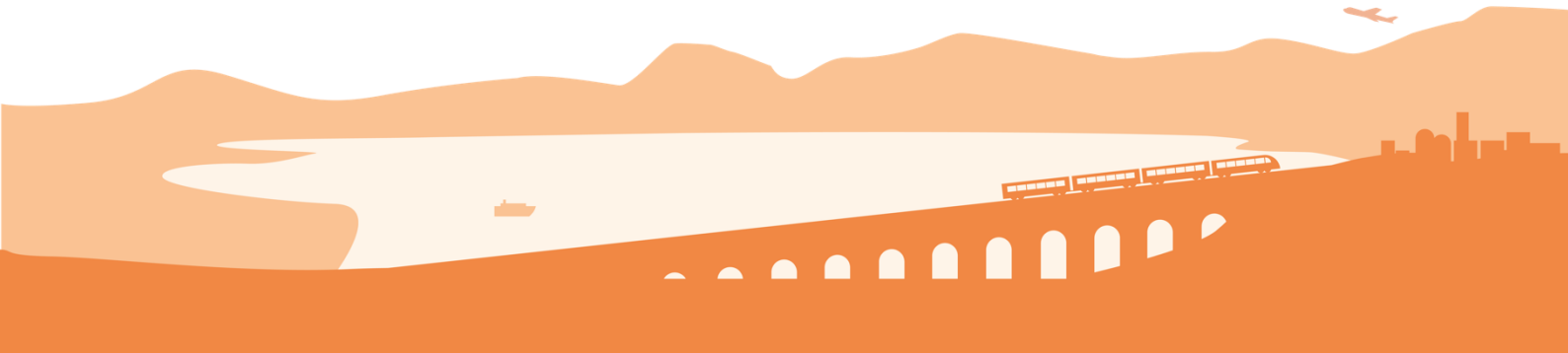
Co-funded by the European Union

DREAM_PACE

D1.1.3 Development scenarios for DRT innovative governance and planning approaches

Final version

02 2024



Authors and log change of the document

Partner No.	Partner Acronym	Name of the author	Action	Version
1	SRM	Chiara Lepori	1st version of the document	1
2	Redmint	Gabriele Grea	Refinement of tables for getting PPs' input	2
1	SRM	Chiara Lepori	Completion of Bologna pilot chapter and sharing with PPs for their input	3
6	DYVOLVE	Saša Bart Dijana Mišerić Beganović	Drafting of Split-Dalmatia County pilot chapter	4
11	nexus	Martin Schlecht	Drafting of Stuttgart pilot chapter	4
9	RMO	Mayur Kumargowda	Drafting of Osttirol pilot chapter	4
1	SRM	Chiara Lepori	Consolidation of inputs received from LL responsibles	4
2	Redmint	Gabriele Grea	Drafting of Pavia pilot chapter	5
5	BKK	Viktória Hideg	Drafting of Budapest pilot chapter	5
2	Redmint	Gabriele Grea	Consolidation of BKK input Review of the document Final version	Proposed final
1	SRM	Chiara Lepori Marco Amadori	Edited approved version for official release	Final

Contents

1. Executive summary

The territory of Central Europe is characterised by uneven transport connections and mobility opportunities, across and within regions, between urbanized contexts and rural and peripheral areas.

The project's common challenge is to improve accessibility and connectivity in CE peripheral and rural areas through better integration of public transport networks with Demand Responsive Transport (DRT) services, building on joint development and implementation of governance, planning, digital and operational innovations.

DREAM_PACE will develop innovative DRT concepts complementing regional mobility networks.

The project will improve DRT planning and delivery capacities of public authorities and operators.

A new generation of DRT services will become functional and integral part of regional mobility networks, enhancing accessibility for citizens, territorial cohesion, and social inclusion. Integration is the key to the DREAM_PACE innovative approach, as DRT services are mostly developed as stand-alone solutions to specific needs, the potential of scalable strategies and solutions is widely underestimated.

Project Partners (thereafter PP) will jointly develop a strategy for DRT in Sustainable Urban Mobility Plans to be adopted at EU level, co-design, test and implement innovative DRT solutions enhancing mobility networks. Strategies and solutions will foster a better integration of DRT and public transport (Bologna, Pavia, Budapest areas), support a higher coordination among existing DT initiatives (Osttirol, Baden-Württemberg) and experiment new integrated approaches for DRT "green fields" (Split-Dalmatia County).

DREAM_PACE will exploit the potential of integrated planning and digital and operational innovations for a common strategy and develop innovative DRT modular solutions. The project implementation builds on transnational cooperation to guarantee an adequate responsiveness and adaptability of project results to specific characteristics of mobility ecosystems across CE rural and peripheral areas.

After a brief background analysis, this deliverable presents the stages of scenario development for each pilot area for DRT innovative governance and planning approaches. All pilots are engaged in the topic. Partner organizations contributed to this report through the reporting of the results of their scenario development approaches and workshops, implemented according to the common DREAM_PACE methodology.

Chapter 2 summarizes such a methodological background, based on the document D.3.1.1 “Methodological background for the design of DRT integrated solutions”.

From here on, the chapters 3 to 8 illustrate the scenario development as started of each pilot, divided into the following steps: information on the process, strategy development, composing scenarios and scenario evaluation. Ultimately, one scenario will be selected or newly composed, which will undergo further refinement through a co-design process involving partners and stakeholders.

Chapter 9 presents a summary at project level of the outcomes of the scenario development process in the pilot areas developing DRT innovative governance and planning approaches, highlighting the visions emerged and the main scenario components on which co-designed solutions will be developed.

The present document is complemented with the slides provided to the Project Partners as Practical guidance for the scenario development exercise, that are based on Annex IV of D3.1.1 “Methodological background for the design of DRT integrated solutions”, named “Phase C: Scenario development”, elaborated to guide the partners ion the implementation of the scenario development phase of the methodology.

2. Methodological background

The document D.3.1.1 “Methodological background for the design of DRT integrated solutions” introduces the DREAM_PACE methodology, tailored for analysing, diagnosing local contexts, engaging stakeholders, and co-designing innovative DRT solutions. This methodology provides essential guidance to the project's Living Labs.

Chapter 6 of D3.1.1 specifically delves into the crucial phase of scenario development. Here, the focus lies on crafting a DRT strategy through aligning a shared vision, setting clear objectives, comprehending risks, and exploring alternative scenarios via participatory dialogues. Objectives encompass delineating precise goals, grasping both risks and opportunities, and crafting alternative scenarios to inform decision-making processes. Key tasks are strategy formulation, scenario definition, and prioritization through thorough scenario evaluation workshops, emphasizing the role of stakeholder involvement in envisioning the future landscape of urban mobility.

The D3.1.1 Annex IV, titled “Phase C: Guidance on Scenario Development”, supplements this chapter by providing practical guidance, complete with templates and step-by-step instructions for crafting alternative scenarios for DRT solutions.

The activities and outcomes of this phase for each pilot are documented in reports such as D1.1.3 “Development scenarios for DRT innovative governance and planning approaches” and D2.1.3 “Development scenarios for DRT innovative digital and operational approaches”.

This phase is structured into three key steps:

- Step 1: Strategy Development;
- Step 2: Definition of Alternative Scenarios;
- Step 3: Scenario Evaluation Workshop.

The following chapters will detail the results of those three steps for each of the territories engaged in the WP1 pilot activities.

3. Metropolitan city of Bologna

3.1. Information on the process

In the Bologna Metropolitan area, there are several local public transport services - such as buses (local, suburban, regional and long distances), trolleybuses, railways (regional, national, TEN-T) and also flexible solutions like taxis, car-hire with driver services, DRT bus services, bike- and e-bike sharing, car- and e-car sharing, shared e-scooters. Despite this wide range of services, there are still criticalities/challenges to people mobility, e.g.:

- congestion peaks on some public transport lines;
- need to guarantee night service in the outskirts;
- provide low demand area with an acceptable level of service;
- provide access to the industries in the surroundings of the main Bologna city;
- guarantee a proper number of shared transport means (especially the cars and the e-cars).

Bologna pilot action is framed in the DREAM_PACE Pilot 1.1 "GOVERNANCE AND PLANNING of INTEGRATED DRT-public transport in a MaaS logic for peripheral and low demand areas" and focuses on the following components: 1 - Strategic planning approach (tested within a. SUMPs); 2 - Recommendations on data governance and integration, tariff and funding; 4 - DRT dedicated tendering procedure (demonstrated on field).

As regards Regulation of DRT services, currently, the rules are defined by SRM, which is the metropolitan Public Transport Authority (PTA). After receiving the related fundings, SRM can award the DRT service through a tender or involving the current operator for the PT in the Metropolitan area, case by case.

The Strategic planning aspects are under the control of the regional/local public bodies (Region, Metropolitan City and the Municipalities), and the preliminary steps to the DRT service establishment are:

- the definition of transport needs;
- the decisions to activate the PT services;
- the provision of resources to activate the services, provided by SRM or public bodies.

For the tactical planning level, SRM draws the service with the transport operator, based on the transport needs defined by the local bodies.

Then, the designed DRT services are awarded by SRM through a tender or directly to the operator in charge of the PT Service Contract.

During the operations, SRM monitors the activities of the transport service provider; the monitoring details are defined case by case (data source, data access, etc.).

Given the above current picture, the main challenges and criticalities at governance and planning level for DRT development for the Bologna Metropolitan Area can be summarised as follows:

- Guarantee the integration of DRT planning and governance in the Public Transport system and in the SUMP framework;
- Enhance the coordination and integration of local and regional mobility networks to improve connectivity of rural and peripheral areas, through a co-design process with local stakeholders;
- Develop the DRT governance in a MaaS logic, from SUMP strategic level to the tender phase and to the Service Contracts.

The Bologna pilot addresses those challenges by:

- defining how DRT can be integrated in the public transport offer since the planning phase (Planning) and how this can also be included in the next public procurement tender documents (Governance);
- defining how DRT can be included into a MaaS system developed and implemented in the Metropolitan City of Bologna (Governance).

The 2nd meeting of the stakeholders of the Bologna Living Lab (LL) was focused on the starting of Scenario development activities and took place on 30 January 2024; it was hosted by the DREAM_PACE Associated Partner (AP) CMBO. Participants were: the PP SRM, the AP Metropolitan city of Bologna (Città metropolitana di Bologna, CMBO for short), the Municipality of Bologna (Comune di Bologna, COBO for short), ASCOM (the association representing over 16.000 companies, entrepreneurs and professionals from Bologna and its Metropolitan city), the CCU[1] (user advisory committee representing consumer and user associations and the annual subscribers to the Bolognese public transport service), and the Diversity Team of the Bologna Municipality[2] (i.e. the team that deals with all dimensions of diversity).

Following what was decided during the 1st LL meeting, SRM included in the Stakeholder group of the LL for the Scenario development phase also Emilia-Romagna Region (Regione Emilia-Romagna, RER for short), Territorio Turistico Bologna-Modena (i.e. the team who drafts the Annual Program of Tourist Activities for the Bologna-Modena Tourist Territory, former Bologna Destinazione Turistica), and the Department of Engineering of the University of Bologna: those stakeholders could not join the meeting but, from this meeting on, they are considered part of the Scenario development activities.

The meeting focused on starting the development of the desired scenario for the future DRT, with special focus on the planning and governance aspects. This includes the definition of the limits within which it is functional to develop the DRT scheme for the Bologna context.

Furthermore, the meeting also served to consider the enlargement of the stakeholder group including other stakeholders, starting from the ones included in the Stakeholder Mapping exercise (e.g. considering the involvement of the mobility operators to design one or more possible DRT schemes, on which a feasibility study can then be carried out).

The methodology used to foster the participation and steer the discussion was the focus group, coordinated by SRM.

3.2. Strategy development

The discussion during the LL stakeholder meeting started with the identification of the pilot territorial scope of the DREAM_PACE pilot and the DRT in the Bologna Metropolitan area, that is intended to cover low-demand areas with effective and more efficient services, through higher flexibility guaranteeing accessibility for all. In specific, it emerged that there is the main issue of covering user needs optimizing the use of available resources, which would allow to rationalize the PT lines – in case introducing the DRT, and to cover new areas with DRT services.

The target user group for DRT is represented by “low-demand” users, while systematic mobility (commuters and students) is supposed to be served by traditional PT services.

[1] https://www.srmbologna.it/?page_id=69

[2] https://www.comune.bologna.it/servizi-informazioni/diversity-manager

On the other hand, given the topics of the pilot which are governance and planning, the LL stakeholder group is composed by public bodies and representatives of various types of users that are interested to generally improve the territorial accessibility, including low-demand areas

The strategic objective of the pilot is to improve connectivity of low demand areas by enhancing the governance and planning approaches in order to deliver services better fulfilling user needs.

In order to identify potential indicators for the Bologna pilot, the discussion took into account various aspects of the DRT, and in particular the planning and funding aspects towards their optimization.

In the Bologna Metropolitan Area, the planning process for DRT relies on the analysis of territorial and socio-economic variables according to the definition at national level, as well as on the number of passengers transported.

The number of passengers transported is also an input to the funding scheme, together with the number of km driven, the time of activity and the hours of availability of the service: those indicators give an idea of the achieved result. On the other hand, for the planning-related results, the length of DRT network/number of bus stops could be a good indicator to be taken into account.

DRT can be planned and organized at different levels, with specific scopes and focus, integrated later with the PT offer and provided by PTOs and others.

Public funding is shared between local entities/communities, within the Public Transport institutional framework. Private funding at local level (companies, associations/communities) is also envisaged for some DRT services.

In the future scenario after the implementation of the DREAM_PACE pilot, the Bologna metropolitan area DRT services will be integrated in the public transport offer since the planning phase (Planning) and will also be included in the next public procurement tender documents (Governance). A target is then to set up specific requests for the next public transport tender: for the main transport operator and also for the DRT-operator, including duties and minimum requirements for both to ensure the proper implementation of the DRT service.

Furthermore, DRT will also be part of a MaaS system developed and implemented in the Metropolitan City of Bologna (Governance). The related targets for this could be then to have DRT included in the app of / with the main transport operator, guaranteeing the data flow, and the DRT operator to run ad-hoc marketing campaign in specific places / areas.

In the final Vision, low-demand area users' needs are covered by optimizing the use of available resources, with the rationalization of PT lines and / or the establishment on new DRT services.

Identified issues & needs	Stakeholders/ User Group	Strategic Objectives for the DRT pilot	Indicators	Expected Impacts (Targets)
Align needs and planning for services	Stakeholder group (no final users)	Save money from underused regular PT lines (main ref. existing DRT services) Cover residents' and tourists' mobility needs both on a deeper level of territorial capillarity and during off-peak	Number of passengers Number of km driven Length of DRT network/number of bus stops	Savings from better planning of single services An overall increase of quality of on demand services integrated in the network

Identified issues & needs	Stakeholders/ User Group	Strategic Objectives for the DRT pilot	Indicators	Expected Impacts (Targets)
		hours/weekend (main ref. new DRT service)	Hours of availability of the service	
Operational model(s) - crowdsourcing	Stakeholder group (no final users)	Rationalize use of resources Save money from underused regular PT lines (main ref. existing DRT services)	Number of passengers Number of km driven Length of DRT network/number of bus stops Hours of availability of the service	Savings from better planning of new services
How to collect and integrate data for monitoring and planning	Stakeholder group (no final users)	--	--	--
Tariff and funding	Stakeholder group (no final users)	Save money from underused regular PT lines (main ref. existing DRT services)	--	Savings from better planning of new services
Funding and participation	Stakeholder group (no final users)	--	--	Savings for the public funding thanks to new sources
Vision:				
The Bologna metropolitan area DRT services will be integrated in the public transport offer since the planning phase (Planning) and will also be included in the next public procurement tender documents (Governance). Furthermore, DRT will also be part of a MaaS system developed and implemented in the Metropolitan City of Bologna (Governance). (Low-demand area) Users' needs are covered by optimizing the use of available resources, with the rationalization of PT lines and / or the establishment on new DRT services.				

3.3. Composing scenarios

Topic	Identified issues & needs	Description of the solution/strategy	Involved stakeholder and their roles	Potential challenges and risks	Included in the scenario? (y/n)
1 - information and data sharing	How to collect and integrate data for monitoring and planning	Define data management criteria in tenders to enable the integration of DRT in MaaS	PTOs, Region, Local Authorities	Alignment with MaaS national project	TBD
3 - multimodal integration	How to collect and integrate data for monitoring and planning	Define service integration criteria in tenders	PTOs, Region, Local Authorities	Alignment with tendering procedures	TBD
5 - business modelling / planning	Tariff, funding and participation	Design a possible funding + integrated tariff scheme for DRT services	Region, Local Authorities	Alignment with tariff strategies at network level	TBD
6 - strategic planning	Align needs and planning for services Operational model(s) - crowdsourcing	Prepare recommendations and measures to be included in the next Sump to integrate DRT in the MA mobility network	PTOs, Local Authorities	Acceptance by stakeholders	TBD

3.4. Scenario evaluation

Given the objectives of the Bologna pilot and its focus on governance and planning aspect, during the meeting the stakeholders openly discussed on the better methodology to achieve the desired objectives, and defined the next steps of the LL stakeholder group activities.

The following points were agreed:

a) The LL stakeholder group activities will be carried out through a collaborative approach that aims to involve citizens, service providers, public authorities and other interested parties in planning, co-design, creation and development activities;

b) The definition of the DRT planning and governance aspects in the Bologna LL has a metropolitan scale: for this reason, the Emilia-Romagna Region (RER) is kept among the LL stakeholders, with the aim of collaborating to the evaluation of practical actions on the territory and of the scalability of the solutions co-designed in the LL;

c) As regards the citizens, their future involvement on specific issues can be promoted through ad hoc surveys, after identifying geographical areas and/or specific topics for the surveys. In general terms, in

its role as coordinator of the LL of Bologna, the SRM will encourage grassroots participation, possibly collaborating with ADOC / CCU to promote public events for presenting the DREAM_PACE achievements and collecting feedback and proposals;

d) Thanks to the DREAM_PACE structure, the LL benefits from the transnational debate active at the project level, where there are partners who cover a territorial role for the improvement of mobility: the stakeholders appreciate this opportunity and intend to exploit it in carrying out the activities of the LL, in particular by evaluating and possibly exchanging good practices and experiences

e) The Bologna LL will analyse the DRT in all its aspects: it will not identify specific areas for a DRT service establishment, but will proceed with their "typological" identification, focusing on the definition and identification of "weak / low- demand" areas to be served with the DRT service from scratch or through the remodulation of existing traditional line services into DRT services, thus optimizing the use of the resources available for public transport;

f) The work of the Bologna LL stakeholder group will define a strategic evaluation and planning structure scalable at a regional level. In particular, it will define the characteristics of optimal DRT for the Bologna context and in which context it will be appropriate and rational to use DRT to provide the public transport service;

g) The shared final objective is to identify the best conditions for the inclusion of DRT already in the public transport planning phase, and for its integration into the public transport network itself;

h) The next meeting of the Bologna LL stakeholder group will continue the activity of defining the limits within which it is functional to develop the DRT scheme for the Bologna context ("Scenario development"), simultaneously evaluating the involvement of mobility operators to design one or more possible DRT schemes (on which a feasibility study can finally be carried out with the external technical support).

In detail, considering also “Identified issues & needs” in chapters 3.2 and 3.3, point f) can be further developed answering the following questions:

- Which DRT service is suitable for the Bologna urban and metropolitan area?
- How is it possible to procure it?
- How to define the clearing issues to integrate DRT in the future MaaS?
- Which is the proper data format & how to ensure / enable full data sharing?
- Who is funding the DRT service?
- Which are the criteria for deciding on DRT funding / DRT establishment / DRT prosecution?

Answering the last question would request to use Decision tools for strategic planning, which can differ area by area and based on the founders (e.g. municipality reason / objectives vs Agency reason, etc.). What can be constant is the minimum level of request to include in a DRT tender to guarantee that the DRT is connected / integrated from the service and the data point of service, and that it can be monitored.

The LL stakeholder group members agreed also on that a further step would be to ask for feedback from transport operators, on the criteria possibly included in a tender, and discuss how they would answer to a tender like that.

The final Bologna metropolitan area DRT planning and governance scenario will be shaped following the above approach.

4. Budapest

4.1. Information on the process

Currently BKK operates several Demand Responsive Transport services in Budapest. The services can be requested through the online interface developed as part of the SMACKER project, via customer service phone number, or by notifying the driver in person at some terminus points. After registration on the online platform, indicating the intention to travel happens relatively quickly. The online service has several advantages, including the ability to save the most frequently requested routes in the "Favourites" menu, making the request even faster; requests can be easily modified or cancelled in case of changes; and a departure alert email can also be set up. Requests for the service can be made at least 30 minutes before departure, and cancellations are possible up to 15 minutes before departure.

The following DRT services and models are available currently in Budapest:

- Service operates only with reservation (including the line 937, night service). This line is an extended section of one of the core night line 901;
- Service operates as a regular public transport system on weekdays, and as demand responsive system on weekends and public holidays (e.g. 219, being beforehand a full-time DRT, showing its success);
- Service operates as a regular public transport system during the day, and as demand responsive system early in the morning and in the evening on a part of the line with lower demand (e.g. 87, 221);
- Service operates as a demand responsive system only on route extensions (e.g. 65, 157);
- Service operates as a demand responsive system except during morning and afternoon peak hours (e.g. 269, 275, 297, 298).

The main challenge in the DREAM_PACE project is that contrary to the current DRTs in Budapest having a fix line, there will be an opportunity to test a DRT system with a flexible route. Since such a service is not currently being operated in Budapest, it is considered as challenge both in terms of operation and IT.

A living lab, conducted online on 4 March 2024, was organized to evaluate various scenarios, with the participation of employees from BKK, Mobilissimus, and Budapest University of Technology and Economics. BKK briefly presented the status of the pilot, including the planned area, coverage, concept of the timetable, options for service availability and accessibility, and types and locations of possible stop points. During the discussion, the following topics were addressed:

- Extension of the service area and better connection opportunity to local railways (HÉV) and other BKK bus lines;
- Modification of the itinerary;
- Possibilities for modifying the timetable concept;
- Reducing density of stops;
- How to place stop points, its legal requirements.

4.2. Strategy development

The following table summarizes the main findings in terms of relevant needs and strategic objectives to be brought forward in the definition of final scenarios for the co-design and testing.

Identified issues & needs	Stakeholders/ User Group	Strategic Objectives for the DRT pilot	Indicators	Expected Impacts (Targets)
Design the DRT stops, its legal requirements	BKK (local authority) Ministry of Construction and Transport	Define and clarify the current rules on how DRT stops are to be designed (construction, signage, etc.)	Clear policy for design DRT stops	--
Develop online DRT request system for the new, flexible route DRT and integrate to the Budapest route planner application (BudapestGO)	BKK (local authority) Passengers	Develop the current online DRT request system (telebusz.bkk.hu) and integrate to the Budapest route planner application (BudapestGO)	Online request system for the new DRT route, BudapestGO integration	All DRT applications and public transport services are available to passengers in one place (strengthening the MaaS concept)
Vision:				
Create a new type of DRT system in Budapest and develop its digital and legal requirements for the better local mobility.				

4.3. Composing scenarios

Topic	Identified issues & needs	Description of the solution/strategy	Involved stakeholder and their roles	Potential challenges and risks	Included in the scenario? (y/n)
2 - Normative and Policy Framework	Design the DRT stops, its legal requirements	Clarify the existing regulations, resolving the contradictions	BKK (local authority) Ministry of Construction and Transport	-	Yes
3 - Multimodal integration	Develop the online DRT request system for the new, flexible route DRT and integrate to the Budapest route planner application (BudapestGO)	Develop the current online DRT request system (telebusz.bkk.hu) and integrate to the Budapest route planner application (BudapestGO)	BKK (local authority) Passengers	-	Yes

4.4. Scenario evaluation

At the online meeting, participants discussed various elements:

- **Territorial coverage and expansion**: Currently, only a small area is covered by the planned demand responsive public transport service, but there's a consideration to extend it to the neighbouring areas where there is currently no regular public transport either. It's also important not to exclude these areas from the possibility of demand-driven transportation;
- **Flexible route planning**: The system will generate routes based on user registrations, but there was a suggestion at the meeting that the planned arrival times should be provided to the users in order to plan their onward journeys effectively;
- **Access to new connections**: A suggestion came up that route should reach important locations such as the Árpádföld HÉV station and the bus line 31;
- **Schedule related questions**: It's crucial to consider the schedule of the HÉV local railway when planning;
- **Placement of stops:** Fewer, but well-placed stops are recommended, preferably with some form of indication like schedule boards, and it is also important to consider and clarify the legal requirements for the placement of stops.

The final scenario will be shaped based on these discussions, likely involving territorial expansion and examining accessibility to the local railways. Colleagues of BKK will examine these proposals for the next meeting. BKK, in collaboration with Mobilissimus, plans to conduct a survey among local residents, to understand the current transportation habits and to see the needs for the new demand responsive transport service. The results of the questionnaire will also be taking into consideration during the co-design process.

5. Pavia - Oltrepò

5.1. Information on the process

Miobus is a DRT service with flexible routes and schedules, to meet the needs of citizens, active in the Oltrepò / Stradella area since September 2019. It has been subject to an important upgrade in June 2023, with the deployment of a new management system, more digital and integrated with other business systems. Customers can book a ride, as well as by phone, also from App at the preferred time, within the available service hours (school period: from Monday to Friday 9.30-11.30 / 16.30-18.30, Saturday 6.00-10.00 / 12.00-14.00 / 17.00-19.00; non-school/summer period: from Monday to Saturday 6.00-10.00 / 12.00-14.00 / 17.00-19.00). During the booking phase, the passenger can choose the departure stop, the arrival stop and the desired departure or arrival time; the management system accepts the request and organizes the ride according to the availability of the buses and the presence of other pre-existing bookings. In the same area, in addition to the DRT service, there are some fixed lines, to guarantee the possibility to reach other destinations outside the area (e.g. line 132 Stradella-Voghera; line 95 Castel S. Giovanni-Stradella-Pavia-Milano Famagosta), where interchange with the DRT service in possible.

The main advantages of the Miobus service are: -Completely digital experience for the customer: booking, change (up to 30 minutes before departure time), confirmation, real time notifications, check-in and travel; -Fully digital service experience for the driver: list of journeys to be made and passengers to accompany and check-in on a special device installed on board the bus; -Optimisation of routes between booked stops according to actual travel requirements to ensure environmental sustainability; -Integration with traditional scheduled services within the customer app.

The first two Living Lab meetings engaged stakeholders in identifying the main challenges of the territory and the state of the art both from the supply and demand side. A third one focused on the scenario development, in order to set the scene for the co-design of solution components and pilot tests on the territory.

The discussion about the governance and planning of integrated DRT public transport in a MaaS logic in the Pavia – Oltrepò area has been conducted since the beginning through a twofold approach.

On one side, a first Living Lab meeting has been organised locally with the engagement of local authorities in order to discuss in parallel governance and planning as well as operational and digitalisation aspects. During this meeting, with the participation of for municipalities and the province of Pavia (together with the PTO Autoguidovie and the DRT platform provider Via, associated partner to the project), the existing DRT service, the project and its objectives were presented to the stakeholders. Local administrators were invited to identify the main demand groups and their needs, and relevant information on the state of the art – both on the supply and on the demand side – has been collected and discussed.

Missing integration and knowledge about the service and its potential emerged as relevant aspects. From the governance point of view, integration must be considered in the long planning perspective.

A new collaborative approach is expected to engage the territory in order to define solutions built around community needs, with the specific challenge of allowing the process to happen within the boundaries of the service contract. Among the suggestions from the stakeholders on how to improve the governance and planning process, the following have been noted:

- Improve collaboration with business actors on the territory generating mobility flows across the province;
- Develop specific solutions for rural areas;
- Set up a comprehensive communication approach, not only through bilateral interactions;

- Forster participation in the development of new solutions;
- Focus on sustainability of services, integrating DRT in the network in a deeper and more systematic way.

The second part of the approach for the governance and planning analyses consisted in conducting an in-depth meeting and discussion with the director of the PTA (Agenzia per il Trasporto Pubblico Locale del bacino della Città Metropolitana di Milano, Monza e Brianza, Lodi e Pavia). The following elements for the analysis were added:

- Data sharing and analysis of potential demand are the key to collaboration among actors;
- Combining sparse systematic demand and occasional new demand is necessary to increase the sustainability of the network;
- Integrating traditional and DRT service in a comprehensive network;
- Spaces for tariff differentiation and segmentation might be identified to make the service more sustainable;
- A dialogue with the national transport authority should be established, in order to foster a better alignment between innovations and regulations.

A third meeting focused on the scenario development based on the findings of the previous meetings in particular those leading to the definition of the state of the art.

Scenarios have been presented, discussed and validated; they represent the basis for the co-design of innovations to be tested.

5.2. Strategy development

During the third meeting, the governance and planning discussion focused on the main relevant elements for planning emerged in the previous discussions, and more in detail on the following aspects:

- Integration, tariffs and funding;
- Criteria and variables for the planning of services.

The following table summarizes the main findings in terms of relevant needs and strategic objectives to be brought forward in the definition of final scenarios for the co-design and testing.

Identified issues & needs	Stakeholders/ User Group	Strategic Objectives for the DRT pilot	Indicators	Expected Impacts (Targets)
Identify the best ways to plan flexible services	PTA, Regional and Local Authorities	Improve the planning capacity of DRT services	Territory coverage, costs, number and types of passengers served	Better quality of planned services enabled by new calculation criteria
Financing flexible services	PTA, Regional and Local Authorities	Make DRT services economically sustainable	Costs, tariffs, revenues	Better sustainability of planned services enabled by new calculation criteria
Vision:				

Develop a methodology for defining and planning DRT services that makes their implementation in the area simpler and more effective.

5.3. Composing scenarios

Topic	Identified issues & needs	Description of the solution/strategy	Involved stakeholder and their roles	Potential challenges and risks	Included in the scenario? (y/n)
5 - business modelling/ planning	Financing flexible services	Develop a calculation model for the conversion of traditional/flexible services	PTA, Regional and Local Authorities	Compliance with national and regional regulations	Yes
6 - strategic planning	Identify the best ways to plan flexible services	Test a new method and the possibility of transforming services depending on the degree of flexibility	PTA, Regional and Local Authorities	Alignment with service contracts	Yes

5.4. Scenario evaluation

The third meeting, focusing on scenario development, highlighted the main relevant challenges of the territory, and validated the strategy and the scenario perimeter where the pilot activities will be co-designed. Main elements emerged are accessibility, improvement of reliability and flexibility, as well as a better communication of the services on the territory.

The process of scenario evaluation was straightforward. Stakeholders agreed on the two main topics identified (business modelling/planning and strategic planning for DRT services) as main fiends for the co-design and testing of new solutions, resulting in a prototype of innovative planning approaches.

At the same time, stakeholders agreed on the fact that both components can be carried out in the next phases, and co-designed synergically to be tested within the pilot activity dedicated to governance and planning approaches.

6. Osstirol

6.1. Information on the process

In the Osttirol region, there is a diverse array of local public transport services, including buses (local, suburban, regional, and long-distance), hike buses, ski buses, railways (regional and national), as well as flexible solutions such as demand-responsive transport (DRT), taxis, bike and e-bike sharing, and car and e-car sharing (carpooling). Despite this wide range of services, challenges to people's mobility persist.

Some of these challenges include:

- Availability of DRT services across the entire region: While DRT exists, it may not cover all areas adequately, leaving parts of the region underserved;
- Long waiting times to access DRT in available regions: Even in areas where DRT is available, the wait times may be excessively high, deterring potential users;
- Limited public transport availability from 7 pm to 5 am: The lack of public transport options during these hours restricts mobility for those who need to travel outside of typical operating times;
- Connectivity throughout the entire region: Ensuring seamless connections between different modes of transport and across various regions is essential for an efficient and user-friendly transportation network;
- Fragmentation of mobility services: The existence of multiple, independent service providers can lead to coordination challenges and a lack of cohesive mobility solutions;

To address these challenges, strategic planning efforts are underway, primarily led by regional and local public bodies. Preliminary steps for optimizing DRT services include:

- Coordinating with DRT service providers (such as VVT) for service expansion: Working closely with existing providers to identify areas for expansion and improvement;
- Enhancing availability and connectivity of public transport services: Collaborating with public transport providers to ensure comprehensive coverage and seamless connections.

To further tackle these issues, the Osttirol pilot initiative is focusing on coordinating with mobility experts and service providers: by involving key stakeholders, such as local authorities, transportation agencies, and technology providers, in the planning process, the initiative aims to design solutions that prioritize the needs of users.

Recently, a Living Lab meeting was convened on 22 February 2024, to develop scenarios for optimizing existing DRT services in Osttirol. During this meeting, stakeholders engaged in discussions about strategies to enhance DRT services and streamline overall mobility solutions in the region.

6.2. Strategy development

The following table summarizes the main findings in terms of relevant needs and strategic objectives to be brought forward in the definition of final scenarios for the co-design and testing.

Identified issues & needs	Stakeholders/ User Group	Strategic Objectives for the DRT pilot	Indicators	Expected Impacts (Targets)
Better availability of DRT Services in the region	Residents Workers Tourists	Optimisation of current DRT services and making it available even after 7pm	Coverage Availability of the service Number of passengers	Less private car usage Reduced carbon emission
High Waiting time	Residents Workers Tourists	Increase coverage	Availability of the service	High PT usage
Funding opportunities	Stakeholder group (no final users)	Looking for potential funding opportunities	--	Implementation
Vision:				
Optimisation of current DRT services and streamlining all mobility services.				

6.3. Composing scenarios

Topic	Identified issues & needs	Description of the solution/strategy	Involved stakeholder and their roles	Potential challenges and risks	Included in the scenario? (y/n)
2 - normative and policy framework	Limited accessibility of public transport, especially outside main routes.	Implement tailored services and expand Demand-Responsive Transport (DRT).	Transportation authorities, local authorities, service providers.	Regulatory constraints, funding limitations,	Yes
4 - multi-actor coordination	Coordination among stakeholders for solution development and implementation.	Engage with transportation authorities and technology firms for collaboration.	Transportation authorities, technology firms, local authorities, service providers.	Resource constraints	Yes
5 - business modelling / planning	Enhancing the sustainability and viability of mobility solutions	Conduct feasibility studies	Transportation & local authorities	Funding constraints	Yes

Topic	Identified issues & needs	Description of the solution/strategy	Involved stakeholder and their roles	Potential challenges and risks	Included in the scenario? (y/n)
6 - strategic planning	Long-term planning to address mobility challenges effectively	Establish monitoring and evaluation mechanisms, engage in strategic planning.	Transportation & local authorities	Uncertain future trends and preferences	Yes

6.4. Scenario evaluation

The workshop underscored two key areas crucial for enhancing mobility in the region. Firstly, it highlighted the pressing need to address the limited accessibility of public transport, particularly for residents living outside main routes. Participants acknowledged the scarcity of local taxi services and recognized the lack of female representation in the transportation sector as significant hurdles. Proposed solutions, such as tailored taxi services and the expansion of Demand-Responsive Transport (DRT), present promising avenues to improve accessibility.

Secondly, the workshop delved into the issue of fragmented mobility services resulting from the use of multiple separate apps, which complicates the process of finding efficient transportation options for users. The suggestion for a unified app that integrates all mobility services could significantly streamline transportation solutions and offer users better recommendations.

To build upon these discussions effectively, it is imperative to conduct feasibility studies to assess the practicality and effectiveness of the proposed solutions. Engaging with stakeholders, including transportation authorities and technology firms, will be pivotal in fostering collaboration on solution development and implementation. Pilot projects should be initiated to test proposed interventions in real-world settings, allowing for thorough evaluation and refinement.

Concurrently, efforts should be directed towards developing an AI-based chatbot for mobility coordination and travel planning. Establishing monitoring and evaluation mechanisms will be essential to track implementation progress and make necessary adjustments based on feedback and evolving mobility trends. These follow-up actions aim to enhance accessibility and streamline mobility services, ultimately improving the overall mobility experience in the region.

7. Split-Dalmatia County

7.1. Information on the process

In the Split-Dalmatia County (hereinafter: SDC), the current state of public transport services includes rail, buses (inter-county, county, and local), ferry transport (ferries, ships, and fast ferries), as well as flexible solutions such as taxi services and bike sharing. However, neither in the SDC nor in the Republic of Croatia has the DRT service been implemented. Despite the wide range of public transport services, there are deficiencies/challenges in mobility in certain areas of the county:

- low of or no public transport service in rural areas;
- variable demand for public transport in rural areas;
- rural residents relying on private cars for daily travel;
- overcapacity of existing public transport lines during peak periods and tourist seasons;
- ensuring mobility for employees in business zones;
- ensuring mobility for users of healthcare services;
- ensuring mobility for users of social facilities.

The pilot action in the SDC is part of Pilot 1.1. DREAM_PACE "MANAGEMENT AND PLANNING," and includes the following components: 1 - Strategic planning approach (tested within the regional Traffic Master Plan) and 2 - Dedicated procurement procedure for DRT service (demonstrated in practice - on the pilot). Currently, there is uncertainty in certain areas regarding the implementation of the DRT service due to ambiguous legal regulations. The relevant laws, regulations, and decrees concerning transportation are defined by the competent Ministry of the Sea, Transport, and Infrastructure. Local units (cities and municipalities) and/or regional self-government units (counties) are responsible for the implementation and organization of public transport services at the regional and local levels. Therefore, the pilot area falls under the jurisdiction of the county (SDC), which can allocate the DRT service through a public tender.

Prerequisites for the establishment of the planning and management process for DRT in the SDC area include:

- identifying parameters of the legislative framework relevant to planning and managing the DRT service;
- defining the planning process for the DRT service and its management;
- establishing a procurement process for DRT services for a specific area;
- creating criteria for bidders and selection criteria for DRT service providers.

Before implementation, based on demand and mobility needs, the SDC will design the DRT service, which should be coordinated with existing regular passenger transport lines. Designed DRT services will be allocated through a tender (public service transport contract). During the provision of the DRT service, the SDC will oversee all activities of the transport service provider, with details defined in the contract (regular reports, data access, etc.).

Potential management and planning challenges and risks for implementing the DRT service in the SDC area include:

- harmonizing different stakeholders' viewpoints/starting points;
- excluding certain stakeholders from the process of defining necessary legal regulations/policies;
- failure to collect data and/or collecting data in inappropriate formats related to DRT service performance indicators;

- insufficient level of digitalization of public transport operators' business processes (ticketing, billing);
- lack of necessary interfaces for integrating DRT service and conventional public transport services;
- procurement procedures insufficiently elaborated/unclear, leading to a lack of bids in public tenders;
- unclear/insufficiently attractive call for tenders resulting in a lack of bids in public tenders;
- defining criteria that are too restrictive for bidders.

Given the current state, the main challenges and risks in the management and planning field for implementing the DRT service in the SDC area can be summarized as:

- involving all relevant stakeholders in the processes of defining legal regulations and improving their communication;
- creating an attractive enough call for tenders to attract more bids for DRT service providers;
- actively involving all stakeholders in the processes of defining the level of digitalization and necessary interfaces for integrating the DRT service.

During the first workshop with stakeholders, inputs were collected and analysed, which were then presented at the second workshop.

The second stakeholder workshop was held on 8 February 2024, organized to assess different scenarios. Participants included Dyvolve and SDC as project partners, as well as representatives from the City of Sinj, mobility service providers Autoherc d.o.o., Promet Split d.o.o., Flixbus CEE South d.o.o., and Clissa d.o.o.

The results of the analysis showed four main sub-areas where there is a possibility of implementing DRT services. After mapping, stakeholders were presented with criteria for ranking the four sub-areas. The criteria included coverage area (km^2), number of inhabitants within the coverage area, business zones, number of available public transport lines, frequency of public transport lines (average), and stakeholders' assessment. As a result of the discussion, stakeholders prioritized sub-area IV, which includes the area around Dugopolje, Trilj, and Dicmo. The final area for DRT service in sub-area IV will be agreed upon with stakeholders before initiating the procurement process for the DRT service.

7.2. Strategy development

Conclusions from the second workshop are as follows:

- stakeholders prioritize sub-area number 4 (Dugopolje, Trilj, and Dicmo area) for DRT service testing;
- stakeholders evaluated the vision of the DRT service;
- analysis of the four proposed scenarios showed possibilities for providing service to four target user groups;
- in the future, DRT could be tested before the introduction of regular public transport lines;
- during the testing of the DRT service, potential service providers see the need for additional human resources and vehicle fleet;
- representatives of SDC evaluated activities in the Planning and Governance approaches area;
- the next workshop will be held as needed.

The targeted user groups for DRT are "low-demand users and/or users who do not have access to other forms of public passenger transport" (traditional public transport). Therefore, the targeted user groups are

employees, customers in shopping centers and markets, users of health services, and users of social care homes.

Identified challenges and needs of user groups include the necessity of using personal vehicles for daily/occasional travel and reducing the amount of harmful emissions from transportation.

For the challenge of the necessity of using personal vehicles for daily/occasional travel, the strategic objectives of the DRT pilot are increasing the share of public transport usage in total travel, adapting the transportation system to all social groups, and better management of overall costs in public transport. For the challenge of reducing the amount of harmful emissions from transportation, the strategic objectives of the DRT pilot are improving connectivity of rural areas with DRT services and introducing digital innovations into the DRT system.

Success indicators (measurable indicators) for the implementation of the DRT service take into account the following indicators:

- the share of trips by public transport in the total number of trips;
- the number of passengers transported (passenger categories according to ticket types);
- offered capacity compared to occupancy, number of empty rides, number of tickets sold, number of kilometers travelled;
- number of introduced flexible DRT lines;
- trend, level of user satisfaction with the DRT service;
- number of implemented digital solutions for using the DRT system and trip planning.

Expected impacts (objectives) include:

- changing travel habits (in favor of public transport);
- popularizing travel by public transport for daily trips;
- more efficient use of financial resources required to provide DRT service;
- reduction of harmful emissions from transportation;
- simpler trip planning and service usage;
- reduction in the use of physical tickets.

The vision of the DRT pilot/service is to increase mobility without the use of personal vehicles in rural areas through a sustainable and economically viable transport DRT solution.

Identified issues & needs	Stakeholders/ User Group	Strategic Objectives for the DRT pilot	Indicators	Expected Impacts (Targets)
The necessity of using personal	Employees	Increasing the share of public transportation usage in total travel	The share of public transportation trips in the total number of trips	Change in travel habits (favouring public transportation)

Identified issues & needs	Stakeholders/ User Group	Strategic Objectives for the DRT pilot	Indicators	Expected Impacts (Targets)
vehicles for daily/occasional travel	Customers in shopping canters / markets Users of healthcare services Users of Community Centers Pensioners Students with extracurricular activities	Adaptability of the transportation system to all social groups	The number of transported passengers (passenger categories based on ticket types)	Popularization of using public transportation for daily commutes
		Improved management of total costs in public transportation	Offered capacity versus occupancy, number of empty rides, number of tickets sold, number of kilometres travelled	More efficient utilization of financial resources required for providing DRT service
Reducing the amount of harmful emissions from transportation		Enhancing connectivity of rural areas through DRT (Demand-Responsive Transportation)	Number of introduced flexible DRT lines	Reduction of harmful emissions from transportation
			Trend, user satisfaction number	
		Introducing digital innovations into the DRT system	Number of implemented digital solutions for using DRT system and trip planning	Simplified trip planning and service utilization Reduction in the use of physical tickets
Vision:				
Increase mobility without the use of personal vehicles in rural areas through the use of sustainable and economically viable DRT solution.				

7.3. Composing scenarios

Topic	Identified issues & needs	Description of the solution/strategy	Involved stakeholder and their roles	Potential challenges and risks	Included in the scenario? (y/n)
2 - Normative	The vagueness of the current legislation	Definition/amendment of the necessary legal regulations and their adoption	Ministry of Transport, SDC, Local/regional	Harmonization of different points of view /	Yes

Topic	Identified issues & needs	Description of the solution/strategy	Involved stakeholder and their roles	Potential challenges and risks	Included in the scenario? (y/n)
and Policy Framework	Absence of regulations that define the method and frequency of monitoring the success indicators of the DRT service	Defining and adopting regulations that define the method, formats and dynamics of report creation, and the frequency of monitoring the success indicators of the DRT service	governments, DRT service providers	starting points of different stakeholders Omission of certain stakeholders from the process of defining the necessary legal regulations / regulations Non-collection of data and/or collection in inappropriate data formats related to DRT service performance indicators	
2 - Normative and Policy Framework	Lack of knowledge of the principles of DRT service on the part of stakeholders (DRT unknown as a service due to lack of practice) "Mixing" DRT service with transport service for special needs by some stakeholders	Defining the body within SDC that will be responsible for planning the DRT service and managing it Defining the system / method of testing the strategic planning of the DRT service within the Masterplan of the region Defining a model for the future integration of the DRT service with existing public transport services	SDC, Local/regional governments, DYVOLVE	Harmonization of different points of view / starting points of different stakeholders Lack of sufficient level of computerized business processes of public service providers (ticketing, billing) Absence of necessary	Yes

Topic	Identified issues & needs	Description of the solution/strategy	Involved stakeholder and their roles	Potential challenges and risks	Included in the scenario? (y/n)
				interfaces for integration of DRT service and "classic" public transport services	
6 - strategic planning (tested within Master Plan processes)	DRT service principles unknown to stakeholders (DRT unknown as a service due to lack of practice) Absence of regulations that define the method and frequency of monitoring the success indicators of the DRT service	Defining the draft RFP for the tendering procedure for the procurement of DRT services for a specific area, which is harmonized with the applicable legal regulations	SDC, Local/regional governments, DYVOLVE	The procurement procedure is insufficiently developed / unclear, which causes a lack of bids at the public tender Unclear / insufficiently attractive Call for tenders, which causes a lack of bids at the public tender	Yes
6 - strategic planning (tested within Master Plan processes)	DRT service principles unknown to stakeholders (DRT unknown as a service due to lack of practice)	Defining draft criteria / conditions for bidders and criteria for selecting bidders for the DRT service, which is harmonized with the applicable legal regulations	SDC, Local/regional governments, DYVOLVE	Defining criteria that are too restrictive for Bidders	Yes

7.4. Scenario evaluation

During the meeting, stakeholders discussed various elements of the new public transport service (DRT):

- **Vision of DRT Service:** Stakeholders analysed the vision of the DRT service. Challenges and needs were identified, along with strategic objectives of DRT, user groups, indicators, expected impacts, and constraints. For each scenario, user groups and their mobility needs were defined. A functional description of the DRT service solution was provided, along with a user story, application areas, operational parameters, and success factors to increase usage and attractiveness. Groups analysed scenarios according to SWOT analysis. After the workshop with stakeholders, a supervisory workshop

was held with SDC representatives. The joint Dyvolve-SDC team evaluated the table with proposals for pilot components/solutions for SDC, areas/topics that the pilot will cover, planning and management, identification of challenges and needs, description of solutions/strategies, proposed stakeholders, and their roles, as well as potential challenges and risks.

- **Implementation Area**: Based on the presented criteria, stakeholders voted for the sub-area number IV (Dugopolje, Trilj, and Dicmo). The final coverage area will be agreed upon with stakeholders before initiating the procurement process for the DRT service.
- **Target User Groups:** For each scenario, user groups and their mobility needs were defined, and a user story was created for each user group, encompassing transportation issues from origin to destination.

The final scenario will be shaped according to the inputs from the workshops. Stakeholders prioritize sub-area IV (Dugopolje, Trilj, and Dicmo) for testing the DRT service. The analysis of the four proposed scenarios showed possibilities for providing services to four target user groups. The next workshop will be held as needed.

8. Stuttgart Region

8.1. Information on the process

One of the challenges for the whole Stuttgart Region is represented by the fact that in several areas the time gaps in public transport services can be up to 6 hours (in one third of the populated areas this gap is between 3 and 6 hours), making it difficult to adequately serve the potential demand. Moreover, in 29% of the territory there is no night service available, and during weekends and holidays only 36% of the area benefits from at least the minimum standard of service provision.

In the selected area of Calw, there are around 13 active DRT services organised by the local transport authority VGC and connecting small towns, to be booked by phone at least one hour in advance.

The main elements of discussion for the future of DRT Services in pilot area Calw are the followings:

- Still 90 % of services requests are made by phone, flexibility and feedback mechanisms are very limited. An app exists, but is (surprisingly) not very known and not user-friendly;
- The call-center has limited operation hours. The center operates from 8-9 every day, which doesn't allow people to call, when needed at night times. Reservations need to be made at least one hour before. This reduces flexibility. Line can be busy, which may lead to the fact, that reservations cannot be made in time;
- People do not show-up, after booking. Customers can't make service updates beyond the regular working hours, demands cannot be cancelled;
- Customers complain that vehicles do not arrive in time, do not show-up at all. This still needs to be verified in detail;
- The mobility routing is not flexible; by service provision regulations, routing needs to stick to existing lines. DRT serves still traditional bus routes and cannot add additional stops;
- Mobility service authorities are very decentralized. The local transport authority VGC has comparatively a small operational zone. Synchronization and trans-regional operating lines are rather tricky;
- Many people in Calw work and commute every day into Stuttgart. While only being a small number of kilometres away from Stuttgart, DRT services have no connection to sub-urban train network with Stuttgart;
- Financial dilemma: When the services would be used more often, this could also lead into higher expenditure for the provider and the municipality, since it would need to increase the offer resulting from a higher demand);
- While certain users are quite regular passengers, the vast majority doesn't use the services: They think it is not practical, or they even don't know about the services.

From the governance point of view, the challenges identified refer to the need of a higher level of coordination among services and resources that allows a more strategic approach to planning for the service, but also for the enhancement of the current situation adding flexibility to the system, modularity and digital enabling features in order to maximise the demand. All these elements should be covered by the planning components to be co-designed and tested. For this reason, activities are expected to focus on the elaboration of a methodology for the systematic analysis and monitoring of citizen needs and behaviours, and on the identification of options for the integration of existing services with further options, including crowdsourcing.

In order to prepare for the scenario development, two meetings with stakeholders were organised. Below a summary of the relevant living lab meetings in preparation for the Calw pilot.

Meeting	Objective	Stakeholders / Participants	Date
Nahverkehr nach Bedraf (online)	Discussion on rural mobility and DRT possibilities. Exchange on pilot scenarios.	Public transport providers in the state of Baden-Württemberg. VGC, Verkehrsgesellschaft Bäderkreis Calw mbH	21.11.2023
Pilot planning workshop	Outline pilot scenarios in Calw. Discussion on applied methodologies	Nexus, Municipality of Calw. VGC, Verkehrsgesellschaft Bäderkreis Calw mbH, Nahverkehrsverbund Baden-Württemberg	30.01.2024

Concerning the methodological approaches followed during the meetings:

- 21.11.2023: nexus presented the planned Living Lab activities for DREAM_PACE in the German Region of Baden-Württemberg at the conference "Local transport on demand: opening up rural areas with flexible services", with more than 140 participants, experts from local mobility providers, research institutions, and industry partners invited by project associated partner “Nahverkehrsgesellschaft Baden-Württemberg” (NVBW), to discuss strengths and challenges of existing DRT-concepts with a special focus on mobility in rural regions;
- 31.01.2024: a first thematic exchange with the pilot region, focused on shedding light on this service and identifying potential and challenges; in a tri-lateral meeting (nexus, Calw District, NVBW), nexus presented possible research methods, the Local Authority presented the main characteristics of the service and the discussion lead to the definition of the state of the art, and to the elaboration of common goals and a vision.

In addition to the local meetings performed, a further application of the LL-concept took place in Aveiro, Portugal, where 7 students discussed mobility services nowadays and worked on a business idea on DRT (Demand Responsive Transport) in rural regions. The aim was to develop a social-technological solution to provide villages of the Hinterland with mobility provision. The outcomes of this challenge will support the co-design of solution components and pilot activities in Calw.

Furthermore, a third local meeting has been prepared to be held in March 2024, where scenarios are discussed and selected for the final sharing and discussion with a broader range of stakeholders.

8.2. Strategy development

The following table summarizes the main findings in terms of relevant needs and strategic objectives to be brought forward in the definition of final scenarios for the co-design and testing.

Identified issues & needs	Stakeholders/ User Group	Strategic Objectives for the DRT pilot	Indicators	Expected Impacts (Targets)
Service is not flexible, potential passengers do not know about service	Youngsters (but also other target groups, like commuters)	Basic needs assessment, availability, and accessibility for relevant target group. Usability of booking tools	Usage of youngsters	Collection of data to improve services.
Passengers / vehicles / drivers do not show up, cancellation does not work outside of working hours	Drivers / passengers	SWOT current booking system	Percentage of booking via app / phone, rating system in app (?)	Increase number of app bookings
DRT-service for many only "plan C" of mobility options	Service provider	Analysing gaps in supply, non-usage analysis	Demographic characteristics of usage	Point out where reinforcing the supply is useful
Vision:				
Flexible, digital and integrated mobility service provision for different use cases.				

8.3. Composing scenarios

According to the discussions from the first two meetings the following scenario elements have been elaborated, and subsequently tested by the development of specific personas helping the selection of relevant scenarios for the co-design and implementation of solutions.

Topic	Identified issues & needs	Description of the solution/strategy	Involved stakeholder and their roles	Potential challenges and risks	Included in the scenario? (y/n)
1 - Information and data sharing	The call center for booking is not in the region. Language barrier.	Analysis of potential solution: synchronized bookings. Third party operator that manages the bookings in the region.	Call center, VGC	Contractualisations	Yes
2 - Normative and Policy Framework	All Landkreise have their own mobility	Analysis of potential solutions: Synchronizing services under which the different providers	Political departments that deal with mobility,	Politically a very sensitive topic, which needs to be carefully assessed.	No

Topic	Identified issues & needs	Description of the solution/strategy	Involved stakeholder and their roles	Potential challenges and risks	Included in the scenario? (y/n)
	service provision.	operate (see also the Berlin Brandenburg Verkehrsverbund).	providers and operators.		
3 - Multimodal integration	Not integrated in sub-urban network in Stuttgart	Integration of DRT, mobility hubs	VGC, NVBW, VVS	Political structures	No
5 - business modelling/ planning	Serivce is not modern, digital and passenger friendly. The DRT can only be booked between 6 a.m. and 9 p.m.	Analysis of potential options: 1) Well working app, ideally integrated into routing applications or regional transport application 2) External service.	VGC, NVBW, Deutsche Bahn (?)	API-Data sharing, data collection Digitalization, tendering	Yes
6 - strategic planning	The DRT only follows the regular bus routes Trips cannot be canceled	Synchronization with other providers; Updating mobility service provision.	NVBW, VGC	Changes on regulatory framework not foreseen in DREAM_PACE	Yes

8.4. Scenario evaluation

As previously mentioned, , personas were developedin order to simulate the impact of scenarios.

One example: a youngster who wants to be taken to their football training and can now (in the scenario) use the app to call a DRT. Then it starts raining and the outdoor training is cancelled. With the new digital solution, the customer can cancel the request and no unnecessary mile must be taken by the driver as result of a scenario where strategic planning allows to implement more flexible and real time digital and operational solutions

The following polished version of the scenario emerged from a discussion with the District responsibles, to be validated with a broader range of stakeholders in a further meeting.

Topic	Identified issues & needs	Description of the solution/strategy	Involved stakeholder and their roles	Potential challenges and risks
1 - Information and data sharing	The call center for booking is not in the region. Language barrier.	Analysis of potential option: A regional third party operator manages the bookings in the region. Bookings can be made via phone call, online application and App. All bookings are handled by that operator.	Call center, VGC	Contractua-lisations
5 - business modelling/ planning	Service is not modern, digital and passenger friendly. The DRT can only be booked between 6 a.m. and 9 p.m.	Analysis of potential options: a) The existing App is improved, well known and easy to use. It is integrated in a routing application like google maps , the NVBW App. or DB App. The App is used frequently by passengers, more often than the phone to call a service. Furthermore, information about waiting time and route of the DRT will be displayed and requests can be canceled via the App. The App can be used 24/7 to book services in advance but also spontaneausly. b) External service.	VGC, Deutsche Bahn (?), NVBW	API-Data sharing, data collection. Digitalization, tendering
6 - strategic planning	The DRT only follows the regular bus routes Trips cannot be canceled	Analysis of potential option: The DRT route is calculated individually depending on the requests of passengers. Therefore, passengers can be picked up wherever they are or at least from a spot close by. This benefits especially elderly, people who are mobile impaired (e.g. with disabilities or with luggage etc.), female passengers at night and children/young people. In case, a trip must be canceled, it is possible do cancel a request via the App. Therefore, no unnecessary trip must be taken.	DRT driver, DRT Operator (VGC), Passengers	Changes on regulatory framwork not foreseen in DREAM_PACE

This scenario will again be discussed with a wider range of stakeholders to finalize details. Afterwards, the co-designing process for the pilot will start.

The pilot tests will target the scenario elements and its identified challenges and goals. Together with stakeholders from Calw the specific elements will be designed, that can help the VCG to get information on which features should be developed further in the first place to attract more passengers and minimize resources for the operator.

9. Conclusions

The pilot areas, engaged in activities focused on the improvement of DRT governance and planning approaches, presented **a range of different and complementary visions** emerging from the scenario development processes.

In the Bologna metropolitan area for example, stakeholders elaborated a composite vision encompassing the inclusion of DRT in the public transport offer since the planning phase and in tendering procedure, as well as its integration in the MaaS system that will be developed. The Bologna vision is completed with the aim of covering effectively and efficiently the user needs in low demand areas by optimizing the use of available resources, with the rationalization of PT lines and / or the establishment on new DRT services.

In the Oltrepò Pavese area, the vision focuses on the development of a methodology for defining and planning DRT services, making their implementation in the area simpler and more effective

Create a new type of DRT system and develop its digital and legal requirements for the better local mobility is the vision designed by stakeholders in Budapest, while in Split Dalmatia County pilot activities aim at increasing mobility without the use of personal vehicles in rural areas through the use of sustainable and economically viable DRT solutions.

Concerning the improvement of coordination among DRT initiatives and other mobility services, in Osttirol the vision is to optimise current DRT services and streamline all mobility services in a common concept, while in the Stuttgart region - with specific focus on the Calw municipality area- stakeholders will support the provision of an enhanced flexible, digital and integrated mobility service suitable for different use cases.

Looking comprehensively at the **proposed and selected governance and planning scenarios** to be implemented, the following elements emerge, that will be at the basis of the co-design and testing process.

Concerning **information and data sharing**, emerged priorities include the definition of data management criteria in tenders to enable the integration of DRT in Mobility as a Service (MaaS), as well as more practical approaches such as a higher synchronization of booking systems to be considered as enhanced approach to integration.

The **normative and policy framework** drafted in the scenarios include for the specific case of Croatia the definition and adoption of necessary legal regulations to make DRT possible, as well as further regulations that define the method, formats and dynamics of report creation, and the frequency of monitoring the success indicators of the DRT service. At the same time, pilot actions will help defining the body that will be responsible for planning and managing the DRT network, and the approach to contribute to the strategic planning of the DRT service within the Masterplan of the region, defining a model for the future integration of the DRT service with existing public transport services.

From the **governance** point of view, the **multimodal integration** topic will be tackled, especially within the Bologna metropolitan area, where the aim is to develop service integration criteria to be embedded in tendering procedures and contracts of service. This scenario is relevant also in terms of **multi-actor coordination**, and therefore is complemented by the development of practices to guarantee higher engagement and collaboration between authorities, technology firms and transport operators (this aspect being relevant for all pilots, in particular Osttirol and Split Dalmatia County).

The identification of viable and more efficient **business models** for DRT is a cross cutting strategic element for the pilot areas, including the need for more general feasibility analysis methodologies to more specific aspects to be co-designed and tested, such as the design of possible funding and tariff schemes for DRT services, and the development of a calculation model for the conversion of traditional/flexible services, supporting more flexible and adaptive planning.

Strategic planning is indeed, in line with the purpose of the project, one of the topics where the attention of engaged partners and stakeholders gathers around common methods and tools, such as SUMPS and Masterplans and tendering procedures.

In particular, through DREAM_PACE partners aim at developing recommendations, measures and tools to be included in SUMPS, to integrate DRT at local level as in Functional Area mobility networks. Moreover, new methods and the possibility of transforming services depending on the degree of flexibility will be considered for co-design and testing, and tendering procedures will be drafted, tested and implemented embedding strategic elements that will trigger the inclusion of more integrated, digitalized and innovative DRT services in the mobility networks.

10. References

1) DREAM_PACE D3.1.1 “Methodological background for the design of DRT integrated solutions” – Chapter 6, Annex IV. 2023.

2) Dynaxibility4CE project, Interregg Central Europe. Guideline for new stakeholder engagement formats in experimental design/Living Labs to test public acceptance. [https://programme2014-20.interreg-central.eu/Content.Node/Dynaxibility4CE/Dynaxibility-D.C.3.3-Lessons-Learned-Brochure-vf.pdf] (2022).

3) SHAREPLACE project, Interregg Central Europe [https://programme2014-20.interreg-central.eu/Content.Node/SHAREPLACE.html]

4) SMACKER, INTERREG Central Europe. Demand Responsive Transport: Guidelines for Public Authorities. [https://www.smacker-toolbox.eu/]. 2022.

5) SMACKER, Interreg Central Europe [https://programme2014-20.interreg-central.eu/Content.Node/SMACKER.html]

11. Annex: D3.1.1 Annex IV, "Phase C: Scenario development" - Practical guidance

SUMMARY

- Introduction
- Step 1 - Strategy development
- Step 2 - Define alternative scenarios
- Step 3 - Scenario evaluation
- Summary of the process
- Expected outcomes

2

INTRODUCTION

The present document aims at supporting local partners in charge for LL meetings in order to prepare and develop, according to the methodology elaborated by Rupprecht, scenarios during the 2nd/3rd round of LL meetings.

NOTE 1 - **meetings with stakeholders** dedicated to scenario development/validation must be held **before March 8th, 2024** *(suggestion is to agree / fix the date with the stakeholders by 23 Feb, which is the date of the next DREAM_PACE Consortium meeting)*

NOTE 2 - for **partners involved in 2 pilots** (one governance and planning, one digital and operational) namely AGI, RMO, BKK, SDC/Dyvolve, **two scenarios** should be developed

NOTE 3 - make sure that the steps presented in the next slides are **preliminarily drafted (desk)**: in the meetings this exercise will be very useful to steer the discussion (the results of this preliminary draft may not be shown to participants if not necessary, but used by the moderator to foster the discussion)

NOTE 4 - please try to cover the **pilot components assigned** to your area (slides 5 and 6)

3

Pilots, partners and components

PILOTS	Pilot action 1.1: GOVERNANCE AND PLANNING of INTEGRATED DRT-public transport in a MaaS logic for peripheral and low demand areas	Pilot action 1.2: GOVERNANCE AND PLANNING of a COORDINATED DRT network enhancing accessibility in peripheral and rural regions	Pilot action 2.1: enhancing existing DRT networks responsiveness in rural and peripheral areas through DIGITAL/OPERATIONAL INNOVATIONS	Pilot action 2.2: EXPERIMENTAL DRT SERVICE in a new regolatory framework
COMPONENTS	1 - Strategic planning approach (tested within a. SUMPs and b. Master Plans processes) 2 - Recommendations on data governance and integration, tariff and funding 3 - Business planning tool for flexible management of DRT-PT (tested on running services)	- Governance scheme for the coordination of DRT, and set up of coordinator (demonstrated on field) - Strategic planning approach to DRT (strategic guidance for DRT coordination) - Business model for crowdsourcing (tested by engaging potential participants)	1 - tools for digitalization of existing services 2 - digital integration between DRT and PT 3 - operational hybrid DRT models enhancing flexibility (based on hotspots, integration of different services) 4 - new approaches to inclusiveness	Applying the tendering procedure from A.1.3, will implement and test the first-of-a-kind DRT experimental service in Croatia, building on the ecently issued regulatory framework at national level
TEST SITES				
Bologna MA	1a, 2, 4			
Pavia - Oltrepò	2, 3		2, 3, 4	
Split - Dalmatia	1b, 4			
Budapest	1a,3		1, 2, 3	
Osttirol		1, 2	1, 2	
Stuttgart Region		2,3		

NB Partners are interested in different pilots, testing some of the components and sharing the results with others in order to compose the final solutions.

Moreover, in the next two slides you will find in **bold** the components for which you are expected to provide a full contribution, also testing them on your territory; those components that are not in bold might be included in the discussions, co-design can be drafted and will contribute to the solutions to be tested by other partners.

4

WP1 pilots, partners and components

	Pilot action 1.1: GOVERNANCE AND PLANNING of INTEGRATED DRT-public transport in a MaaS logic for peripheral and low demand areas	Pilot action 1.2: GOVERNANCE AND PLANNING of a COORDINATED DRT network enhancing accessibility in peripheral and rural regions
Bologna Metropolitan Area	**1 - Strategic planning approach (tested within a. SUMPs and b. Master Plans processes)** **2 - Recommendations on data governance and integration, tariff and funding** 4 - DRT dedicated tendering procedure (demonstrated on field)	
Pavia - Oltrepò	**2 - Recommendations on data governance and integration, tariff and funding** **3 - Business planning tool for flexible management of DRT-PT (tested on running services)**	
Split - Dalmatia	1 - Strategic planning approach (tested within a. SUMPs and b. Master Plans processes) **4 - DRT dedicated tendering procedure (demonstrated on field)**	
Budapest	**1 - Strategic planning approach (tested within a. SUMPs and b. Master Plans processes)** 3 - Business planning tool for flexible management of DRT-PT (tested on running services)	
Osttirol		**1 - Governance scheme for the coordination of DRT, and set up of coordinator (demonstrated on field)** **2 - Strategic planning approach to DRT (strategic guidance for DRT coordination)**
Stuttgart Region		**2 - Strategic planning approach to DRT (strategic guidance for DRT coordination)** **3 - Business model for crowdsourcing (tested by engaging potential participants)**

5

NOTES for Pilots - Draft (I)

	WP1	WP2
Bologna MA	- Living Lab only focuses on governance and planning, with limited number of institutional stakeholders - SRM drafts the scenario and validates it with stakeholders in workshops(s), focusing on strategic planning and data governance/ integration of DRT in MaaS	
Pavia - Oltrepò	- Autoguidovie works on Business planning tool for flexible management of DRT-PT, at the moment focusing on one stakeholder (PTA), therefore interacting for the definition of a single scenario on which data simulations will be planned and developed as test	- LL activities focus on enhancing digital integration between DRT and PT, developing and testing new operational hybrid DRT models enhancing flexibility (based on hotspots, integration of different services), and new approaches to inclusiveness (including no or simplified booking through interactive screens)
Split - Dalmatia	-SDC governance and planning focuses on the definition of the whole planning and tendering approach together with institutional stakeholders, within the LL framework	- LL activities focus on defining the characteristics of new services to be tested and implemented
Budapest	- BKK works on strategic planning with institutional stakeholders, in order to idenntify the measures for the integration of DRT in the strategic planning (next SUMP revision?) and extend the existing services - as the number of stakeholders is limited the LL worjkshops might focus more on WP2 while this activity might be developped more though direct interaction with policymakers	- LL activities focus on testing tools for digitalization of existing services, enhancing digital integration between DRT and PT, developing and testing new operational DRT models enhancing flexibility (flexible routes)
Osttirol	- RMO collaborates with local stakeholders to establish a new coordinator for DRT and other mobility services in the area, to improve the governance and coordination of planning	- LL activities focus on testing tools for digitalization of existing services
Stuttgart Region	- Nexus collaborates with local stakeholders a) to enhance the level of coordination among existing DRT services, b) develop a possible business model for crowdsourcing involving local private and public stakeholders for the cofunding of new initiatives c) to develop and test a model for the analysis of demand, with focus on non-users	

7

NOTE for Pilots - Draft (II)

NB Please amend the previous table, and specify which topics will be addressed and discussed in LL meetings: the scenarios should cover the Pilots/solutions in which you are engaged, but in some cases in the "governance and planning" workpackage (WP1) the co-design might develop through bilateral or restricted meetings with stakeholders; please keep note of this!

8

STEP 1 – STRATEGY DEVELOPMENT (BOTH FOR WP1 AND WP2)

- List the **issues and needs** already emerged from previous LL, as well as the ones that will emerge during the discussion (be specific and summarize in 2-3 max aspects)
  - Examples (WP1 / WP2): integration in Maas, cost savings, etc. / better accessibility, higher flexibility, reliability of connections, time effectiveness, etc.
- Identify the **user groups** relevant for each issue/need
  - Examples (WP1 / WP2): PTAs, policymakers, etc. / elderly, workers on shifts, university students, etc.
- Define a **strategic objective** for each group of issues and needs + user groups
  - Examples (WP1 / WP2): new business models, integration rules, etc./ door to door service, accessibility and inclusion for vulnerable people, reliability of connections, etc.
- Choose measurable **indicators**
  - Examples (WP1 / WP2): costs, accessibility, n. of planned services, etc. / spatial coverage, travel time, average delay, levels of accessibility for people with disabilities, etc.
- Set targets of **expected impact** (optional)
  - Examples (WP1 / WP2): new planning document, tenders, etc. / eliminate all architectural barriers, guarantee a 90% territorial coverage, increase punctuality by 30%, etc.
- Propose a **VISION** (very important: the vision must be agreed upon, take some time to discuss it and fine tune with stakeholders; the co-design exercise starts from here!!!)

9

STEP 1 - TEMPLATE

Identified issues & needs	Stakeholders/ User Group	Strategic Objectives for the DRT pilot	Indicators	Expected Impacts (Targets)
Vision:				

10

STEP 1 - FOCUS ON POSSIBLE INDICATORS (WP2)

Strategic Objective (example)	Indicator(s)	Unit / measurement
Shift travel behaviour (e.g., increase Public Transport, reduce private car)	Modal Shift	Share of total trips Share of total passenger km (Pkm)
Improve service performance (Public Transport, DRT)	Average travel time for passengers	Minutes
	Average delay in the service	Minutes
	Average waiting time for passengers	Minutes
	Average number of transfers	Number of transfers
	Availability of service	% of time services are unavailable
	User satisfaction	Degree of satisfaction
Manage high operational costs, improve efficiency/sustainability of Public Transport	Occupancy rate	Average occupancy rate (% of capacity)
Improve accessibility to Public Transport services and inclusion	Spatial coverage	Area coverage based on max distance to PT stop
	Safety perception	User perception (e.g., based on need to walk late at night or wait at a bus stop vs booking a DRT service)
	Accessibility for vulnerable or differently abled users	N. of stops/vehicles/routes equipped for differently abled users

STEP 2 -TEMPLATE FOR COMPOSING SCENARIOS (WP1)

TOPIC	Identified issues & needs	Description of the solution/strategy	Involved stakeholder and their roles	Potential challenges and risks	Included in the scenario? (y/n)
1 - Information and data sharing	(from the previous table)		(from the previous table)		
2 -Normative and Policy Framework					
3 - Multimodal integration					
4 - multi-actor coordination					
5 - business modelling/ planning					
6 - strategic planning					

Step 2 approach is differentiated by WP: for governance and planning it envisages the composition of one or more scenarios, ideally prioritizing and/or aggregating proposed solutions on the basis of the 6 pre-defined topics

15

STEP 3 -SCENARIO EVALUATION (BOTH FOR WP1 AND WP2)

After the definition of scenario(s), stakeholders should evaluate them and decide on the one(s) on which the co-design and testing should focus, according to 3 possibilities:

- **One scenario** has been developed: stakeholders are requested to fine tune it analysing the pros and cons and their possible contribution;
- **Many scenarios, select one**: the discussion should focus on their feasibility and could use a SWOT analysis to support the decision;
- **One/many scenarios, combine elements**: scenarios can be compared, and according to available resources their components could be aggregated into a new one, on which stakeholders' preferences converge.

20

SUMMARY OF THE PROCESS

	Approach A	Approach B
Step 1 Strategy development	• Prepared in advance (desk) • Discussed and validated by stakeholders	• Prepared in advance (desk) • Discussed and validated by stakeholders
Step 2 Define scenarios	• One scenario pre-drafted • Discussed and fine tuned with stakeholders	• Different scenarios pre-drafted • Discussed and detailed with stakeholders
Step 3 Scenario evaluation		• Scenarios presented and: a. The preferred one is selected b. A new one is composed by stakeholders

Complexity of interaction with stakeholders

NB: different approaches can be chosen, in any case the final result should be to identify a scenario on which the co-design will build (in the picture you find two different approaches, a single scenario one and a more complex, requiring more interaction with the stakeholders during the workshop(s))

21

EXPECTED OUTCOMES

Per each pilot in which you are involved (basic requirements):

- a description of the event, type of participants, methodology used to foster the participation and steer the discussion (e.g. world cafè, plenary session, focus group, etc.);
- one table with the results of **step 1 strategy development**;
- one table with the **scenarios (step 2)** ;
- description of the discussion and decision process;
- **final scenario**;
- **outlook on the next steps** (if needed some further discussion on specific elements, or the start of the co-design process, etc.).

All these elements will be described using the LL meeting template, and will then be integrated in the Scenario development deliverables (D1.1.3 and D2.1.3)

22