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DREAM_PACE

D3.1.3 Topic guide DRT 3.0 in Sustainable Urban Mobility Plans (SUMPs)

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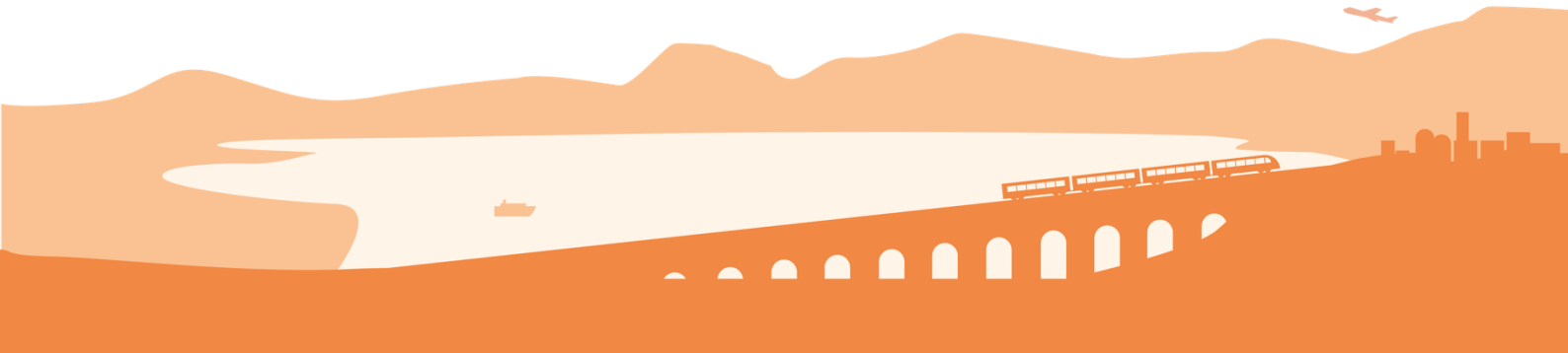

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Contents

List of Figures

List of Boxes

List of Abbreviations

Abbreviation	Full Term
API	Application Programming Interface
AVL	Automatic Vehicle Location
AI	Artificial Intelligence
CAPEX	Capital Expenditure
CE	Central Europe
DRT	Demand Responsive Transport
ETA	Estimated Time of Arrival
EU	European Union
GDPR	General Data Protection Regulation
GIS	Geographic Information System
GTFS	General Transit Feed Specification
ICT	Information and Communication Technology
IoT	Internet of Things
KPI	Key Performance Indicator
LL	Living Lab
MaaS	Mobility as a Service
M & E	Monitoring and Evaluation
NMT	Non-Motorised Transport
PPP	Public-Private Partnership
PRM	People with Reduced Mobility
PT	Public Transport
SMART	Specific, Measurable, Achievable, Relevant, Time-bound
SUMP	Sustainable Urban Mobility Plan
TDM	Travel Demand Management
TOD	Transit-Oriented Development
UX	User Experience
UCD	User-Centred Design

1. Executive summary

The territory of Central Europe, similar to many regions worldwide, is characterised by uneven transport connections and unequal mobility opportunities. These disparities occur both across and within regions, particularly between urbanised areas and rural or peripheral territories. Limited accessibility, demographic change, declining conventional public transport services, and increasing dependence on private cars continue to challenge social inclusion, territorial cohesion, and sustainable development objectives.

DREAM_PACE (Demand REsponsive trAnsport integrating regional Mobility networks for PAssengers in Central Europe) is an Interreg Central Europe funded project that addresses these challenges by improving accessibility and connectivity in peripheral and rural areas through the better integration of public transport networks with Demand Responsive Transport (DRT) services. The project builds on the joint development and implementation of governance, planning, digital, and operational innovations, recognising DRT as a key complementary component of regional mobility systems rather than a stand-alone solution.

The project brought together twelve partners from five Central European countries, representing nine regions, and implemented six Living Labs as real-life testing environments. The Living Labs, developed in alphabetical order in Baden-Württemberg, Bologna Metropolitan Area, Budapest Area, East Tyrol, Pavia Area, and Split-Dalmatia County, form the backbone of the DREAM_PACE pilots. Collectively, these pilots focused on three core strategic challenges: (i) integration of DRT with public transport networks (Bologna, Budapest, Pavia), (ii) coordination and optimisation of existing DRT and flexible transport initiatives (Baden-Württemberg, East Tyrol), and (iii) the development of integrated DRT approaches in “greenfield” contexts (Split-Dalmatia County).

Building on these pilots, DREAM_PACE developed and tested innovative DRT concepts that enhance regional mobility networks and strengthen the planning, governance, and delivery capacities of public authorities and operators. The project demonstrates how a new generation of DRT services can function as an integral part of multimodal mobility systems, contributing to improved accessibility, social inclusion, and territorial cohesion. Integration is central to the DREAM_PACE approach, responding to the fact that many DRT initiatives remain fragmented and limited in scalability, thereby underutilising their strategic potential within public transport systems.

The DREAM_PACE Project Partners jointly developed this document - a Strategic Planning Guide for integrating DRT into Sustainable Urban Mobility Plans (SUMPs) - with the ambition to support its uptake and adaptation across European regions. The guide follows a practical, step-by-step approach aligned with the SUMP phases, supporting authorities throughout the full planning cycle from analysis and strategy development to implementation, monitoring, and learning.

Chapter 2 sets up the scene, recalling DRT and its role in Sustainable Mobility Systems and introducing the link between DRT and the Sustainable Urban Mobility Planning Framework.

Chapters 3 to 6 detail the four phases into which the planning guide provides guidance: Building a Baseline for DRT Integration in Mobility Systems; Developing a Strategic Framework for DRT Integration; Designing and Enabling DRT Measures and Actions; Implementation, Monitoring, and Learning for DRT. The addressing of each specific SUMP phase ensures consistency between this Topic guide and the established European mobility planning practice. Each chapter includes guiding questions to support local adaptation, informed decision-making, recommends appropriate tools and methods for DRT planning, operations and implementation, and draws on good practices from the DREAM_PACE Living Labs and selected international good practices to enhance transferability beyond the Central European context.

Chapter 7 provides the concluding remarks synthesising key insights and policy recommendations, and the practical Action Checklist for Integrating DRT in SUMPs.

The Annex contain the visuals for the publication of the “Topic guide DRT 3.0 in Sustainable Urban Mobility Plans (SUMPs)”.

With this approach, this strategic guide presents the DREAM_PACE strategy for integrating DRT with public transport within a coherent SUMP-based framework. It aims to support public authorities, transport planners, and mobility practitioners in embedding DRT as a scalable, inclusive, and resilient component of sustainable mobility systems, contributing to wider European transport and cohesion policy objectives.

2. Setting the Scene: Towards Integrated, Sustainable & Demand Responsive Mobility Systems

2.1. DRT and its role in Sustainable Mobility Systems

Demand Responsive Transport (DRT), also referred to as "On-Demand Transport", refers to "a form of transport where vehicles alter their routes based on actual transport demand rather than following a fixed route or timetable" (Community Transport Association, 2017). Its defining characteristic is flexibility: users book trips in advance or in real time, typically via an app or by phone, and services dynamically adjust routes and/or schedules in response to these requests. This reservation-based logic clearly differentiates DRT from conventional public transport and enables a more efficient match between supply and demand.

In this way, DRT occupies a strategic middle ground between fixed-route public transport and fully individualised services such as taxis. It combines the sustainability and efficiency of collective transport with a degree of personalisation and comfort usually associated with individual mobility. As such, DRT is increasingly recognised as a key building block of integrated and user-oriented mobility systems, particularly in contexts where conventional services struggle to operate efficiently.

Understanding DRT requires positioning it within the broader mobility ecosystem. As illustrated in the following figure, DRT services typically achieve a higher level of sustainability and shareability, while offering competitive flexibility compared to individual car-based services. Nevertheless, their ability to adapt to real demand, optimise routes, and pool passengers makes them particularly effective in complementing mass transit (such as metro, tram, or BRT systems) and in extending coverage in rural, peri-urban, and low-density areas where fixed routes are often inefficient.

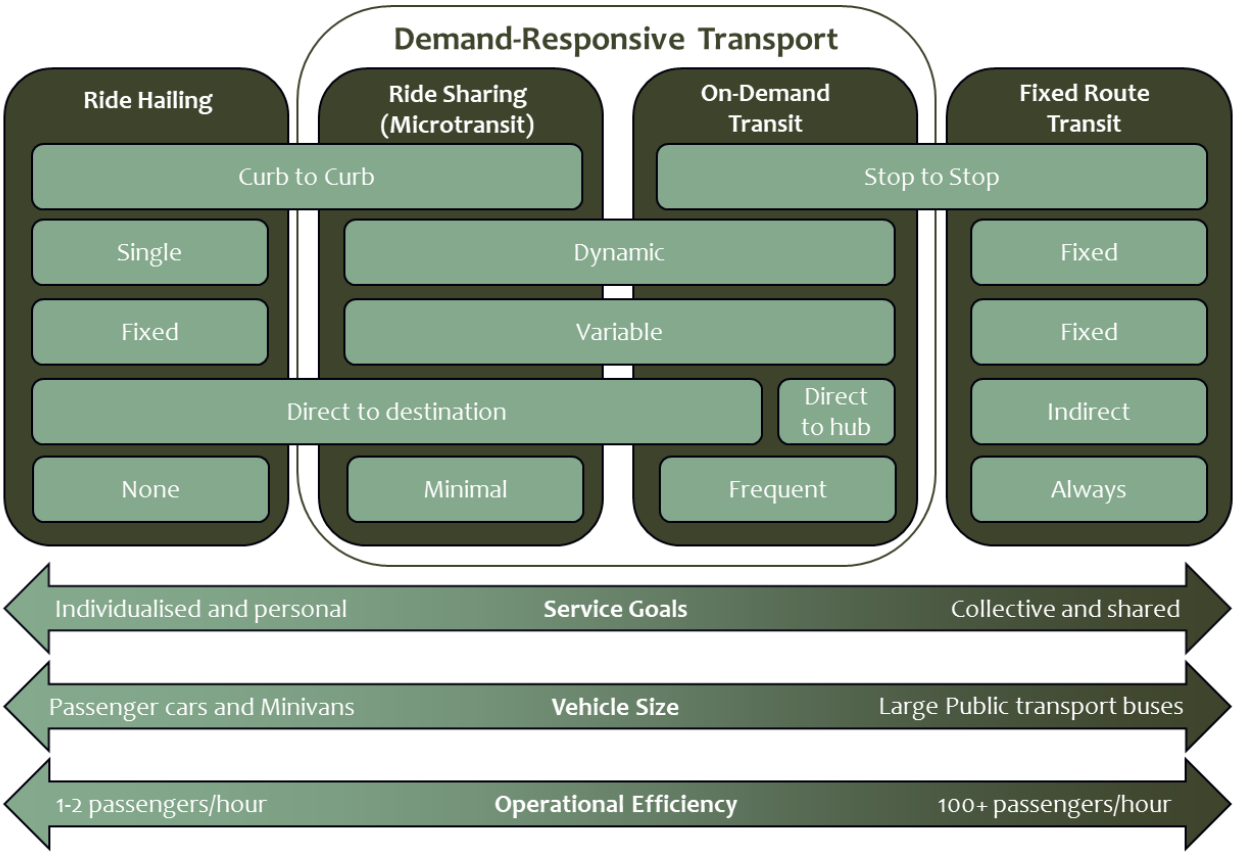


Figure 1: Demand for Responsive Transport Service Options (Source: Author,2025, adapted from Klumpenhouwer, 2020; University of Toronto)

Beyond service logic, the success of DRT also depends on fare integration and fleet design. When operated or regulated by public transport authorities, DRT services can be integrated into existing public transport fare structures, supporting seamless multimodal travel. Fleet configurations typically rely on smaller and adaptable vehicles such as minibuses or vans, enabling access to residential streets and rural roads while maintaining shared-use efficiency. Choices regarding propulsion technologies (electric, hybrid, or conventional) should depend on local context, operational requirements, and environmental objectives.

2.1.1. Why DRT?

Many regions, particularly rural and peripheral areas, face dispersed travel patterns, irregular demand, and limited public transport provision. In such contexts, DRT offers a pragmatic and scalable response. By operating only when and where demand exists, DRT can extend the spatial and temporal reach of public transport, enhance resilience, and respond to evolving mobility needs driven by demographic change, new working patterns, and social inclusion goals.

When strategically integrated into public transport networks, DRT contributes to several key outcomes:

- **Strengthening public transport networks** by complementing mass transit and improving coverage in underserved areas.
- **Balancing flexibility, sustainability, and shareability**, offering a viable alternative to private car use while remaining user-oriented.
- **Responding to local needs**, provided that services are designed through a structured and context-sensitive planning process.
- **Enabling co-design and stakeholder engagement**, notably through Living Labs and SUMP-based participatory processes that involve citizens, operators, and public authorities.
- **Enhancing policy coordination and integrated decision-making**, aligning DRT with wider mobility, environmental, and social objectives across governance levels.

2.1.2. Benefits of Demand Responsive Transport

Experience from European and International practices highlights several concrete benefits of DRT when well-planned and integrated:

- **Replacing inefficient fixed routes**: By operating only when needed and following optimised routes, DRT can reduce vehicle kilometres travelled, fuel consumption, and emissions. Vehicle size can be adjusted to expected demand, improving efficiency per passenger kilometre and supporting social inclusion by unlocking suppressed travel demand.
- **Substituting private car journeys**: In areas with insufficient demand for fixed-route services, or where travel patterns are irregular (for example, shift work), DRT can replace multiple single-occupancy car trips, contributing to emission reductions and reduced car dependency.
- **Encouraging active and multimodal travel**: DRT can be integrated with walking and cycling by improving access to public transport nodes, allowing bicycles on board or on external racks, and supporting secure bicycle parking at stops and key destinations.

Together, these characteristics position DRT not as a niche or temporary solution, but as a strategic component of integrated, sustainable mobility systems.

2.2. Sustainable Urban Mobility Planning Framework and DRT

To ensure a structured, strategic, and policy-aligned approach to the planning and implementation of DRT, this guide adopts the Sustainable Urban Mobility Planning (SUMP) framework as its core methodological foundation.

SUMP is a well-established strategic planning approach designed to address the complexity of urban and regional mobility systems in an integrated and participatory manner. As illustrated in Figure 2, the SUMP process follows a cycle planning logic, structured around four interlinked phases: Preparation and Analysis, Strategy Development, Measure Planning, and Implementation and Monitoring. This cycle is iterative in nature, emphasising continuous learning, adaptation, and improvement over time. The strength of the SUMP framework lies in its combination of a comprehensive methodology and a set of core principles such as integration across sectors and modes, stakeholder and citizen engagement, evidence-based decision-making, and long-term sustainability. These principles can be flexibly applied to different thematic areas, making SUMP particularly well-suited to the planning of innovative and dynamic mobility solutions.

Figure 2: The Sustainable Urban Mobility Plan (SUMP) Process (Source: Rupprecht Consult 2019)

In the context of DRT, the SUMP framework provides a coherent structure to:

- Embed DRT within wider mobility, spatial, social, and environmental policy objectives.
- Guide the coordination of multiple stakeholders and institutional actors involved in DRT governance, planning, and operations.
- Support informed decisions on service design, digital tools, regulatory frameworks, and funding models.

- Ensure that DRT services are not developed as isolated pilots, but as integrated and scalable components of the public transport system.

By applying the SUMP framework, this guide supports public authorities and practitioners in managing the technical, operational, and governance complexity of DRT, while maintaining a clear strategic direction. The following chapters translate the SUMP phases into practical guidance for DRT integration, drawing on experiences from the DREAM_PACE Living Labs and international good practices to support implementation in diverse territorial contexts.

2.3. Overview of the upcoming chapters

This planning guide is structured as follows:

- **Chapter 3. Phase 1 - Building a Baseline for DRT Integration in Mobility Systems**: This chapter focuses on preparatory analysis, including context assessment, gap analysis, mobility system diagnostics, stakeholder mapping, and the design of engagement strategies to support DRT development. It addresses governance structures, legal frameworks, and funding and financing models essential for effective DRT implementation, drawing on insights from DREAM_PACE Living Labs and international best practices.
- **Chapter 4. Phase 2- Developing a Strategic Framework for DRT Integration**: This chapter presents the strategic framework for DRT integration, including the formulation of a shared vision, strategic objectives, and future mobility scenarios. It explains how alternative DRT scenarios can be developed, assessed, and prioritised, using evidence from DREAM_PACE pilots and international experiences to inform strategic decision-making.
- **Chapter 5. Phase 3 - Designing and Enabling DRT Measures and Actions**: The measure planning phase emphasises the co-design of DRT solutions with key stakeholders through workshops, pilot actions, and Living Lab processes. It highlights the importance of accessible, user-centred service design, addressing the needs of diverse user groups, particularly vulnerable populations, to ensure inclusive and demand-oriented DRT services.
- **Chapter 6. Phase 4 - Implementation, Monitoring, and Learning for DRT**: This chapter focuses on implementation pathways, monitoring and evaluation frameworks, and mechanisms for continuous learning and adaptation. It addresses performance monitoring, user feedback collection, scalability, and long-term financial and institutional sustainability, supported by lessons learned and best practices from DREAM_PACE.
- **Chapter 7. Concluding Remarks - Advancing Demand Responsive Transport Planning**: This final chapter synthesises key insights and policy recommendations, reinforcing the role of DRT as a flexible and efficient component of integrated public transport systems. It provides a forward-looking perspective on the contribution of DRT to sustainable, inclusive, and resilient mobility systems, supporting wider European and local mobility policy objectives.

Together, these chapters provide a comprehensive and practice-oriented framework for integrating DRT into sustainable mobility planning. By combining structured guidance with real-world experiences from the DREAM_PACE project and international good practices, the guide supports authorities in moving from strategic intent to effective implementation.

3. Phase 1 - Building a Baseline for DRT Integration in Mobility Systems

The successful integration of Demand Responsive Transport (DRT) begins with a solid understanding of the local context. Within the Sustainable Urban Mobility Planning (SUMP) cycle, this chapter corresponds to the Preparation and Analysis phase, which lays the foundation for all subsequent strategic and operational decisions.

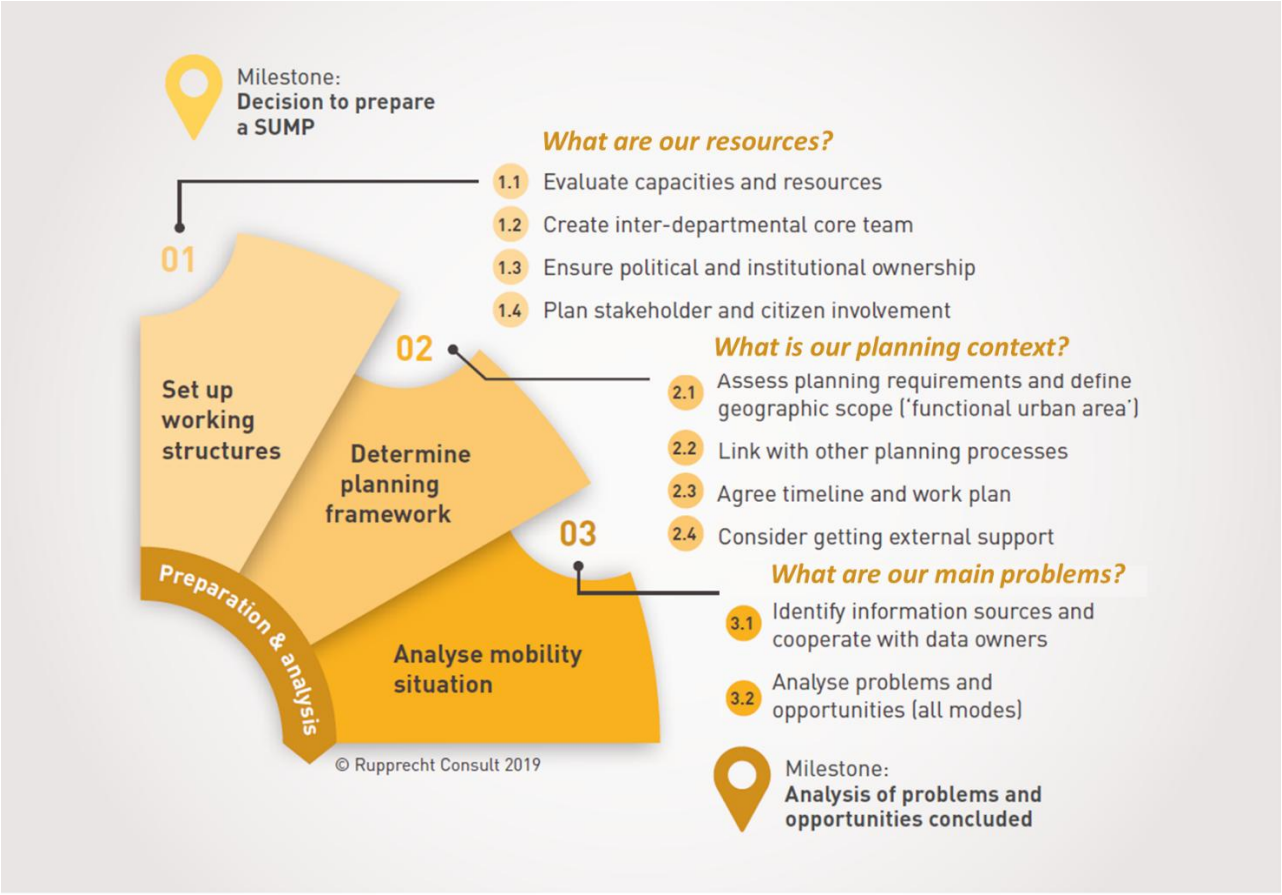


Figure 3: SUMP-Phase 1: Preparation and Analysis Scope & Main Activities (Source: Rupprecht Consult, 2019)

Insights gathered through DREAM_PACE consultation activities, combined with a comprehensive review of international literature and practice, indicate that this early phase is often where DRT initiatives face their most persistent challenges. These typically include:

- **Inadequate understanding of users and their mobility needs**, particularly in low-density, rural, and peri-urban contexts where demand patterns are fragmented and poorly captured by conventional data sources.
- **Low levels of stakeholder engagement and weak prioritisation of DRT**, resulting in limited institutional ownership and fragmented decision-making.
- **Resistance from conventional or established public transport operators**, often driven by concerns related to operational complexity, cost, competition, or disruption of existing service models.

If left unaddressed, these challenges can lead to DRT concepts that are poorly aligned with real demand, insufficiently embedded within existing public transport systems, or constrained by institutional and operational barriers. Addressing them requires a structured, inclusive, and evidence-based baseline

assessment that goes beyond technical analysis and actively engages institutional actors and users from the outset.

At this stage, the objective is not to design services or select technologies, but to build a shared evidence base and governance understanding. This involves assessing existing mobility conditions, identifying institutional and stakeholder dynamics, and understanding who travels, how, when, and why. For DRT in particular, this phase is critical, as the effectiveness of flexible and demand-driven services depends heavily on local travel behaviour, user needs, policy constraints, and the capacity of institutions to coordinate across sectors and levels.

This chapter therefore focuses on three interrelated building blocks:

- **Bringing the right voices to the table** by identifying and engaging key stakeholders and (potential) users from an early stage.
- **Understanding the policy, planning, and governance framework**, including regulatory, institutional, and funding conditions that shape DRT feasibility.
- **Identifying local mobility gaps, needs, and opportunities**, with particular attention to users' travel behaviour and underserved demand.

Across these three subchapters, the guide emphasises a participatory, evidence-based, and context-sensitive approach. Each section combines strategic reflections with practical guidance, including key guiding questions and recommended tools and methods, drawing on experiences from the DREAM_PACE Living Labs and wider international practice.

By the end of this chapter, planners and decision-makers should have a clear and shared understanding of their starting point: who needs to be involved, what constraints and opportunities exist, and where DRT can add the greatest value within the local mobility ecosystem. This baseline provides the essential reference for developing a coherent DRT strategy in the subsequent SUMP phases.

3.1. Bringing the right voices to the table: stakeholders & (potential) users

Early and meaningful stakeholder and user engagement is a critical success factor for Demand Responsive Transport. Within the SUMP Preparation and Analysis phase, stakeholder and user engagement serves three key purposes:

- To build a **shared understanding** of mobility challenges and opportunities.
- To **establish legitimacy and trust** among institutions, operators, and users.
- To ensure that DRT **solutions are co-designed**, rather than imposed, thereby increasing acceptance and long-term viability.

For DRT in particular, engagement must go beyond formal institutional actors and actively include potential users, especially groups that are currently underserved by conventional public transport. This early involvement helps uncover latent demand, behavioural patterns, and accessibility barriers that are often invisible in aggregated transport data.

3.1.1. Identifying and mapping stakeholders

The first step is to identify all actors who influence, operate, regulate, or are affected by DRT. These typically include:

- Public authorities at local, regional, metropolitan, and, if relevant, also national levels.
- Public and private transport operators, including conventional and flexible service providers.
- Mobility, digital, and MaaS service providers, including both large enterprises and SMEs.
- Infrastructure owners and managers (e.g. road authorities, station and stop operators, charging infrastructure providers).
- Social services, health, education, and employment institutions.
- Civil society organisations, community groups, and professional or sectoral networks (e.g. transport associations, city networks).
- Existing and potential users, particularly vulnerable and transport-dependent groups.

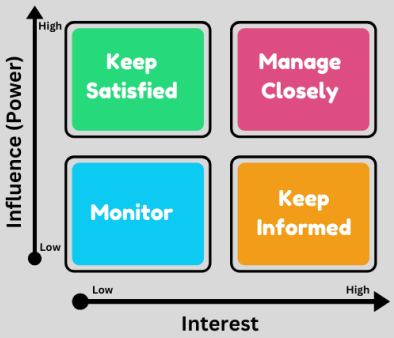
Stakeholder mapping aims to clarify **roles, interests, influence, and interdependencies** within the local mobility ecosystem. Understanding these dynamics is essential for anticipating conflicts, managing expectations, and designing appropriate engagement formats.

Guiding Questions:

- Who are the **key decision-makers,** service providers, and influencers relevant to DRT?
- Which stakeholders may **support or resist DRT** integration, and why?
- Which user groups are **currently underserved or excluded** by existing transport services?

Recommended Toolbox

- **Stakeholder mapping matrix:** Classify actors by their influence, interest, and relevance to Demand Responsive Transport solutions to ensure balanced representation.



- **Actor-network diagrams:** Visualise relationships, interdependencies, and potential collaboration pathways.

3.1.2. Engaging stakeholders and potential users

Once identified, stakeholders and users should be engaged through tailored and inclusive formats. Not all actors need to be involved in the same way or at the same intensity; prioritisation is essential to ensure effective use of resources while maintaining transparency and inclusivity.

Engagement should be designed as an ongoing process, rather than a one-off consultation. In the context of DRT, early engagement is particularly important to address concerns from conventional public transport operators and to build a shared understanding of how DRT complements, rather than competes with, existing services.

Key engagement approaches are:

- **Strategic stakeholder dialogues**: Targeted bilateral or small-group meetings with key decision-makers, public transport authorities, and operators help clarify expectations, address institutional concerns, and identify potential regulatory or operational barriers early in the process. These dialogues are particularly effective in reducing resistance from conventional operators by framing DRT as a complementary, not competing, service.
- **Multi-stakeholder workshops**: Facilitated workshops bring together public authorities, operators, service providers, and civil society organisations to jointly discuss mobility challenges, define shared objectives, and explore the role of DRT within the wider mobility system. These formats support consensus-building and alignment across sectors and governance levels.
- **Living Lab and co-creation sessions**: Living Labs enable hands-on collaboration between planners, operators, and users in real-life contexts. Through co-design exercises, scenario discussions, and pilot testing, participants can actively shape service concepts, booking processes, and operational rules, increasing acceptance and usability.

Guiding Questions:

- **What roles could different stakeholders play** across planning, implementation, and operation phases?
- How can resistance from PTAs and conventional operators be constructively addressed?
- Which engagement formats are most suitable for reaching potential users with limited digital access?

- **User-focused outreach and participation**: Engagement with potential users should combine digital and non-digital methods to ensure inclusivity. This may include on-street surveys, interviews at key destinations (health centres, schools, employment hubs), community meetings, and collaboration with social service organisations that represent transport-dependent groups.
- **Operator and driver involvement**: Involving drivers and operational staff in workshops or interviews provides valuable insights into feasibility, service reliability, and on-the-ground challenges. Their early involvement also supports smoother implementation and organisational buy-in.

By combining these approaches, planners and authorities can move beyond formal consultation towards active co-creation, ensuring that DRT solutions are socially accepted, institutionally supported, and closely aligned with real mobility needs.

3.1.3. From engagement to working structures

Bringing the right voices to the table—both active stakeholders and potential users—is the **foundational step** for effective DRT planning. The preceding steps of identification, mapping, and engagement serve a clear

purpose: to establish a shared understanding of mobility challenges, align priorities, and build trust among all actors involved.

The ultimate goal of this subchapter is to translate stakeholder identification and engagement into actionable and sustainable working structures. These structures should provide a stable platform for ongoing collaboration, decision-making, and co-creation throughout the DRT planning and implementation process. By formalising roles, responsibilities, and communication channels, local authorities can ensure that diverse perspectives—ranging from public transport operators to transport-dependent users—are incorporated into service design and operational decisions.

Key elements of effective working structures include:

- **Diverse collaborative groups** that represent public authorities, operators, community organisations, and users.
- **Clear role definitions** to ensure accountability and efficiency in decision-making.
- **Regular and inclusive interactions**, such as workshops, steering committee meetings, or co-creation sessions.
- **Feedback and learning mechanisms** that capture insights from stakeholders and users, feeding them back into planning and refinement.

When established thoughtfully, these structures reduce resistance from conventional operators, foster institutional ownership, and ensure that DRT solutions are responsive to local needs and scalable over time.

Box 1: Diagnosis Workshop DREAM_PACE Example: Stradella Living Lab

Diagnosis Workshop Example: Stradella Living Lab

The third DREAM_PACE Living Lab, held in November 2023 in Stradella (Pavia area), focused on rural mobility challenges and opportunities. A diverse group of stakeholders, including representatives from local institutions such as the Province of Pavia and various municipalities, along with users, citizens with different mobility needs, and mobility and IT providers, gathered to discuss the current and future state of mobility in the Stradella and Oltrepò Pavese area.

Participants were updated on the main goals and activities of the DREAM_PACE project, as well as its expected impact on local communities. The workshop provided a platform for participants to collaboratively contribute to a "state of the art" analysis of local mobility systems, discussing the challenges and potential of Demand Responsive Transport (DRT) solutions in delivering high-quality services to users. Representatives from local institutions particularly appreciated the opportunity to engage not only in this workshop but also in future co-design sessions. They also committed to serving as project ambassadors by recruiting additional participants from local communities and promoting the project throughout the region.

Figure 4: DREAM_PACE's Diagnosis Workshop in Stradella (Source: DREAM_PACE, 2023)

3.2. Understanding the policy, planning and governance environment

Effective DRT planning depends not only on understanding users and stakeholders but also on navigating the institutional, regulatory, and financial context in which services will operate. Without a clear grasp of the policy environment and governance structures, DRT initiatives risk misalignment with local priorities, regulatory barriers, or operational conflicts with existing transport services.

Insights from DREAM_PACE consultation activities and international experience indicate that common challenges in this area include:

- **Fragmented or unclear governance structures**, where responsibilities between authorities and operators overlap or are undefined.
- **Regulatory barriers**, such as licensing, ticketing, or service requirements, that restrict flexibility in DRT deployment.
- **Financial constraints** or misaligned incentives, limiting the capacity of authorities or operators to sustain or scale services.

This subchapter focuses on assessing and understanding the planning, policy, and governance framework to ensure that DRT solutions are not only feasible but also aligned with broader mobility, social, and sustainability objectives.

3.2.1. Regulatory and Legal Environment

The regulatory framework defines what is legally permissible and outlines constraints or requirements that shape DRT deployment. Planners must assess national, regional, and local regulations to identify potential barriers or enablers. Regulations may cover licensing, vehicle types, operational areas, safety standards, accessibility requirements, fare structures, and digital data handling.

DRT often requires flexibility that traditional transport regulations were not designed for. For instance, regulations may assume fixed routes or schedules, which can impede the dynamic routing required for DRT. DREAM_PACE pilots highlighted cases where local authorities needed to negotiate exceptions or adaptations, particularly for rural areas where conventional public transport is limited.

Understanding past planning documents and strategies helps reveal how transportation decisions were historically made and how they influence current conditions. For example, some regional plans prioritise high-capacity fixed-route services, which may require DRT planners to demonstrate complementarity rather than competition.

Guiding Questions:

- Which national, regional, or local regulations govern public transport and DRT operations?
- Are there restrictions on vehicle types, routing flexibility, or booking methods?
- What legal mechanisms exist to enable partnerships between public authorities and private operators?
- Are there standards for accessibility, digital services, or fare integration that DRT must comply with?

3.2.2. Institutional and Governance Structures

DRT planning typically involves multiple public and private actors with overlapping responsibilities. Understanding who makes decisions, who implements them, and how these actors interact is crucial to avoid inefficiencies and conflicts. Governance structures define the coordination mechanisms, accountability pathways, and institutional support needed for successful DRT deployment. Institutional mapping also helps identify gaps or redundancies, such as overlapping responsibilities between municipal and regional authorities.

Guiding Questions:

- Which institutions are responsible for transport planning, operations, and funding?
- How are decisions coordinated across different governance levels?
- Are there existing working groups, committees, or advisory boards that could support DRT planning?

3.2.3. Financial and Funding Landscape

Sustainable DRT services depend on a robust financial framework. Understanding the funding landscape helps planners design services that are cost-effective, equitable, and scalable.

Funding can come from multiple sources: public subsidies, fare revenues, private investments, cross-sector partnerships, or blended models.

DREAM_PACE experiences revealed that a lack of clarity on funding often undermined DRT deployment. Successful pilots combined targeted subsidies with flexible cost-sharing arrangements among municipalities and private operators. Funding strategies also accounted for variations in demand: peak vs. off-peak, urban vs. rural, and regular vs. occasional users.

Guiding Questions:

- What funding sources are available for DRT, if any, and what are their conditions?
- Which funding mechanisms can support pilot projects and scale-up phases?
- Are there opportunities for cross-sector partnerships, e.g., with health or social services, to co-fund services?

3.2.4. Technological and Operational Readiness

Digital and operational infrastructure are critical for efficient DRT delivery. Technology supports real-time booking, dynamic routing, fleet management, and integration with other modes of transport. DREAM_PACE pilots showed that technological readiness often determines the speed and quality of DRT implementation.

At this step, planners should also evaluate whether existing digital platforms can support DRT booking, dispatch, and data management functions; assess fleet suitability in terms of vehicle size, type, accessibility, and environmental performance; identify operational synergies with conventional public transport services to enable seamless integration; and consider the digital literacy of users to ensure inclusivity.

Guiding Questions:

- What digital platforms exist for booking, routing, and payment?
- Are operators and users digitally literate enough to adopt app-based or online booking systems?
- What fleet types and operational models are feasible given local infrastructure?
- How can DRT services integrate with existing public transport operations and schedules?

3.3. Understanding Local Mobility Gaps, Needs, Opportunities and Users' Travel Behaviour

A robust understanding of local mobility gaps and travel behaviour is essential to ensure that DRT services are not only technically feasible, but also socially relevant, inclusive, and well-targeted. While DRT is often introduced to address spatial or temporal gaps in conventional public transport, its success largely depends on how accurately it responds to real mobility needs of current and potential users.

This step builds on the stakeholder and governance analysis by shifting the focus towards how, why, when, and by whom trips are made, and where existing systems fail to meet these needs. Rather than starting from a predefined service model, planners are encouraged to adopt a needs-driven perspective that places users and their daily mobility realities at the centre of DRT design.

3.3.1. Identifying mobility gaps and unmet needs

Mobility gaps can be spatial, temporal, social, or functional. *Spatial gaps* often occur in rural, peri-urban, or low-density areas where fixed-route services are economically or operationally unviable. *Temporal gaps* typically relate to off-peak hours, evenings, weekends, or shift-based travel patterns. *Social gaps* may affect specific user groups such as older adults, people with reduced mobility, low-income households, or those without access to private cars. *Functional gaps* can arise where existing services do not adequately connect key destinations such as healthcare facilities, education centres, employment areas, or intermodal hubs.

Identifying these gaps requires combining quantitative data, such as service coverage maps, catchment area[1], ridership figures, population density, workplace density, and overall accessibility, with qualitative insights from users and local stakeholders. It is important to note that good service coverage alone does not guarantee effective accessibility: service frequency may be too low, or underserved locations may remain too far from existing transport stops. This integrated perspective helps avoid purely supply-driven solutions and supports the prioritisation of areas and trip purposes where DRT can deliver the highest added value.

Guiding Questions:

- Which areas or corridors are underserved or not served at all?
- Which trip purposes (e.g. work, education, healthcare, social activities) are most affected?
- Are there signs of suppressed or unmet mobility demand?

Recommended Toolbox

- **Public transport network and timetable analysis:** Assess service structure, frequency, and temporal gaps.
- **GIS-based service coverage and accessibility mapping:** Identify spatial gaps and inequities.
- **Catchment area and isochrone analysis:** Assess time-based access to services and destinations.
- **Review of complaints and mobility studies:** Capture user-reported issues and local insights.

Evidence-based planning for DRT depends on reliable technical analysis. Tools such as GIS-based mapping, accessibility analysis, and demand modelling are essential for identifying underserved areas, understanding spatial and temporal gaps, and estimating potential ridership. Beyond their analytical function, these tools also play a critical role in communication and stakeholder engagement, as visualisations make abstract accessibility problems tangible and easier to discuss. For this reason, it is often advisable to cooperate with specialised external experts who have the technical capacity to carry out these analyses in a robust and transparent manner.

[1] When conducting catchment area and isochrone analysis, it is recommended to include service frequencies to calculate Total Access Time, which accounts for walking time to a stop plus average waiting time. Considering only isochrone areas may overestimate network quality, as low-frequency services reduce effective accessibility. For practical methodology, see TfL's Connectivity Assessment Guide: https://content.tfl.gov.uk/connectivity-assessment-guide.pdf (TfL, 2021)

Box 2: Identifying Mobility Gaps using ÖV-Güteklassen method

Identifying Mobility Gaps using ÖV-Güteklassen method

In East Tyrol, GIS analysis was used to cross-reference population distribution with public transport quality grades. This revealed clear coverage and accessibility gaps in municipalities such as Heinfels and Stronach. By overlaying population data with ÖV-Güteklassen, it became visible which settlements were located outside areas with adequate public transport provision despite having resident populations and potential demand. Presenting these visualisations to local authorities and stakeholders proved more effective than abstract data tables, as the maps created a shared understanding of the problem and helped build consensus around the need for targeted interventions. On this basis, priority areas for improving public transport services and for considering DRT as a complementary solution could be clearly identified.

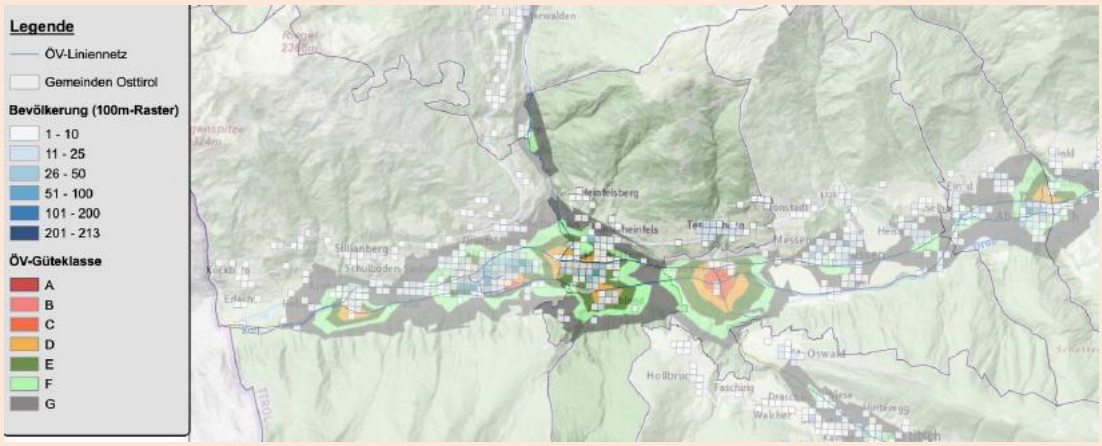


Figure 5: Accessibility assessment for East-Tirol grade cross-cutting population and PT-quality (Source: RMO, 2025)

Another example from the Spiesen-Elversberg region in Saarland, Germany, illustrates how spatial accessibility gaps can be reduced through the introduction of DRT. By complementing conventional public transport with virtual DRT stops, overall public transport accessibility levels improved across the service area, particularly in locations previously characterised by long walking distances to fixed stops and low service frequencies. The assessment applies the ÖV-Güteklassen-based accessibility concept, in which accessibility classes (A = high to G = low) are derived from a combination of service headway and distance to the nearest stop, allowing a comparative analysis between a baseline scenario (conventional public transport only) and a DRT-enhanced scenario.

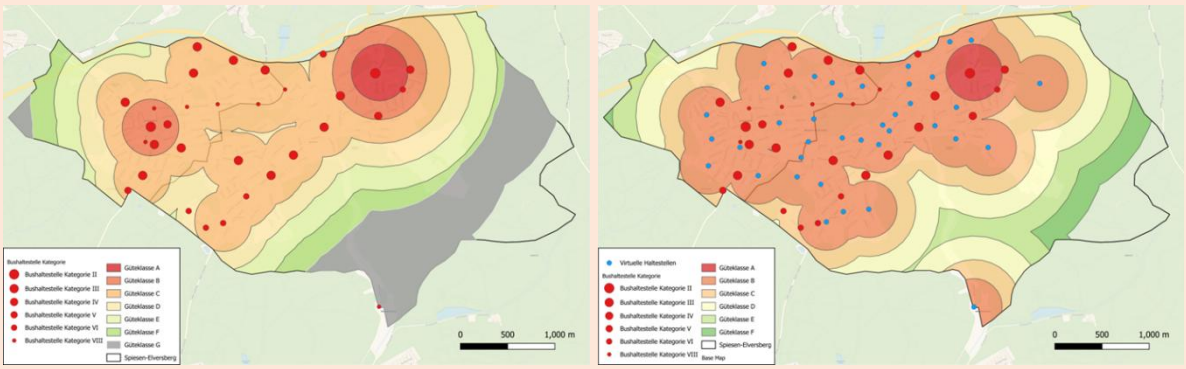


Figure 6: Accessibility assessment for the Spiesen-Elversberg region under two scenarios: conventional public transport only (left) and public transport complemented by virtual DRT stops (right). Blue dots indicate virtual DRT stops. (Source: Rupprecht Consult, 2025, based on preliminary results from the BBSR project "Bundesweiter Überblick und Bewertung der Angebote an Bedarfsverkehren im Vergleich zu ‚klassischen' Linienverkehren im öffentlichen Verkehr", Region gestalten programme.)

3.3.2. Understanding Travel Behaviour and Target User Groups

Beyond identifying where gaps exist, it is equally important to understand travel behaviour and user preferences. This includes analysing trip purposes, travel frequencies, time sensitivity, willingness to share rides, booking behaviour, and acceptance of flexible services. Different user groups may have very different expectations and constraints, and a one-size-fits-all DRT solution is unlikely to be effective.

Particular attention should be paid to groups that are more likely to benefit from DRT, such as transit-dependent populations, older people, people with disabilities, workers, and residents of areas with limited public transport.

Understanding their needs, constraints, and digital capabilities is critical for designing inclusive services, including decisions related to booking channels, vehicle accessibility, service hours, and fare structures.

Guiding Questions:

- Who are the current and potential users of DRT in the area?
- What are their main trip purposes, frequencies, and time sensitivities?
- Which user groups face the greatest barriers in the existing transport system?
- What level of flexibility, reliability, and comfort do users expect?
- What are users' digital capabilities and preferred booking channels?

Recommended Toolbox

- **Household travel surveys and mobility diaries**: Structured collection of trips over time to understand real travel behaviour and unmet demand.
- **User segmentation and persona development**: Grouping users into data-informed categories and creating representative persona profiles.
- **Focus groups and interviews with specific user groups** (e.g. older adults, People with Reduced Mobility, young people): Qualitative engagement to capture lived experience, preferences, and contextual barriers.
- **Analysis of census and socio-demographic data**: Mapping socio-economic characteristics to understand potential mobility dependencies and equity needs.

Box 3: Demographic Analysis of (potential) DRT Users

Demographic analysis of DRT users: An example for context analysis

The ODT (On-Demand Transit) Toolkit document published by CUTA (Canadian Urban Transit Authority) has good examples of ODT/DRT context analysis. It highlights a study by the Transport Research Board in the United States on the population categories that have the highest potential for using Demand Responsive Transit or other flexible transport options, ranked by trip purpose (Crockett et al, 2010), as shown in the table below. The results highlight that the equity deserving groups such as senior citizens and differently abled people have the highest potential of use under various trip purposes, from non-emergency medical trips to the day-to-day essential trips for groceries, shopping and socialisation. This could be attributed to the fact that this demography of people is transit dependent and their trips are relatively less time sensitive. The younger population was found to have lesser potential for use under work or school trips. However, the non-emergency medical trip potential remained high for this demography. The same roughly applies to the adult demography as well.

<table>
<tr><th>Demographic/ Trip Purpose</th><th>Youth (<18)</th><th>Adult (18-64)</th><th>Equity Deserving Groups</th></tr>
<tr><td>Work</td><td colspan="3" rowspan="2">Low</td></tr>
<tr><td>School</td></tr>
<tr><td>Non-emergency Medical</td><td>High</td><td>Medium</td><td rowspan="4">High</td></tr>
<tr><td>Groceries</td><td colspan="2">Low</td></tr>
<tr><td>Shopping</td><td rowspan="2">High</td><td rowspan="2">Low</td></tr>
<tr><td>Social</td></tr>
</table>

Figure 7: Demography with potential for DRT use ranked by trip purpose (Source: Crockett et al, 2010)

In the DRT planning stage, a similar demographic analysis could be conducted via household surveys or census based spatial analysis to identify and define the target trip purpose and demography for the DRT services.

3.3.3. From Diagnosis to Opportunity Identification

This analytical step should not only highlight problems but also reveal opportunities. DRT can, for example, strengthen first- and last-mile connections to high-capacity public transport, support access to essential services, reduce car dependency, or enable more efficient use of existing transport resources. Identifying such opportunities helps position DRT as part of an integrated mobility system rather than as a standalone or temporary solution.

The outcome of this step is a clear, evidence-based understanding of who the DRT service is for, which mobility problems it addresses, and how it can complement existing services. This forms a critical input for the subsequent strategy development and service design phases.

Guiding Questions:

- Which user groups are most affected by the identified gaps, and for which trip purposes?
- What are the dominant travel patterns, constraints, and preferences of potential DRT users?
- Which gaps can realistically and effectively be addressed through DRT?
- How and where can DRT complement existing public transport services?

3.4. From Understanding Context to Informed Action

Chapter 3 establishes the analytical foundation for the integration of Demand Responsive Transport within local and regional mobility systems. By combining stakeholder engagement, governance and policy analysis, and a deep understanding of mobility gaps and user behaviour, this phase ensures that DRT planning is grounded in local realities rather than assumptions.

Experience from consultation activities, literature, and practical implementation shows that many DRT initiatives struggle not due to technological limitations, but because of inadequate understanding of user needs, insufficient stakeholder engagement, or resistance from established transport actors. Addressing these challenges early, through a structured and participatory Preparation and Analysis phase, significantly increases the likelihood of successful and sustainable DRT integration.

The insights generated in this chapter provide a shared knowledge base for all actors involved and create a common understanding of objectives, constraints, and opportunities. This prepares the ground for Chapter 4, which translates these findings into a strategic framework, defining the role of DRT within the wider mobility system and setting clear directions for service design and implementation.

4. Phase 2 - Developing a Strategic Framework for DRT Integration

Building on the baseline analysis carried out in SUMP Phase 1, this chapter focuses on translating evidence, stakeholder input, and contextual insights into a coherent strategic framework for the integration of DRT within public transport systems. While the previous phase establishes where mobility gaps exist and who is affected, this phase addresses how DRT can strategically respond to these challenges and what role it should play within the wider mobility ecosystem.

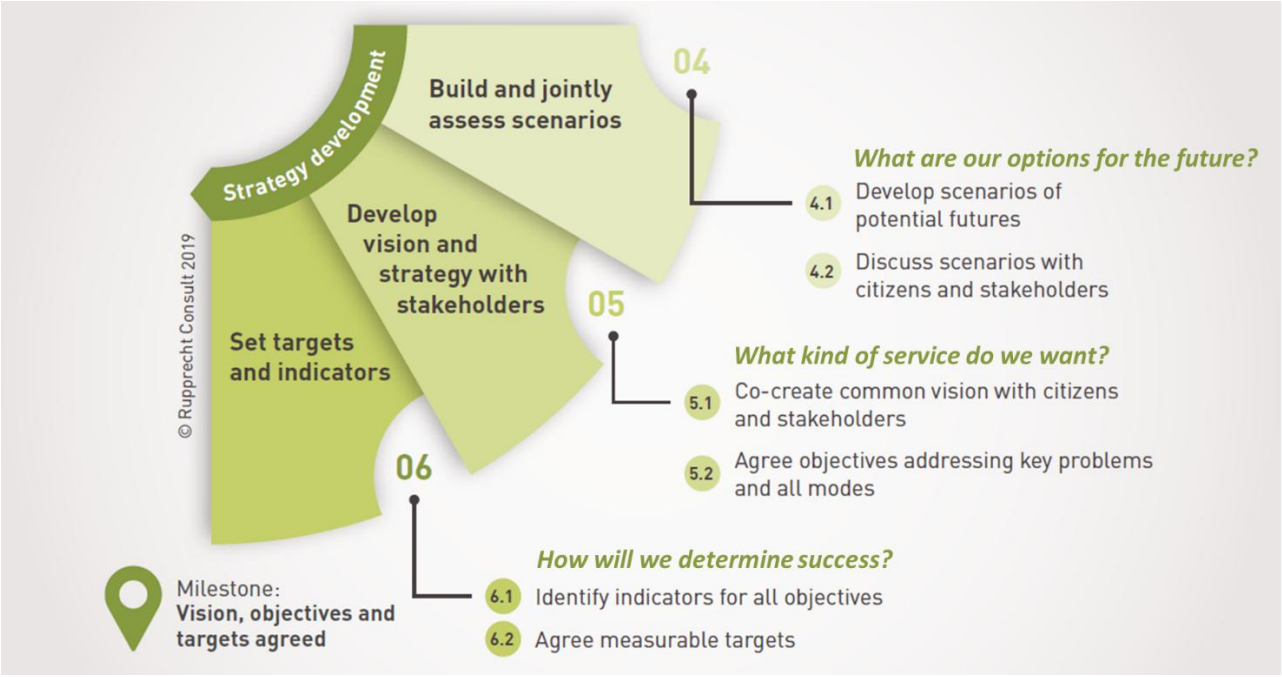


Figure 8: Strategy Development Phase: Scope and Main Activities (Source: Rupprecht Consult, 2019)

In line with the SUMP methodology, strategy development moves beyond isolated project thinking and focuses on long-term direction setting. It combines a shared vision, clearly defined strategic objectives, and measurable targets with a structured exploration of alternative DRT scenarios and service models. This ensures that DRT is not introduced as a stand-alone or ad-hoc solution, but as an integrated, scalable, and policy-aligned component of sustainable mobility systems.

Within DREAM_PACE experiences, this phase proved particularly critical, as Living Labs operated in diverse territorial contexts, ranging from rural and peripheral regions to metropolitan areas with complex public transport networks. Scenario-based planning enabled project partners and local stakeholders to explore different roles for DRT, assess trade-offs, and identify solutions that are technically feasible, socially acceptable, and institutionally viable. This chapter is structured into three complementary subchapters:

- **Section 4.1** focuses on the exploration and evaluation of alternative DRT scenarios and service models.
- **Section 4.2** addresses the definition of strategic objectives and target outcomes, ensuring alignment with wider mobility, social, and environmental goals.
- **Section 4.3** establishes performance metrics and monitoring priorities to support evidence-based decision-making and long-term learning.

Together, these elements provide public authorities and practitioners with a structured pathway to define *what kind of DRT system* is needed, *why* it should be implemented, and *how success* should be assessed over time.

4.1. Exploring and evaluating DRT scenarios & service models

Scenario development is a core element of the strategy development phase, allowing planners and decision-makers to explore alternative futures and assess how different DRT configurations could respond to identified mobility gaps, policy priorities, and operational constraints. Rather than converging prematurely on a single solution, scenario-based planning creates a structured space to test assumptions, compare impacts, and build consensus among stakeholders.

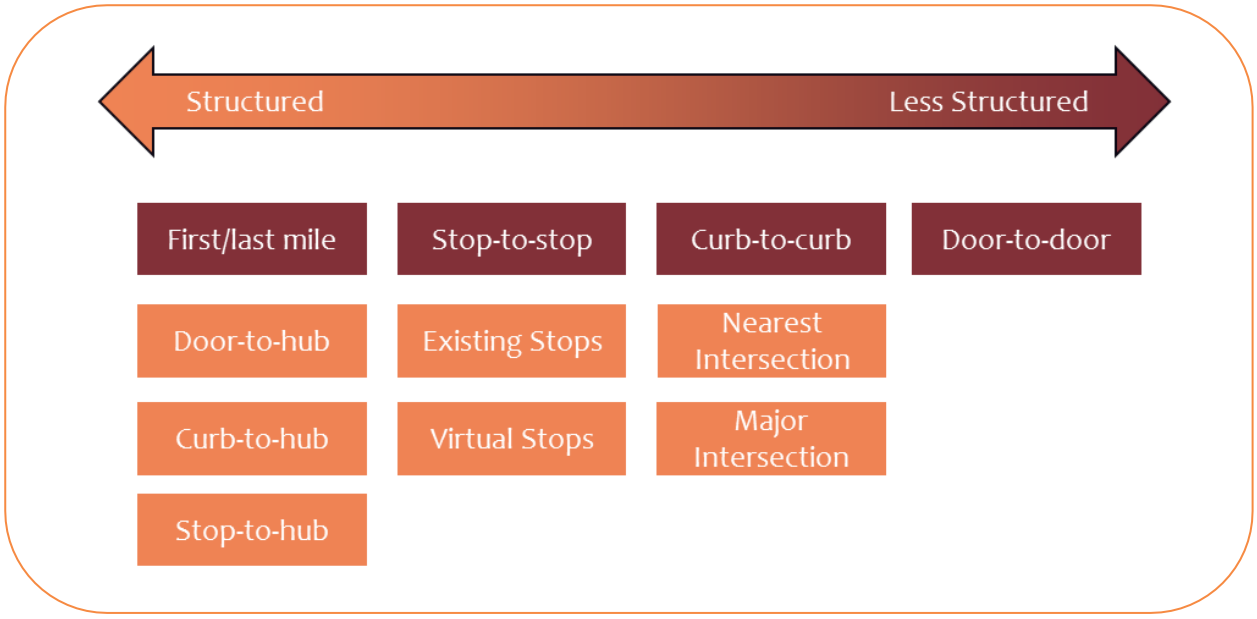


Figure 9: DRT Service Types & Models (Source: Author, adapted from Itani et al., 2024, Transport Policy)

In the context of DRT, scenarios typically vary along several key dimensions:

- **Service function**, such as first- and last-mile feeder services, area-wide coverage in low-density zones, destination-based services to key facilities, or full on-demand replacement of fixed routes.
- **Operational design**, including levels of route and schedule flexibility, vehicle size and fleet composition, service hours, and booking rules.
- **Target user groups**, ranging from general population services to solutions prioritising specific groups such as older adults, people with reduced mobility, shift workers, or young people.
- **Degree of integration**, covering fare integration, timetable coordination, physical interchange, and digital interoperability with conventional public transport, under a MaaS (Mobility as a Service) logic.
- **Governance and delivery models**, including public-led services, public-private partnerships, or operator-driven models under public regulation.

Scenario development typically begins with joint workshops involving public authorities, transport operators, and other key stakeholders. These sessions build on the results of the diagnostic phase and focus on translating identified needs into concrete service concepts. Scenarios should not be treated as fixed blueprints but as exploratory tools, which can be refined, combined, or phased over time.

4.1.1. Exploring Alternative Scenarios

A common starting point is the Business-as-Usual (BAU) scenario, reflecting the continuation of existing policies and services. This scenario is contrasted with one or more DRT-enhanced scenarios, illustrating alternative levels of ambition, investment, and integration. Such comparisons help stakeholders understand

the added value of DRT and the institutional, financial, and operational implications of different approaches.

The exploration phase focuses on generating and describing alternative DRT service concepts. This stage encourages creativity and considers a wide range of operational and functional possibilities before narrowing down options. Typical approaches include:

- Mapping service functions against identified mobility gaps.
- Considering target user groups and the potential social impact of each scenario.
- Testing varying levels of integration with conventional transport and digital platforms.
- Discussing governance and operational models, including partnerships, public provision, or operator-led solutions.

Box 4: Types of different operational DRT services (Source: Author, adapted from DREAM_PACE D2.1.1)

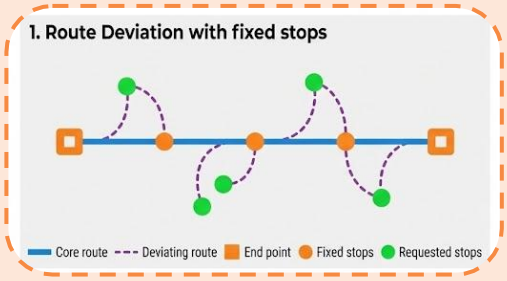
Types of different operational DRT services

DRT services offer exceptional flexibility in routes, stops, and schedules, catering to users' mobility needs, particularly in areas with low demand and during off-peak times, such as weekends, holidays, nights, and off-peak hours.

DRT services are classified into two scheduling structures: fixed schedule and flexible schedule. Additionally, the four main operational concepts of DRT services include:

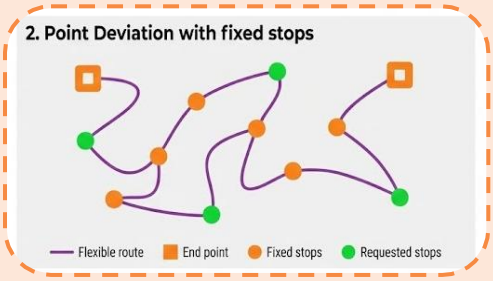
- **Route Deviation with Fixed Stops:**

  In this mode of DRT, vehicles operate on a predetermined route with fixed initial and final terminals and designated stops. The distinguishing feature is the flexibility to deviate from the fixed route, stopping at any location or requested spot along the route, and accommodating on-demand transportation requests.



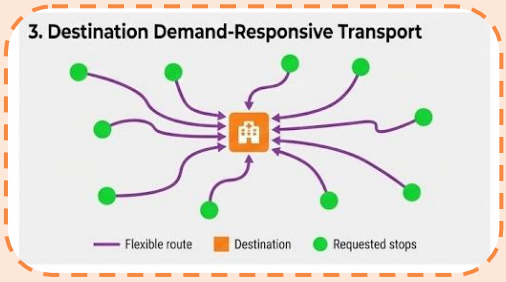
- **Point Deviation with Fixed Stops:**

  Zone-based DRT operates within specific geographical areas, featuring predefined intermediate stops without necessarily having initial and final terminals. These stops guide the structured path of the DRT vehicle, ensuring efficiency while responding to passenger requests.



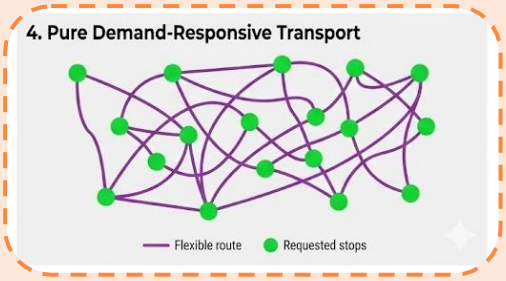
- **Destination / Many-to-One Demand-Responsive Transport:**

  This model is designed to transport passengers to specific Points of Interest (POI), such as shopping centres, hospitals, airports, or other significant locations. The primary goal is to efficiently meet passenger transportation needs from various locations to the specific POI they have requested.



- **Pure / Many-to-Many Demand-Responsive Transport:**

  This model operates dynamically, responding to real-time passenger requests. Unlike traditional fixed-route systems, this mode offers fully flexible routes and variable schedules, adjusting daily to accommodate the varying demands of passengers.



Box 5: Good Practice: Scenario Development in the DREAM_PACE Project

Good Practice: Scenario Development in the DREAM_PACE Project

The DREAM_PACE project's scenario development phase began with an internal partners' workshop led by Rupprecht Consult GmbH, held in January 2024, which set the groundwork for creating effective, context-specific Demand Responsive Transport solutions. In this collaborative session, participants discussed a shared vision for DRT services, identifying essential service goals and exploring alternative operational and governance models. The group also reviewed adaptable guidance materials, including annexes and project indicators, ensuring flexibility for each Living Lab's unique context.
Following this workshop, the pilot Living Labs organised their own scenario development meetings, enabling localised refinement of DRT strategies. These efforts empower the Living Labs to address the unique mobility needs of rural and peripheral areas, setting the stage for flexible, sustainable transport solutions tailored to community needs across Central Europe.

Figure 10: DREAM_PACE SDC Pilot LL Meeting in February 2024 (Source: Dyvolve)

4.1.2. Evaluating Scenarios

Once scenarios are defined, they must be assessed and compared to inform strategic decisions. Evaluation involves a mix of quantitative and qualitative approaches, including operational feasibility, financial sustainability, user experience, and social inclusivity. Each proposed scenario should be assessed against a baseline (Business-As-Usual) or alternative proposed scenarios to quantify potential improvements in accessibility, coverage, and service quality. Participatory methods, such as workshops and user stories, help capture stakeholder perspectives and foster consensus. Key evaluation steps include:

- **Conducting comparative coverage and accessibility analysis** to measure the potential effects of each scenario, including spatial and temporal service improvements.

- **Estimating capital and operational costs** and testing potential funding models.
- **Analysing digital and operational readiness**, including dispatch and booking systems.
- **Identifying trade-offs and risks**, including demand fluctuations, operational complexity, and social equity considerations.

Guiding Questions for Alternative Scenarios Evaluation:

1. **Strategic Fit**
   - Which identified mobility gaps or underserved areas would each scenario address most effectively?
   - How well does each scenario align with the city's broader mobility, social, and environmental goals?
   - Does the scenario support equitable access for priority user groups (e.g., PRM, older adults, youth)?
2. **Operational Feasibility**
   - What are the infrastructure, fleet, and staffing requirements for each scenario?
   - Can the scenario be integrated with existing public transport services, timetables, and fare systems?
   - Are digital booking and dispatch systems sufficient, or is additional technological investment required?
3. **Financial Sustainability**
   - What are the estimated capital and operational costs?
   - Which funding sources or business models (public, private, PPP) are viable?
   - What is the projected cost per passenger-km and potential revenue generation?
4. **User Experience and Accessibility**
   - How convenient is the service in terms of travel/wait time, and door-to-door access?
   - Are there potential barriers to access, including digital literacy, affordability, or physical accessibility?
   - How might user behaviour and demand patterns influence service performance?
5. **Risks and Trade-offs**
   - What are the potential risks or unintended consequences of each scenario?
   - How resilient is the service to demand fluctuations, peak hours, or external shocks (e.g., fuel costs, staffing shortages)?

Box 6: Good Practice Box: Exploring DRT Scenarios and Service Models

Using DREAM_PACE's Business Planning Tools to Compare DRT Models[2]

Planning a new DRT service should involve balancing flexibility, accessibility, and cost-efficiency. A practical approach is to use a scenario-based calculation tool that allows planners to compare different service models and operational assumptions. The tool evaluates traditional public transport alongside four types of DRT services—from fixed routes with booked or deviated stops to fully flexible free-route options.

[2] Link to DREAM_PACE's Business Planning Tool : D1.2.3-Annex-5_DREAM_PACE_BPmodel-1.xlsx

In the DREAM_PACE Bologna pilot case, the analysis was structured around three strategic scenarios. The **Accessibility** scenario focuses on ensuring mobility for all citizens within the service area, serving as a baseline for territorial coverage. The **Intermodality** scenario examines how DRT can complement existing networks, supporting first- and last-mile connections and encouraging multimodal travel. Finally, the **Inclusiveness** scenario prioritises the needs of citizens at risk of marginalisation, providing personalised and accessible travel options where traditional services may fall short.

By entering local data on population, demand, service hours, fleet size, and operational costs, the tool produces key performance indicators, including passenger kilometres, vehicle utilisation, load factors, and costs. The results allow planners to visualise trade-offs between scenarios, highlighting which service models are best suited to different strategic objectives. Importantly, the tool supports iterative testing, enabling planners to refine service design and financial assumptions to optimise both operational performance and social impact.

Scenario I - Accessibility

		PT	DRT1	DRT2	DRT3	DRT4
P*Km per month	P*Km	123.637,5	123.637,5	123.637,5	123.637,5	123.637,5
P*hrs per month	P*hrs	4.121,3	4.121,3	4.121,3	4.121,3	4.121,3
V*Km per month	V*km	16.363,6	15.454,5	16.363,6	20.000,0	20.000,0
V*hrs per month	V*hrs	450,0	450,0	450,0	450,0	450,0
Avg km per hour	km/hr	36,4	34,3	36,4	44,4	44,4
Load factor	**P/V**	**7,56**	**8,00**	**7,56**	**6,18**	**6,18**

		PT	DRT1	DRT2	DRT3	DRT4
Costs of the service	€	38.280,30 €	38.571,21 €	37.455,30 €	41.091,67 €	41.091,67 €
Cost/km	**€/Km**	**2,34 €**	**2,50 €**	**2,29 €**	**2,05 €**	**2,05 €**
Revenues from fares	€	32.145,75 €	32.145,75 €	32.145,75 €	32.145,75 €	32.145,75 €
Break even (public contribution)	€	- 6.134,55 €	- 6.425,46 €	- 5.309,55 €	- 8.945,92 €	- 8.945,92 €
Public contribution per km	**€/Km**	**0,37 €**	**0,42 €**	**0,32 €**	**0,45 €**	**0,45 €**
Revenues/costs ratio	**%**	**84%**	**83%**	**86%**	**78%**	**78%**

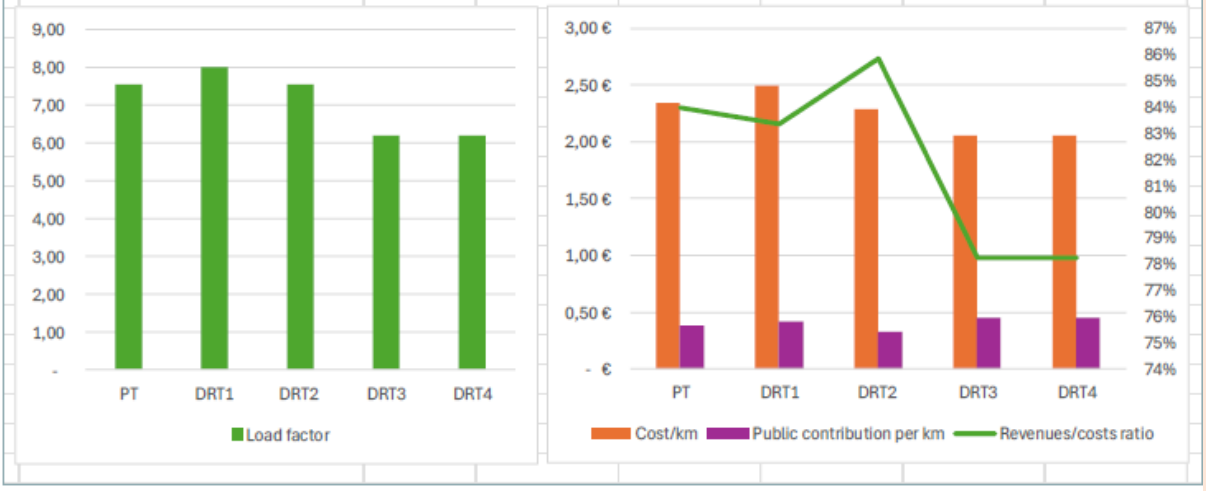


Figure 11: Examples from the Results and Evaluation of Bologna's DREAM_PACE Accessibility Scenario (Source: DREAM_PACE D1.2.3)

Box 7: Scenario evaluation based on user stories

Scenario evaluation based on user stories

A good way of encouraging in-depth discussion of the impacts and related trade-offs of each scenario is to create user stories. User stories set a concrete example for each scenario, describing the user experience, explaining the perceived advantages and disadvantages, and encouraging participants to consider the user's perspective and needs. This allows for a more user-centric analysis and, in consequence, a more inclusive and suitable service design.

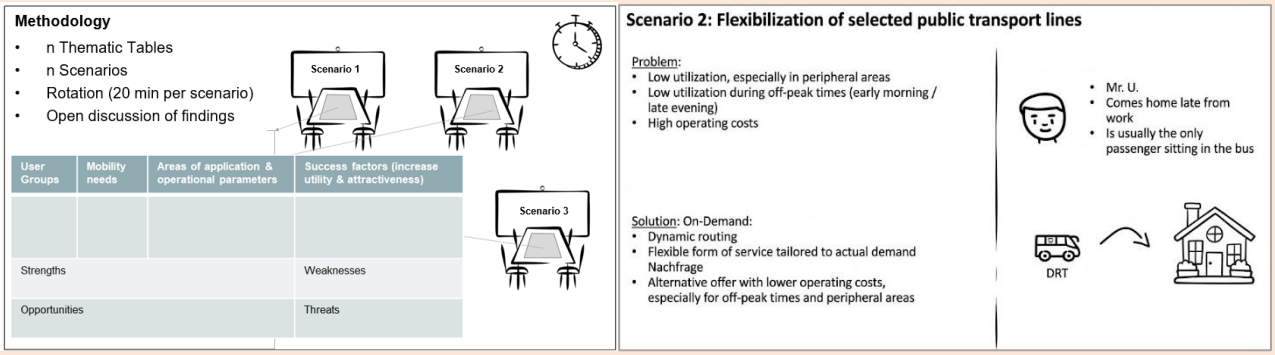


Figure 12: Recommended Qualitative Scenario evaluation workshop methodology (Source: Rupprecht Consult, 2022)

In a workshop setting, participants should be divided into breakout groups (one per scenario). Each scenario is described, including a clear definition of the problem addressed and the solution proposed by the scenario, as well as the user story for this case. The breakout groups then should discuss, based on guiding questions, to assess the strengths and weaknesses of the scenario. After a given time (e.g., 20 minutes) the groups rotate (in a World Café-type setting) until all groups have discussed each scenario.

Recommended Toolbox for Scenarios Evaluation

- **Scenario Mapping / Matrices**: Visual comparison of service models against criteria such as coverage, cost, and user needs. Helps stakeholders understand differences between options.
- **User Stories / Personas**: Illustrate the user experience under each scenario, highlighting accessibility, travel time, and convenience. Useful for participatory discussions.
- **Stakeholder Workshops**: Facilitate co-creation and evaluation of scenarios, integrating perspectives from authorities, operators, and community representatives. Can include World Café or Future Search methods.
- **Cost-Benefit and Feasibility Analysis**: Quantitative assessment of operational costs, revenue potential, capital costs (CapEX), and resource requirements for each scenario.
- **GIS-Based Accessibility Analysis:** Map service coverage, travel times, and gaps under different DRT configurations to evaluate spatial impacts.
- **Simulation Tools**: Model demand-response operations, vehicle routing, and service reliability under alternative scenarios.
- **SWOT / Multi-Criteria Analysis (MCA):** Evaluate each scenario against strategic, operational, financial, and social criteria. Enables structured prioritization.

Scenario exploration and evaluation provide a **structured, participatory framework** to understand the potential role of DRT within a city's mobility ecosystem. Rather than producing a single "ideal" solution, this process often identifies a **hybrid or phased approach**, combining multiple service models to address diverse territorial needs. By systematically exploring scenarios and evaluating trade-offs, planners and public authorities can:

- Build stakeholder consensus and public support for DRT initiatives.
- Make informed strategic decisions regarding governance, operations, and technology.
- Establish a robust foundation for defining **strategic objectives, targets, and performance metrics**, which are addressed in the following sections 4.2 and 4.3.

4.2. Defining strategic objectives and target outcomes

Following the exploration and evaluation of DRT scenarios, the next critical step in strategy development is defining **strategic objectives** and **target outcomes**. These objectives translate the city's shared vision for DRT into concrete, actionable directions, ensuring that future planning and operational decisions align with broader urban mobility, social, and environmental goals.

Strategic objectives serve as **guiding principles** for DRT implementation, helping planners prioritise interventions, allocate resources, and measure progress. They also provide a transparent framework for evaluating trade-offs between different service models, funding mechanisms, and technological solutions.

4.2.1. Objectives with Vision and Policy

Objectives should directly reflect the city's long-term vision for mobility and the insights gained during scenario evaluation. Key alignment considerations include:

- **Mobility and Accessibility Goals:** Improve coverage in underserved areas, enhance first- and last-mile connections, and reduce travel times for all users.
- **Social Inclusion:** Address the needs of priority groups, including older adults, people with reduced mobility, low-income households, and youth.
- **Environmental Sustainability:** Support reductions in private car use, emissions, and congestion, promoting greener transport alternatives.
- **Economic Development:** Facilitate access to employment, education, and commercial centres, contributing to local economic growth.
- **Governance and Institutional Fit:** Ensure objectives align with municipal policies, regulatory frameworks, and public-private collaboration potentials.

Guiding Questions:

- Which mobility gaps or unmet needs are directly addressed by each objective?
- How do the objectives complement existing urban transport policies and plans?
- Which objectives advance social, environmental, and economic priorities simultaneously?
- Are objectives realistic given current institutional, financial, and technical capacities?

4.2.2. Formulating SMART Targets

Once strategic objectives are defined, they should be operationalised through **SMART targets** (Specific, Measurable, Achievable, Relevant, Time-bound). SMART targets provide clarity for monitoring and evaluation, enabling stakeholders to track progress, adapt strategies, and demonstrate accountability.

Example Target Areas for DRT:

- **Coverage:** Increase the proportion of residents within 500 meters of a DRT-accessible stop by 25% within three years.
- **Frequency and Reliability:** Ensure at least 80% of requested trips are fulfilled on time during peak hours.
- **User Inclusion:** Achieve a 15% increase in DRT use among older adults or PRM within two years.
- **Environmental Impact:** Reduce private vehicle trips in targeted areas by 10% through DRT integration and promotion.
- **Operational Efficiency:** Maintain cost per passenger-kilometre below a defined threshold while ensuring high service quality.

Guiding Questions:

- How can each objective be quantified or assessed?
- Are the targets realistic within existing budget, staffing, and infrastructure constraints?
- How do targets balance coverage, quality, and cost considerations?
- How will progress be reported and communicated to stakeholders?

4.2.3. Integrating Objectives Across Scenarios

Strategic objectives should **inform scenario selection and phasing**. For example, if social inclusion is a priority, scenarios serving underserved neighbourhoods or priority user groups may be prioritised.

Conversely, if operational efficiency or environmental impact is emphasised, scenarios with fleet optimisation, electrification, or shared-use principles may be preferred.

Bridging strategic objectives with scenario evaluation ensures that the DRT strategy is:

- **Coherent:** Scenarios and operational plans reflect shared priorities.
- **Responsive:** Objectives guide decisions in areas of greatest need.
- **Flexible:** Allows phased implementation or hybrid solutions tailored to evolving circumstances.

Recommended Toolbox

Methods and tools to define and prioritise strategic objectives include:

- **Stakeholder Visioning Workshops:** Engage authorities, operators, and communities to co-create and validate objectives.
- **Multi-Criteria Analysis (MCA):** Evaluate objectives against social, economic, and environmental criteria to prioritise actions.
- **Gap Analysis:** Compare current mobility provision with desired outcomes to identify priority objectives.
- **Benchmarking:** Analyse comparable cities or DRT services to inform realistic target-setting.
- **Participatory Ranking:** Use citizen surveys or focus groups to weight objectives based on community priorities.

Defining strategic objectives and targets ensures that the DRT strategy is **purpose-driven and measurable**, linking the city's vision to actionable outcomes. This step provides a foundation for the next phase, **establishing performance metrics and monitoring priorities**, which will operationalise these objectives and allow continuous assessment and adaptation.

Box 8: Sprinti: A case study on strategy development

Sprinti: A case study on strategy development[3]

The Sprinti DRT service in the Hannover Region is an illustrative case study of how a clear vision and strategy, grounded in context analysis, can support the successful and widely accepted introduction of a DRT service. Launched as a pilot in June 2021 in three municipalities (Springe, Sehnde, and Wedemark), the planning began with a clear problem definition: increasing the visibility of a novel service, building trust, differentiating it from fixed-route public transport, and lowering digital barriers for diverse user groups.

Figure 13: Sprinti - on-demand transport in the Hannover region, Germany (Source: Hannover Region)

To address these challenges, Sprinti launched with a consistent brand identity and a multi-stage communication campaign, including roadshows, local events, digital explainer videos, and targeted information activities. These efforts were supported by close cooperation with municipalities to foster early acceptance and co-creation. In parallel, Sprinti invested in digital inclusion through training offers delivered in cooperation with Adult Education Centres (Volkshochschule), enabling less digitally confident residents to use the app-based booking system. On the product side, algorithmic dispatch and full integration into the existing public transport fare and app system ensured ease of use and familiarity for passengers.

In its first year of operation, Sprinti recorded over 570,000 rides, around 80% of which were booked digitally, demonstrating both strong demand and rapid digital adoption. Survey results from the Deutsches Institut für Urbanistik (Difu) further showed that around 40% of users would otherwise have travelled by private car, indicating a measurable contribution to modal shift, while one-third reported they would not have made the trip at all without Sprinti, highlighting its role in reducing mobility poverty and supporting social inclusion in peripheral and rural areas.

As a result of its strong uptake, Sprinti expanded from three to twelve municipalities by December 2023, covering approximately 1,680 km² and serving around 360,000 inhabitants. By June 2025, the service had completed more than 3 million trips, with current ridership exceeding 138,000 trips per month (as of May 2025), supported by a fleet of approximately 120 accessible vehicles. Sprinti has established itself as one of the largest publicly integrated DRT services in Europe and has received national recognition, including the German Mobility Award.

[3] Sprinti - on-demand transport in the Hannover region. Website: https://sprinti.gvh.de/. Reference: https://mohawiv.de/

4.3. Establishing DRT performance indicator metrics

Monitoring performance is a critical element of DRT strategy, enabling cities to ensure services deliver on intended mobility, social, environmental, and operational outcomes. Well-defined metrics help assess whether DRT services improve accessibility, efficiency, and equity, while also contributing to broader sustainability and liveability goals, such as reduced congestion, lower emissions, improved air quality, and enhanced pedestrian environments.

Metrics should focus on **outcomes rather than outputs**, providing planners and decision-makers with evidence for iterative service improvement and supporting adaptive planning. In addition, establishing clear monitoring priorities ensures that performance evaluation informs policy decisions, resource allocation, and stakeholder engagement, while tracking progress toward strategic objectives.

DRT performance metrics are proposed to be structured into **three interrelated clusters**, based on DREAM_PACE's methodology and pilots' experiences, each representing a critical dimension of service success.

4.3.1. Mobility, Accessibility, and Liveability Impacts

This cluster evaluates how DRT enhances travel opportunities, supports inclusive mobility, and improves urban liveability. Metrics here focus on the experiences of users, accessibility for priority groups, and environmental or spatial impacts. **Key aspects include:**

- **Modal shift**: Encouraging sustainable transport choices, reducing reliance on private cars, and promoting public transport and active mobility.
- **Accessibility**: Extending coverage to underserved areas and populations, including people with reduced mobility, older adults, low-income households, and youth.
- **User experience and satisfaction**: Measuring convenience, travel time, waiting time, safety perception, and reliability.
- **Environmental and liveability impacts**: Assessing reductions in vehicle-kilometres travelled, emissions, congestion, and improvements in public space, walkability, and quality of life.

Guiding Questions:

- Does DRT increase accessibility for previously underserved populations?
- How does DRT influence modal shift and reduce congestion or emissions?
- Are users satisfied with travel experience and perceived safety?
- Does the service improve overall urban liveability (e.g., less traffic, more space for pedestrians, better air quality)?

Box 9: DREAM_PACE recommended mobility, accessibility, and liveability indicators

Strategic Objective	Indicator(s)	Unit / Measurement
Shift travel behaviour	Modal shift	Share of total trips / Passenger-km
Improve accessibility & inclusion	Spatial coverage	Area coverage based on the maximum walking distance to the PT stop
User satisfaction	Degree of satisfaction	Survey score or qualitative assessment

Strategic Objective	Indicator(s)	Unit / Measurement
Safety perception	User perception	Survey score or qualitative assessment
Environmental impact	Emissions reduction	CO_2 equivalent saved / Vehicle Kilometres Travelled (VKT) reduced

4.3.2. Operational Performance and Efficiency

This cluster assesses how efficiently and reliably DRT services operate, ensuring resources are used effectively while meeting user needs. Efficient operations also contribute to environmental sustainability by maximising occupancy, reducing unnecessary trips, and lowering operational emissions. **Key aspects include:**

- **Service reliability**: travel time, delays, waiting times, and transfers.
- **Fleet efficiency**: vehicle occupancy, utilisation, fuel efficiency, and operational costs.
- **Service availability**: robustness during peak demand or disruptions, ensuring dependable mobility for users.

Guiding Questions:

- Are services punctual, reliable, and consistent?
- Are vehicles efficiently utilised and fleet composition optimised for environmental and operational goals?
- Where are operational gaps, and how do they affect service coverage or user satisfaction?

Box 10: DREAM_PACE recommended operational performance and efficiency indicators

Strategic Objective	Indicator(s)	Unit / Measurement
Improve service performance	Average travel time / Delay / Waiting time / Transfers	Minutes / Number of transfers
Manage high operational costs	Occupancy rate	% of vehicle capacity utilised
Availability of service	Service availability	% of time services are operational
Environmental efficiency	Vehicle-km per passenger / Emissions per passenger	VKT / CO_2 per Pkm

4.3.3. Integration, Governance, and Data-Driven Performance

This cluster evaluates systemic coordination, multi-actor collaboration, and technological integration, which are critical for scaling DRT and linking it to broader urban mobility and sustainability strategies. Effective integration also ensures better environmental outcomes, for example, through multimodal trip optimisation and coordination with public transport.

Key aspects include:

- **Service integration**: coordination with public transport, fare systems, MaaS platforms, and urban mobility policies.
- **Data sharing and interoperability**: enabling evidence-based planning, performance monitoring, and continuous improvement.
- **Governance and multi-actor collaboration**: ensuring alignment of goals, operational coordination, and stakeholder engagement.

Guiding Questions:

- Are DRT services integrated into wider mobility systems and policy frameworks?
- Is data collected, shared, and used effectively for planning, monitoring, and optimisation?
- Are governance and collaboration mechanisms facilitating coordinated decision-making and accountability?

Box 11: DREAM_PACE recommended integration, governance, and data-driven performance indicators

Strategic Objective	Indicator(s)	Unit / Measurement
Improve integration of mobility services	Level of service integration	MaaS assessment (0–4 scale: 0, in case of no integration. 1. Integration of information. 2, integration of booking and payment. 3, integration of service offer subscription. 4, integration of societal goals.)
Improve data sharing / integration	Level of data sharing	Qualitative assessment (Data Commons / Collaboratives / Marketplaces / Open Data / None)
Improve multi-actor coordination	Coordination level	Qualitative assessment of collaboration mechanisms

Recommended Toolbox

- **KPI Dashboards:** Track mobility, operational, integration, and environmental metrics.
- **DRT Booking and Dispatch Analytics:** Monitor fleet utilisation, demand-response efficiency, and service coverage in real time.
- **GIS and Accessibility Mapping:** Evaluate spatial coverage, identify underserved areas, and visualise impact on urban accessibility and liveability.
- **User Surveys and Feedback Tools:** Collect qualitative and quantitative data on satisfaction, safety, and perceived accessibility.
- **Scenario-Based Evaluation:** Test performance under different operational and phased scenarios, including environmental impact modelling.
- **Multi-Criteria Analysis & Benchmarking:** Assess trade-offs between coverage, cost, efficiency, environmental benefits, and user outcomes.

Performance monitoring ensures that DRT services remain responsive, sustainable, and socially inclusive, while also supporting broader urban objectives such as reducing congestion, emissions, and enhancing liveability. By clustering metrics around mobility, operational efficiency, and integration, cities can create a coherent framework for evidence-based planning, iterative improvement, and long-term strategic alignment.

4.4. From Strategic Vision to Measurable Action

Chapter 4 has built on the analytical foundation established in Chapter 3, translating insights into a clear and actionable strategic framework for Demand Responsive Transport. By exploring alternative service scenarios, defining strategic objectives, and establishing performance metrics, this phase ensures that DRT planning is not only conceptually sound but also operationally feasible and aligned with broader urban mobility goals.

Experience from consultation activities, literature, and practical pilots demonstrates that scenario-based planning and participatory strategy development are essential for achieving consensus among stakeholders, identifying viable service models, and balancing trade-offs between accessibility, efficiency, and sustainability. Early engagement in defining objectives, targets, and monitoring priorities allows decision-makers to anticipate challenges, optimise resource allocation, and guide implementation in a structured and evidence-based manner.

The outputs of this chapter—scenarios, strategic objectives, and monitoring frameworks—provide a shared roadmap for DRT integration, linking policy ambitions, operational design, and measurable outcomes. Together, they equip planners, operators, and stakeholders with the tools to make informed decisions, adapt services over time, and ensure that DRT contributes effectively to an inclusive, efficient, and sustainable urban mobility system.

Looking forward, the findings of Chapter 4 form the basis for Chapter 5, which focuses on designing and enabling DRT measures, translating strategic objectives into concrete design, technological, governance and social interventions. Subsequently, Chapter 6 addresses the implementation, monitoring, and evaluation of DRT, ensuring that performance metrics and indicators guide adaptive management and continuous improvement of services.

5. Phase 3 - Designing and Enabling DRT Measures and Actions

This chapter marks the transition from strategic planning to concrete action. Building on the selected scenarios, strategic objectives, targets, and indicators defined in Chapter 4, it focuses on the design, enabling, and preparation of Demand Responsive Transport (DRT) measures that can be implemented in practice. At this stage, the emphasis shifts from what role DRT should play within the mobility system to how this role can be realised through coordinated service design, digital solutions, governance arrangements, and social measures.

Figure 14: Measure Planning Phase: Scope & Main Activities (Source: Rupprecht Consult, 2019)

Designing DRT is inherently multilayered, as it requires the alignment of operational decisions, digital systems, institutional responsibilities, financing mechanisms, and user expectations. Unlike conventional fixed-route public transport, DRT should rely on continuous interaction between users, operators, and digital platforms, and therefore demands a higher degree of flexibility, coordination, and adaptability. Decisions taken in this phase directly influence service performance, cost efficiency, user acceptance, and long-term sustainability.

A **co-design approach** is a core principle throughout this chapter. Building on the stakeholder engagement and shared understanding developed in earlier phases, co-design ensures that DRT measures are shaped collaboratively by public authorities, transport operators, technology providers, civil society actors, and users. Rather than treating implementation as a purely technical exercise, co-design enables the integration of local knowledge, operational realities, and user needs into the definition of measures. This is particularly important for DRT, where acceptance, trust, and behavioural change play a decisive role in service uptake and success.

The chapter is structured around four interrelated categories of measures, reflecting the main dimensions that need to be addressed to enable effective DRT implementation:

- **Service design and operational frameworks**, focusing on how DRT services are structured, operated, and integrated into the wider transport system.
- **Digital platforms, integration, and user interfaces**, addressing the technological backbone required for booking, dispatching, optimisation, and multimodal integration.
- **Financing, procurement, and partnership measures**, covering funding models, contractual arrangements, and cooperation between public and private actors.
- **Social and community measures**, ensuring that DRT services respond to social needs, promote inclusion, and build user awareness, trust, and acceptance.

Together, these sections provide a structured overview of the key DRT measures and actions that cities and regions can consider when moving towards implementation. While presented separately, these measures are closely interconnected and should be developed iteratively and in parallel, using co-design processes such as Living Labs, pilot projects, and stakeholder workshops.

By the end of this chapter, planning authorities and practitioners should have a clear understanding of the range of design and enabling measures available, how they relate to strategic objectives, and how they can be combined into coherent, locally adapted DRT solutions. This prepares the ground for **Chapter 6**, which focuses on implementation, monitoring, and evaluation, ensuring that the designed measures deliver measurable impacts and can be continuously improved over time.

5.1. Service design and operational frameworks

Service design is the backbone of any DRT system. It defines how the service operates on the ground, how it interacts with existing public transport, and how well it responds to user needs and local mobility patterns. Decisions taken at this stage determine not only the quality and accessibility of the service but also its operational efficiency, financial sustainability, and long-term scalability.

Unlike conventional fixed-route services, DRT requires a flexible yet robust operational framework, capable of adapting to irregular demand, diverse user groups, and varying spatial contexts. Service design, therefore, needs to balance flexibility with clarity, and innovation with reliability. A co-designed approach is essential to ensure that operational choices are grounded in local realities and aligned with the expectations and capacities of both users and operators.

This section structures service design measures into three interrelated dimensions:

- Defining the service concept and operational model.
- Integrating DRT within the wider transport system.
- Ensuring operational robustness and adaptability over time.

5.1.1. Defining the DRT Service Concept and Operational Model

The first step in service design is to clearly define the core service concept. This includes decisions on the type of DRT service to be offered, its spatial and temporal scope, and the degree of flexibility provided to users. Common DRT models range from fully on-demand, door-to-door services to semi-flexible or stop-based services that operate within defined zones or corridors (as comprehensively explained in Box 4: Types of different operational DRT services (Source: Author, adapted from DREAM_PACE D2.1.1).

Guiding Questions:

- What mobility gaps should DRT primarily address in this context?
- Which level of flexibility is necessary and operationally feasible?
- Should the service prioritise coverage, frequency, speed, or inclusiveness?
- How do different user groups perceive and value flexibility versus reliability?

These choices should be informed by local mobility gaps identified in earlier phases, such as low-density areas, off-peak demand, first- and last-mile connections, or the needs of specific user groups.

Co-design workshops with local stakeholders and users help ensure that the selected model reflects actual travel behaviour rather than theoretical assumptions.

Key design elements include:

- Service area and zoning (e.g. neighbourhood-based, regional, feeder services).
- Stop concepts (virtual stops, fixed stops, door-to-door).
- Operating hours and booking windows.
- Vehicle types and capacity.
- Rules for trip bundling and ridesharing.

Recommended Toolbox

- Mobility **gap and demand analysis.**
- **Scenario testing** of alternative service models.
- **Co-design workshops** with users and operators.
- **Pilot simulations** using historical demand.

5.1.2. Integrating DRT into the Public Transport System

DRT services are most effective when they function as an integrated component of the wider public transport system, rather than as a stand-alone or competing service. Integration decisions shape how DRT complements fixed-route services, supports network efficiency, and contributes to strategic objectives such as modal shift and accessibility.

Operational integration includes alignment with existing routes and timetables, coordinated transfer points, and clearly defined roles between DRT and conventional services. In many contexts, DRT is particularly suited as a feeder service to high-capacity public transport or as a replacement for underperforming fixed routes during low-demand periods.

Guiding Questions:

- How should DRT complement rather than compete with fixed-route services?
- Which routes, time periods, or areas are most suitable for DRT integration?
- How can transfers between DRT and public transport be made seamless?
- How is the DRT service positioned in public communication and branding?

Co-design with public transport authorities and operators is critical to manage concerns around competition, labour conditions, and service quality, and to build shared ownership of the DRT solution.

Key integration aspects include:

- Functional role of DRT within the network (feeder, coverage, substitution).
- Coordination of schedules and transfer points.
- Fare and ticketing principles (even if digital integration follows later).
- Communication of the DRT offer as part of public transport.

Recommended Toolbox

- Public transport **network and timetable analysis.**
- Transfer and interchange **mapping.**

Box 12: Co-Design activities example from DREAM_PACE Pilot; Budapest

Co-Design Activities Example: Budapest Living Lab

In Budapest, the co-design activities of the DREAM_PACE project brought together representatives from the local public authority (BKK), knowledge partners (Mobilissimus), and the higher education institution (BME) within the Living Lab framework to collaboratively refine pilot project scenarios. The discussions focused on service planning, addressing key aspects such as route options, service areas, and infrastructural constraints.

Key outcomes from the co-design session ran in March 2024 included:

- Reduction in the Number of Stops: A strategy aimed at improving service efficiency.
- Legal Issues of Stop Design: Identifying signage and built stop requirements to comply with local regulations.
- Pilot Area Extension to the South: Proposals to expand service coverage, enhancing accessibility for more residents.
- Weekend Service Consideration: Plans for engaging residents through a spring survey, led by Mobilissimus, to assess the need for weekend services.
- Pilot Vehicle: The use of a 19-seat minibus (route number 274) for the pilot phase.
- Development of an Online DRT Request System: Enhancements to telebusz.bkk.hu and integration with the Budapest route planner app (BudapestGO) to streamline service requests.

Figure 15: Budapest's / BKK's DRT vehicle (Source: BKK, 2024)

Figure 16: Experiences from DREAM_PACE - Budapest's pilot Virtual DRT Stops study (Source: BKK, 2024)

These co-design activities are vital for optimising the DRT service, ensuring that it meets local needs while enhancing connectivity and convenience for residents.

5.1.3. Ensuring Operational Robustness, Scalability, and Adaptability

Beyond initial service design, DRT requires an operational framework that can adapt over time. Demand patterns evolve, user expectations change, and services often start as pilots before being scaled up or modified. Planning for adaptability from the outset helps avoid rigid systems that are difficult or costly to adjust.

Operational robustness includes defining clear performance expectations, fallback solutions for disruptions, and procedures for continuous service improvement. Scalability considerations address how the service could be expanded spatially, temporally, or to new user groups, without undermining service quality or financial viability.

Co-design plays a key role in defining realistic operational boundaries and in establishing feedback loops between users, operators, and authorities.

Key considerations include:

- Performance targets linked to strategic objectives.
- Rules for adjusting service areas, stops, or operating hours.
- Procedures for managing peak demand and service disruptions.
- Learning mechanisms from pilots and early operation phases.

The operational choices defined in this section form the foundation for the measures discussed in the following sections. Digital platforms and user interfaces translate service design into real-time booking, dispatching, and information systems. Financing and procurement measures determine how the designed services are funded and delivered. Social and community measures ensure that the service is understood, trusted, and used by the intended user groups.

5.2. Digital platforms, integration and user interfaces

Digital platforms are a critical enabler of Demand Responsive Transport, translating service design principles into real-time operation and user experience. They support booking, dispatching, routing, monitoring, and communication, while also shaping how users perceive and trust the service. For DRT, digitalisation is not primarily about technology sophistication, but about reliability, inclusiveness, and integration within the wider mobility system.

Well-designed digital solutions enable flexible operations, efficient vehicle utilisation, and continuous performance monitoring. At the same time, poorly designed platforms can create barriers to access, exclude certain user groups, or undermine integration with public transport. Digital measures must therefore be co-designed with operators, authorities, and users, ensuring that technology choices respond to local capacities, regulatory frameworks, and digital literacy levels.

This section focuses on three complementary dimensions:

- Core digital architecture for DRT operations.
- Integration with public transport and MaaS ecosystems.
- User interfaces and inclusive access to digital services.

5.2.1. Core Digital Architecture for DRT Operations

At the operational level, DRT relies on a set of interconnected digital components that manage demand, vehicles, and information flows in real time. The core architecture typically includes a dispatching and control system, vehicle-based devices, and data management tools that enable routing optimisation, service monitoring, and reporting.

The level of digitalisation can vary significantly, from semi-manual systems supported by call centres to fully automated platforms using real-time algorithms. Selecting the appropriate level of digital complexity should be guided by service scale, demand patterns, institutional capacity, user acceptance, and available resources. Co-design with users, operators and IT providers is essential to ensure that digital systems are operationally realistic and maintainable over time.

Key architectural elements commonly include:

- A central dispatch or travel management system for trip assignment and routing.
- Vehicle devices enabling positioning, communication, and service updates.
- Data collection and analytics tools for performance monitoring.
- Interfaces for operators and authorities to oversee operations.

Guiding Questions:

- What level of digitalisation is required to support the defined DRT service model?
- Which operational processes need to be automated, and which can remain manual?
- How robust and scalable must the system be to support future expansion?

Recommended Toolbox

- **Assessment of existing** IT systems and operational capacity.
- **Market scan** of DRT software solutions and vendors.
- **Co-design sessions** with operators and technology providers.
- **Pilot testing** of dispatching and routing systems.

Box 13: Digital Advancements Enhancing DRT Services (Source: DREAM_PACE D2.1.1)

Digital Advancements Enhancing DRT Services

In DRT services, the technological landscape varies from systems without any digital elements to partially digitalised setups, and finally to fully digitalised systems. Fully digitalised on-demand transport systems rely on four pivotal architectural components: real-time demand detection, dynamic routing and scheduling, integrated user interfaces, and centralised data management. These components together enable flexible, efficient, and reliable service, while ensuring that operational decisions are data-driven and responsive to user needs. This section delves into the key architectural components essential for the operation of on-demand transportation technology systems, which can be identified as follows:

- **The DRT Travel Dispatch Centre** (TDC): This centre is a pivotal component of the demand-responsive transport system, orchestrating real-time travel information for users and drivers, managing order processes, optimising routes, and monitoring service performance. Through data statistics and analysis, the TDC enhances the DRT service by identifying trends, improving operational efficiency, and continually refining the user experience.

- **DRT vehicle device**: Selection of a suitable vehicle for a DRT service is crucial for success, with factors like passenger capacity and operational needs playing a vital role. On-demand transport vehicles, such as cars, minibuses, and vans, equipped with onboard computers and position-determination systems, enable efficient communication between drivers and the Travel Dispatch Centre (TDC), enhancing service quality and optimising routes for a seamless user experience in the DRT ecosystem.
- **Customer interfaces**: In DRT systems, users are afforded a range of convenient options for requesting transportation, ensuring accessibility and user-friendliness. Through mobile apps, phone calls, web pages, and SMS, users can seamlessly input their travel details, track vehicle locations, and receive real-time information. The service's flexibility allows users to request transportation well in advance or shortly before their desired departure, depending on the system's capabilities, promoting user-centric trip planning. Notably, the use of mobile apps and web-based booking systems enables route optimisation through sophisticated algorithms, ensuring efficiency and inclusivity, especially for passengers with reduced mobility. This comprehensive approach enhances the overall mobility experience for DRT service users.
- **Digital frameworks**: In modern transportation, digital frameworks play a pivotal role in enhancing communication, marketing, and passenger information dissemination. These frameworks include communication tools like mobile and radio communication, IoT for data exchange, marketing strategies such as digital advertising and CRM, and passenger information systems like real-time updates, navigation, and digital ticketing. User feedback collection is vital in assessing service quality and making data-driven improvements to meet community demands effectively in Demand-Responsive Transport (DRT).

These digital models are transforming the way DRT services are delivered, making them more flexible, responsive, and user centric. Digitalization plays a vital role in improving the accessibility and sustainability of DRT options.

5.2.2. Integration with PT and MaaS Ecosystems

Digital integration is a key factor in positioning DRT as part of an integrated mobility system rather than an isolated service. Integration can occur at different levels, ranging from shared information to fully integrated booking, payment, and subscription models within MaaS platforms.

The appropriate level of integration depends on strategic objectives, institutional arrangements, and regulatory frameworks. Early coordination between transport authorities, public transport operators, and digital platform providers is crucial to align data standards, interfaces, and responsibilities. Co-design helps address common challenges such as data ownership, interoperability, and concerns around competition. Key integration dimensions include:

- Information integration (journey planning, real-time updates).
- Booking and payment integration across modes.
- Data sharing between DRT operators and public authorities.
- Alignment with MaaS strategies and platforms where relevant.

Guiding Questions:

- How should DRT be visible and accessible within existing public transport systems?
- Which level of digital integration is realistic in the short and medium term?
- What governance arrangements are needed to manage integrated digital systems?

Recommended Toolbox

- **Assess APIs & Open Data Platforms** for real-time sharing of schedules, vehicle locations, and service updates across operators.
- **Evaluate MaaS & Ticketing Platforms** for booking and payment for seamless multi-modal journeys.
- **Engage users, authorities, operators, and platform providers** via codesign workshops to align objectives, responsibilities, and data standards.

5.2.3. User Interfaces and Inclusive Digital Access

User interfaces are often the most visible part of a DRT service and play a decisive role in user acceptance and uptake. Booking channels, information provision, and communication tools must be intuitive, reliable, and accessible to a diverse range of users, including those with limited digital skills or specific accessibility needs.

Inclusive design requires offering multiple access channels, such as mobile apps, web platforms, and telephone-based booking, and ensuring that digital interfaces are designed according to accessibility standards. Co-design with users, particularly vulnerable or underrepresented groups, helps identify barriers and adapt interfaces accordingly.

Key considerations include:

- Ease of use and clarity of booking processes.
- Accessibility features (language options, visual contrast, assistive technologies).
- Real-time information and feedback mechanisms.
- Trust, transparency, and data protection.

Digital platforms translate service design into daily operation and user experience, but their effectiveness depends on appropriate financing, procurement, and partnership arrangements. The upcoming section “Financing, Procurement, and Partnership Measures” addresses how digital and operational solutions can be contracted, funded, and governed in a way that ensures long-term sustainability, accountability, and innovation.

Guiding Questions:

- Which user groups may face barriers in using digital DRT services?
- Are alternative, non-digital or low-threshold booking options possible?
- How can user feedback be collected and acted upon effectively?

Recommended Toolbox

- **User journey mapping** and usability testing.
- **Accessibility audits** of digital interfaces.
- **Focus groups** with vulnerable or digitally excluded users.
- **Continuous feedback** collection through apps, call centres, or surveys.

5.3. Financing, Procurement, and Partnership Measures

Financing, procurement, and partnership arrangements are decisive for the viability, scalability, and long-term sustainability of DRT services. Even well-designed DRT services and advanced digital platforms can fail if funding mechanisms are unstable, procurement processes are misaligned with service objectives, or roles and responsibilities among actors remain unclear.

DRT often challenges traditional public transport funding and contracting models, as it combines characteristics of public services, digital platforms, and flexible operations. This requires adaptive financing approaches, procurement procedures that allow innovation, and partnership models that balance public control with operational efficiency. Co-design plays a critical role in this phase, enabling authorities, operators, and technology providers to jointly shape feasible and transparent arrangements.

This section addresses three key dimensions:

- Financing models and cost structures.
- Procurement and contracting approaches.
- Partnership and governance arrangements.

5.3.1. Financing Models and Cost Structures

DRT services typically involve a mix of fixed and variable costs, including vehicles, staff, digital platforms, maintenance, and customer support. Unlike conventional fixed-route services, costs and revenues can fluctuate significantly with demand, making financial planning more complex.

Financing models may combine public subsidies, user fares, and complementary funding sources such as regional development funds, social budgets, or climate-related programmes. In many contexts, DRT is justified not solely on cost recovery but on its contribution to accessibility, social inclusion, sustainability, and network efficiency. Clear articulation of the public value of DRT is therefore essential when defining financing frameworks.

Key financing considerations include:

- Capital versus operational expenditure requirements.
- Fare policies and affordability thresholds.
- Subsidy rationales linked to social or territorial objectives.
- Scalability and long-term budget implications.

Guiding Questions:

- What level of public funding is justified based on policy objectives and expected benefits?
- How should fares be structured to balance affordability and cost recovery?
- Which costs are fixed, and which vary with demand and service scale?
- How can financing models support gradual scaling or piloting of services?

Recommended Toolbox

- **Cost structure and lifecycle cost analysis**
- **Review of comparable DRT funding models**
- **Alignment with social, regional, or environmental funding programmes**

5.3.2. Procurement and Contracting Approaches

Procurement processes shape how DRT services are delivered and how risks and responsibilities are distributed. Traditional public transport procurement frameworks may not fully accommodate the flexibility and innovation required for DRT, particularly regarding digital platforms, data management, and adaptive service design.

Authorities can adopt procurement approaches that encourage innovation while maintaining transparency and accountability. These may include functional specifications rather than prescriptive requirements, phased contracts linked to performance milestones, or pilot-oriented procurement allowing iterative refinement. Co-design with procurement units and legal advisors is essential to ensure compliance with public procurement rules while preserving flexibility.

Key procurement dimensions include:

- Definition of service scope and performance requirements.
- Allocation of operational and financial risks.
- Contract duration and scalability provisions.
- Data ownership and interoperability clauses.

Guiding Questions:

- Should DRT be procured as a service, a platform, or a combined solution?
- How can contracts allow flexibility while ensuring service reliability?
- Which risks should be produced by the public authority, and which by operators?
- How can procurement support learning and adaptation during pilots?

Recommended Toolbox

- **Functional** and outcome-based **tender specifications.**
- **Market dialogue** and pre-procurement consultations.
- **Innovation-friendly procurement** procedures pilots.
- **Legal review** of data, platform, and interoperability clauses.

5.3.3. Partnership and Governance Arrangements

Effective DRT delivery relies on cooperation among multiple actors, including public authorities, transport operators, technology providers, and sometimes community organisations or private mobility providers. Clear partnership and governance arrangements help align incentives, coordinate responsibilities, and manage interfaces between actors.

Partnership models can range from fully public provision to public-private partnerships or operator-led services under public regulation. Regardless of the model, transparent governance structures are needed to oversee performance, manage data, and adapt services over time. Co-design helps establish shared ownership and trust, particularly in contexts where DRT challenges existing operational roles or market structures.

Guiding Questions:

- Which actors are best placed to plan, operate, and manage the DRT service?
- How can partnerships support innovation without undermining public objectives?
- What governance structures are needed to oversee integrated services?

Key governance aspects include:

- Role allocation across planning, operation, and monitoring.
- Coordination between transport, social, and digital policy domains.
- Mechanisms for stakeholder involvement and conflict resolution.
- Accountability and reporting structures.

Financing, procurement, and partnerships define the institutional and economic conditions for DRT delivery. However, long-term success also depends on social acceptance, community engagement, and trust. Section 5.4 Social and Community Measures focuses on how DRT services can be embedded within local communities, supported by communication, outreach, and capacity-building actions that encourage uptake and sustained use.

5.4. Social and community measures

Demand Responsive Transport is not only a technical or operational intervention, but a service that directly interacts with people's daily routines, habits, and perceptions of mobility. Even well-designed and well-funded DRT services may underperform if users do not understand the service, trust it, or perceive it as relevant to their needs. Social and community measures, therefore, play a decisive role in ensuring acceptance, uptake, and sustained use.

Social measures focus on engaging users and communities, addressing behavioural and perceptual barriers, and building the skills and confidence needed to use DRT services effectively. This is particularly important for user groups that are more likely to benefit from DRT, such as older adults, people with reduced mobility, low-income households, or residents of rural and peri-urban areas. Co-design remains central in this phase, ensuring that services are shaped not only for users, but with them.

This section addresses three complementary dimensions:

- Community engagement and trust-building.
- Communication, awareness, and behaviour change.
- Capacity-building and digital inclusion.

5.4.1. DRT Community Engagement and Trust-Building

Community engagement is essential to ensure that DRT services respond to real needs and are perceived as legitimate and reliable alternatives to private car use or informal transport options. Engagement should go beyond consultation and involve continuous dialogue before, during, and after implementation.

Trust-building is particularly critical in areas where previous mobility services have been reduced or where new digital services are met with scepticism. Early involvement of community representatives, local organisations, and user groups helps identify concerns related to reliability, safety, accessibility, or affordability and allows these to be addressed proactively.

Key engagement considerations include:

- Representation of diverse user groups and neighbourhoods.
- Transparency about service objectives, limitations, and trade-offs.
- Mechanisms for ongoing feedback and adaptation.
- Visibility of public authority commitment and accountability.

Guiding Questions:

- Which community groups are most affected by current mobility gaps?
- What concerns or expectations might influence trust in the DRT service?
- How can feedback be continuously integrated into service improvement?

Recommended Toolbox

- **Community workshops and neighbourhood meetings.**
- **Engagement through local NGOs, social services, or citizen groups.**
- **Structured feedback channels (surveys, hotlines, user panels).**

Box 14: PPP Collaborations for Codesign of DRT Solutions

Bürgerbus - Community-Driven Demand Responsive Transport

The Bürgerbus in Baden-Württemberg demonstrates how volunteer-led, locally embedded DRT services can enhance mobility and social cohesion in rural areas. The Bürgerbus is a voluntary, community-driven transport service developed to fill gaps in areas where conventional fixed-route public transport is uneconomic. Typically operating in rural regions, the service relies on local volunteers to drive small minibuses along flexible routes and schedules, responding to the needs of residents while complementing existing transport networks.

Beyond providing transport, the Bürgerbus strengthens social ties and inclusion, particularly for older adults and people with reduced mobility. Its community-led approach fosters trust and acceptance, as residents actively participate in planning, scheduling, and operating the service. Municipalities can support the initiative through funding, vehicles, insurance, and integration into local transport planning, while volunteer drivers and civil associations handle day-to-day operations, communication, and local outreach.

Financing typically combines state grants, municipal support, sponsorships, small participation funds, and fares. This mixed funding model ensures both affordability and sustainability while maintaining strong local ownership. Establishing a Bürgerbus requires careful planning, including community engagement, defining operational roles, securing volunteers, and addressing legal and insurance requirements.

The Bürgerbus illustrates how social and community measures such as early engagement, trust-building, and co-creation are crucial for successful DRT implementation. By empowering residents to co-manage the service, the Bürgerbus not only improves mobility access but also fosters social participation and local resilience.

Figure 17: DREAM_PACE's Engagement Activities in Baden-Württemberg Region (Source: nexus, 2025)

5.4.2. Communication, Awareness, and Behaviour Change

Clear and targeted communication is essential to ensure that potential users understand how DRT works, when it can be used, and how it complements existing transport services. DRT services often differ significantly from conventional public transport, and unclear communication can lead to misconceptions, underuse, or frustration.

Communication strategies should be tailored to different user segments and mobility needs, using multiple channels and formats. Beyond information provision, social measures can also support behaviour change by addressing habits, perceived risks, and social norms related to car use or public transport.

Key communication aspects include:

- Simple and consistent service explanations.
- Emphasis on concrete benefits and use cases.
- Alignment with broader mobility and sustainability narratives.
- Use of trusted local communication channels.

Guiding Questions:

- What do different user groups need to know to feel confident using DRT?
- Which communication channels are most trusted and accessible locally?
- How can DRT be positioned as part of an integrated mobility system?
- What messages can support shifts away from private car use?

Recommended Toolbox

- User-oriented **service guides and visual explainers.**
- **Targeted campaigns** for specific user groups.
- **Local ambassadors** or **peer-to-peer communication.**

5.4.3. Capacity-Building and Digital Inclusion

While digital platforms are central to most DRT services, not all users have the same levels of digital access, literacy, or confidence. Capacity-building and digital inclusion measures are therefore essential to avoid excluding precisely those groups that DRT aims to support.

Capacity-building can target both users and local stakeholders, including municipal staff, social workers, and community organisations who may act as intermediaries or multipliers. Providing alternative access channels, such as telephone booking or assisted booking points, is often necessary to ensure equitable access.

Key inclusion considerations include:

- Digital literacy and access gaps among users.
- Availability of non-digital or assisted booking options.
- Training needs of frontline staff and intermediaries.
- Long-term support mechanisms rather than one-off training.

Guiding Questions:

- Which user groups may face barriers to digital access or use?
- What alternative booking and support mechanisms are required?
- How can local actors support users in accessing the service?
- How can inclusion measures be maintained as services scale?

Recommended Toolbox

- Digital literacy **training and support sessions.**
- **Assisted booking** via phone, kiosks, or community centres.
- **Training** for municipal staff and service operators.
- **Monitoring of usage patterns** to detect exclusion risks.

5.5. From Strategic Intent to Integrated Action

Chapter 5 translates strategic objectives and scenarios into measures and action fields that enable the real-world deployment of Demand Responsive Transport. It highlights that successful DRT implementation depends not on isolated interventions, but on the careful combination of service design, digital systems, financing, partnerships, and social and community measures.

Service design and operational frameworks define how DRT functions on the ground, shaping accessibility, reliability, and integration with the wider public transport network. Digital platforms and user interfaces act as the backbone of DRT operations, enabling booking, dispatch, data exchange, and seamless multimodal integration. Financing, procurement, and partnership measures determine whether services are viable, scalable, and resilient over time, while social and community measures ensure that DRT is understood, trusted, and used by those it is intended to serve.

Experience from the DREAM_PACE project and international practice highlights that these measure categories are mutually reinforcing. Technically robust services may fail without user trust and inclusion; socially well-received services may remain marginal without sustainable financing; and innovative digital tools deliver limited value without operational clarity and institutional coordination. Integrating these measures into coherent implementation packages is therefore essential to avoid fragmented solutions and to maximise the impact of DRT within local mobility systems.

By embedding co-design and user-centricity as guiding principles throughout this phase, Chapter 5 also underscores the importance of continuous collaboration among public authorities, operators, technology providers, and communities. This approach supports context-sensitive solutions, strengthens ownership among stakeholders, and increases the adaptability of services as needs evolve.

The measures and actions defined in this chapter create the conditions for implementation. Chapter 6 builds on this foundation by focusing on Implementation, Monitoring, and Evaluation, guiding how DRT services can be launched, assessed, and refined over time to ensure long-term effectiveness, accountability, and contribution to sustainable, inclusive, and resilient mobility systems.

Box 15: SHAREPLACE project approach to Co-Design

Best Practice: SHAREPLACE approach to co-design (Interreg Central Europe 2014-2019)

Within the framework of the SHAREPLACE project, co-design was employed as a structured and iterative process to develop shared mobility solutions in collaboration with local stakeholders. The process started with two to four workshops in each pilot area, complemented by continuous documentation of discussions, ideas, and decisions. This documentation supported transparency, learning, and later reflection on how solutions evolved.

Although each pilot followed its own timeline and rhythm, a common pattern emerged across sites. This pattern can be described as a co-design loop, meaning an iterative cycle of problem exploration, solution development, testing, and re-adjustment in close collaboration with stakeholders. The loop does not follow a rigid sequence but provides a flexible framework that can be adapted to local contexts.

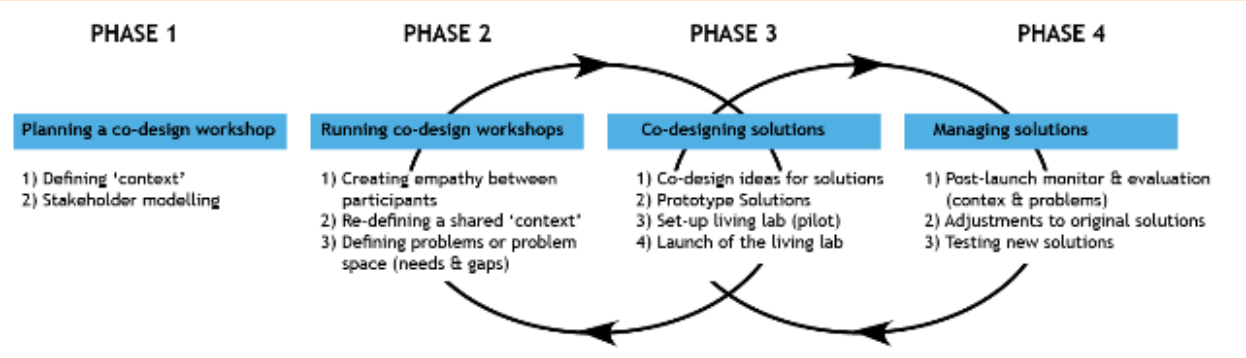


Figure 18:Interrelated Co-Design approach (Source: SHAREPLACE, 2018)

In practice, the process evolved through four main phases. It started with a context and stakeholder phase, in which local conditions were analysed, and relevant actors were identified. This was followed by a problem framing and ideation phase, using co-design workshops to explore needs, challenges, and potential solutions. In the prototyping and testing phase, selected solutions were developed and trialled in Living Labs under real-life conditions. Finally, a reflection and adaptation phase allowed teams to collect feedback, adjust the solutions, and, if needed, repeat parts of the loop.

This phased and iterative approach helped ensure that solutions were not only technically feasible but also socially acceptable, context-sensitive, and supported by those expected to use and operate them.

6. Phase 4 - Implementation, Monitoring, and Learning for DRT

The Implementation, Monitoring, and Learning phase marks the transition from planning and design to real-world delivery of Demand Responsive Transport services. At this stage, strategic intentions and co-designed measures are translated into operational practice, tested in real conditions, and continuously refined based on evidence and experience. Effective implementation is therefore inseparable from robust monitoring, systematic evaluation, and structured learning processes.

Figure 19: Implementation & Monitoring Phase: Scope & Main Activities (Source: Rupprecht Consult, 2019)

For DRT, this phase is particularly critical due to the dynamic nature of on-demand services, their reliance on digital systems, and their close interaction with users and existing public transport networks. Unlike static infrastructure measures, DRT services evolve over time in response to demand patterns, operational constraints, and behavioural change. Continuous monitoring and evaluation are essential to ensure that services remain aligned with strategic objectives, deliver tangible benefits, and adapt to changing local conditions.

This chapter focuses on how public authorities and operators can establish integrated monitoring and evaluation frameworks that combine operational data, user feedback, and outcome-oriented indicators. It emphasises the importance of moving beyond purely technical performance tracking to also assess social, accessibility, environmental, and governance-related impacts. In doing so, monitoring becomes not only a control mechanism but a learning tool that supports informed decision-making and iterative service improvement.

In addition, the chapter addresses how insights from monitoring and evaluation can inform scaling strategies and long-term sustainability. Learning from pilots, early implementation phases, and operational experience

enables cities and regions to adjust service models, refine funding and governance arrangements, and gradually expand DRT in a resilient and cost-effective manner.

The chapter is structured into three subchapters:

- Monitoring DRT Operations and Service Quality, focusing on real-time and periodic performance tracking.
- Evaluating DRT Outcomes and Social Impacts, examining how DRT contributes to wider mobility, inclusion, and sustainability objectives.
- Learning, Scaling, and Ensuring Long-Term Sustainability, addressing how evidence and experience can support adaptation, replication, and long-term viability.

Together, these sections provide guidance on how DRT can move from pilot implementation to a mature, accountable, and continuously improving component of integrated mobility systems.

6.1. Monitoring DRT Operations and Service Quality

Building on the previous SUMP phases and tasks, and especially Chapter 4.3 that establishes a structured framework of DRT performance indicators, this subchapter focuses on how these metrics can be systematically monitored, interpreted, and used in practice. While Chapter 6.2 defines what should be measured to assess mobility, accessibility, liveability, operational efficiency, and governance performance, this section translates these metrics into ongoing monitoring activities that support adaptive management and continuous improvement.

Monitoring is particularly critical for DRT due to its dynamic and demand-driven nature. Service performance can fluctuate significantly depending on demand patterns, booking behaviour, fleet availability, and integration with the wider public transport system. As a result, monitoring should not be treated as a one-off evaluation exercise, but as a continuous process closely linked to daily operations, contractual arrangements, and strategic oversight.

Effective monitoring enables cities and operators to track whether DRT services are delivering the intended outcomes, including improved accessibility for priority groups, efficient use of resources, environmental benefits, and stronger integration within the mobility system. At the same time, it supports transparency and accountability, particularly where public funding or policy commitments are involved.

6.1.1. Roles and Responsibilities in Monitoring and Evaluation

Effective monitoring and evaluation require clearly defined responsibilities among all stakeholders involved in DRT operations. Typically, local authorities or transport agencies oversee the overall M&E framework, ensuring alignment with strategic objectives and regulatory compliance. Service operators manage day-to-day data collection, including vehicle tracking, trip records, and service performance metrics. Technology providers maintain digital platforms and analytics tools, enabling real-time monitoring and reporting. Users also contribute through feedback systems, surveys, or participatory assessments. Clearly delineating responsibilities ensures accountability, enables timely decision-making, and supports the continuous improvement of DRT services.

To be meaningful, monitoring systems should prioritise outcome-oriented indicators, combining quantitative operational data with qualitative insights from users and frontline staff. This ensures that performance assessment goes beyond technical efficiency and captures broader social, environmental, and liveability impacts.

6.1.2. Linking Monitoring Activities to the Indicator Clusters

Monitoring activities should be structured to reflect the three indicator clusters introduced earlier in Chapter 4.3:

- **Mobility, Accessibility, and Liveability Impacts:** Monitoring in this cluster focuses on whether DRT services effectively expand travel opportunities, improve user experience, and contribute to environmental and liveability goals. This includes tracking changes in modal shift, spatial coverage, perceived safety, and user satisfaction over time, as well as monitoring emissions and vehicle-kilometres travelled where data availability allows.
- **Operational Performance and Efficiency:** This cluster requires close-to-real-time monitoring of service reliability and resource use. Key aspects include waiting times, travel times, delays, vehicle occupancy, and service availability. Continuous tracking supports rapid identification of inefficiencies, peak-demand challenges, or recurring service disruptions, enabling timely operational adjustments.
- **Integration, Governance, and Data-Driven Performance:** Monitoring here is more qualitative and strategic, focusing on the degree of integration with public transport, MaaS platforms, and governance arrangements. It includes assessing data-sharing practices, coordination mechanisms between actors, and the maturity of service integration, as defined in the indicator framework of Chapter 2.3.

Aligning monitoring activities with these clusters helps ensure consistency between strategic objectives, indicators, and day-to-day operational oversight.

Guiding Questions:

- Are the indicators defined earlier being regularly measured, reviewed, and discussed?
- Which indicators require real-time monitoring, and which are better suited for periodic evaluation?
- Do monitored results reveal differences in service quality across areas, times, or user groups?
- How are environmental and liveability impacts captured alongside operational performance?
- Are monitoring results actively used to adjust service design, contracts, or governance arrangements?
- Is performance information shared transparently with stakeholders and decision-makers?

Recommended Toolbox

- **Operational dashboards** linked to performance indicators: Digital dashboards integrating booking, dispatch, and vehicle data enable continuous tracking of key operational and efficiency indicators.
- **Periodic performance reporting**: Monthly or quarterly reports synthesise operational data, user feedback, and environmental indicators, supporting strategic review and accountability.
- **User surveys and feedback tools**: short surveys, ratings, and complaint analysis provide qualitative input for mobility, accessibility, safety perception, and satisfaction indicators.
- **Environmental impact estimation tools**: Simple calculation methods or modelling tools help estimate emissions reductions, vehicle-kilometres saved, or efficiency gains attributable to DRT.

6.1.3. Real-Time and Periodic Monitoring in DRT Systems

Monitoring DRT performance requires a **combination of real-time and periodic approaches**, reflecting the different temporal dynamics of the indicator clusters defined in Chapter 2.3. Real-time monitoring is essential for managing the operational volatility of demand-responsive services, allowing operators and authorities to respond immediately to fluctuations in demand, service disruptions, or user experience issues. In contrast, periodic monitoring supports strategic reflection, policy learning, and accountability by assessing longer-term trends, cumulative impacts, and progress toward broader mobility, social, environmental, and liveability objectives.

- **Real-time monitoring** is particularly relevant for the **Operational Performance and Efficiency** cluster. Indicators such as waiting times, travel times, vehicle occupancy, service availability, and route efficiency benefit from continuous tracking through digital platforms, GPS systems, and booking data. This enables rapid operational adjustments, resource reallocation, and service optimisation, ensuring reliability and efficiency in day-to-day operations.
- **Periodic monitoring**, typically conducted on a monthly, quarterly, or annual basis, is more appropriate for assessing **Mobility, Accessibility, and Liveability Impacts**, as well as **Integration, Governance, and Data-Driven Performance**. Indicators related to modal shift, accessibility for priority groups, user satisfaction, safety perception, emissions reduction, service integration, and governance maturity require longitudinal analysis and qualitative interpretation. These impacts often emerge over time and depend on cumulative behavioural, spatial, and institutional changes rather than short-term operational fluctuations.

Combining real-time and periodic monitoring ensures that DRT services remain operationally responsive while strategically aligned with long-term urban mobility and sustainability goals. Together, these approaches create a robust feedback loop, enabling cities to fine-tune services in the short term while learning, adapting, and scaling DRT solutions over the longer term.

Box 16: Good Practice: Monitoring and Evaluation in the Sprinti DRT Project

Monitoring and Evaluation in the Sprinti DRT Project

Sprinti is an on-demand bus service in the Hannover region, developed to enhance public transport accessibility and support emission reduction goals. Originally launched as a pilot in three municipalities, sprinti has since been expanded across the outer Hannover region and now operates in 12 municipalities. It serves as a reliable mobility solution, particularly for people in peripheral areas. Sprinti also explores multi-purpose use of vehicles during low-demand periods, optimising resource use.

Figure 20: Sprinti DRT Vehicle (Source:Region Hannover)

Monitoring and Evaluation Processes:

- **Continuous Demand Tracking:** Sprinti regularly monitors ride requests and fulfilment rates to adapt service availability based on demand trends. This proactive approach helps identify demand spikes, enabling Sprinti to adjust resources accordingly and maintain consistent service quality, even during fluctuations.

- **Dynamic Resource Allocation**: Through real-time monitoring, Sprinti dynamically allocates driver shifts and vehicle usage to match demand levels in different areas. This flexible resource management supports balanced availability across municipalities, ensuring that service levels remain high while optimising operational efficiency.
- **Integration of Multimodal Data**: Sprinti evaluates its service in conjunction with fixed-line transit networks, using monitoring data to align on-demand services with existing transit options. This helps reduce redundancies, ensuring Sprinti's resources are focused where they're most needed and enhancing the overall transit experience for users.

Learning from Sprinti:

Sprinti's comprehensive monitoring and evaluation framework highlights the importance of real-time data tracking, adaptive resource allocation, and multimodal integration. These practices ensure that DRT services remain responsive, efficient, and aligned with local mobility needs, setting a valuable model for future DRT implementations focused on sustainable, data-driven operations.

6.2. Evaluating DRT Outcomes and Social Impacts

Once DRT operations are underway and performance is being monitored, evaluating the broader outcomes and social impacts of the service becomes critical. While real-time monitoring supports operational responsiveness, systematic outcome evaluation is required to determine whether DRT achieves its strategic objectives, delivers social benefits, and justifies continuation, scaling, or redesign. In practice, this requires moving beyond general aspirations (such as "improving accessibility" or "enhancing equity") towards clearly defined evaluation questions, indicators, comparison points, and decision criteria.

Outcome evaluation should therefore be structured around three interrelated clusters of performance metrics, each associated with specific evaluation questions, methods, and interpretations.

6.2.1. Mobility, Accessibility, and Liveability Impacts

Evaluation within this cluster should examine whether DRT produces measurable changes in travel behaviour, accessibility, and perceived quality of life, particularly for groups previously underserved by conventional public transport. In practical terms, this can be assessed through:

- **Before-and-after comparisons**, for example, changes in average walking distance to the nearest service point, changes in travel time to key destinations (healthcare, education, retail), or changes in the number of trips made by specific user groups.
- **User segmentation**, distinguishing impacts on elderly users, people with reduced mobility, low-income households, and general users rather than relying on aggregate figures alone.
- **Survey-based indicators**, such as perceived accessibility, perceived safety, and satisfaction with service reliability and booking processes, collected at regular intervals.
- **Observed behavioural changes**, such as reductions in personal taxi use, or car trips for specific trip purposes.

Environmental and liveability impacts should be assessed through proxy indicators, such as changes in vehicle kilometres travelled, estimated emissions, or reductions in low-occupancy car trips, acknowledging that short-term pilots may not produce large absolute changes but may indicate directional trends.

Rather than asking only whether "accessibility improved," evaluation should therefore ask, for example: Which groups gained access to which destinations, by how much, and with what level of reliability compared to previous conditions?

Guiding Questions:

- Are DRT services improving travel options for underserved populations?
- Has there been a measurable modal shift from private cars to shared or public transport?
- Are environmental impacts (emissions, congestion, vehicle-km) showing improvement?
- How do users perceive safety, convenience, and travel reliability?
- Are urban public spaces being positively affected by DRT operations (e.g., reduced traffic, better walkability)?

6.2.2. Operational Performance and Efficiency

Beyond continuous monitoring, outcome evaluation should assess whether the chosen operational model proves sustainable, reliable, and efficient over time. This can be done through:

- **Trend analysis of key indicators** such as cost per passenger trip, average occupancy, wait times, cancellation rates, and service coverage stability.
- **Benchmarking**, either against fixed-route services serving similar areas or against comparable DRT services in other regions.
- **Scenario comparison**, such as comparing different fleet sizes, service hours, or booking rules to understand which configurations produce the best balance between coverage, cost, and user satisfaction.

Guiding Questions:

- Are vehicle occupancy rates and route utilisation meeting operational targets?
- Are travel times, waiting times, and service reliability improving consistently?
- Are operational costs aligned with budget and financial sustainability objectives?
- How does performance compare to baseline or similar services (benchmarking)?

The purpose is not only to confirm whether the service "works," but to identify which design choices (zoning, booking windows, integration with fixed routes, pricing) contribute to positive or negative outcomes, and therefore inform future adjustments.

6.2.3. Integration, Governance, and Data-Driven Performance

Evaluation in this cluster should focus on whether DRT functions as a meaningful part of the wider mobility system rather than as an isolated pilot. This includes:

- **Assessing whether DRT trips connect effectively** with fixed-route public transport, measured through transfer times, missed connections, or combined ticket usage.
- **Evaluating the level of institutional integration**, such as data-sharing agreements, joint planning processes, or coordinated communication strategies.
- **Reviewing governance arrangements**, including regulatory adaptations, stakeholder roles, and decision-making processes, to understand whether they enable or constrain scaling and long-term embedding.

Guiding Questions:

- How well is DRT integrated with public transport and multimodal mobility platforms?
- Are data-sharing mechanisms functional and supporting evidence-based planning?
- Is multi-actor coordination (operators, authorities, tech providers) effective and aligned with mobility goals?
- Are governance structures adaptable to emerging challenges or scaling needs?

Qualitative methods, such as stakeholder interviews, internal workshops, and process reviews, are particularly important here, as systemic integration cannot be captured through quantitative indicators alone.

6.2.4. Social and Equity Considerations

Social impact evaluation should explicitly examine whether DRT contributes to more equitable mobility outcomes, rather than assuming that flexibility automatically leads to inclusion. This requires:

- **Disaggregated data collection** by age, gender, disability status, income proxy, or neighbourhood type.
- **Targeted surveys or interviews** with users and non-users in vulnerable groups to understand barriers to uptake.
- **Analysis of who benefits and who does not, and why**, including digital access, affordability, trust, and awareness.

This helps prevent situations in which DRT primarily serves already mobile populations while failing to reach those most in need of improved access.

Guiding Questions:

- Are vulnerable groups (elderly, people with reduced mobility, low-income households) adequately served?
- Is DRT enhancing social inclusion and mobility justice?
- How satisfied are users with accessibility, safety, and affordability?
- Are there differences in service uptake or satisfaction across demographics or neighbourhoods?

6.2.5. From Evaluation to Decision-Making

Finally, outcome evaluation should be explicitly linked to decision points, such as whether to continue, expand, redesign, or discontinue a service. This requires defining, at least qualitatively, what constitutes “success” or “failure” in the local context, even if these criteria remain provisional during early pilots.

Rather than aiming for definitive judgments, evaluation should be understood as a learning process that supports adaptive planning, evidence-based policy adjustment, and gradual refinement of DRT as part of a broader sustainable and inclusive mobility strategy.

6.3. Learning, Scaling, and Ensuring Long-Term Sustainability

This subchapter focuses on how cities can leverage insights from monitoring and evaluation to refine DRT services, expand their reach, and ensure long-term operational and financial sustainability. Beyond simply tracking performance, this phase emphasises learning from practical experience, adapting services to evolving urban mobility needs, and embedding resilience in organisational, technological, and financial structures.

6.3.1. Learning and Continuous Improvement

Learning requires systematically collecting, analysing, and applying data from monitoring activities to inform operational decisions. This can include refining routes, schedules, vehicle allocation, and digital interfaces based on observed demand, user feedback, and performance metrics. Continuous learning supports a culture of responsiveness, enabling cities to anticipate changes in mobility patterns or user needs. Key approaches include:

- **Regular review cycles** for operational and user data to identify patterns and anticipate emerging needs.
- **Stakeholder workshops** to discuss evaluation outcomes, address challenges, and co-create adaptive solutions.
- **Benchmarking** against comparable DRT initiatives to identify best practices and innovative solutions.

Guiding Questions:

- What patterns emerge from user feedback and real-time monitoring?
- Which operational adjustments are needed to better meet user demand?
- How can insights from pilots or small-scale implementations be applied to broader service expansions?

6.3.2. Scalability of DRT Services

Scalability in the context of DRT refers to the system's ability to expand its service offerings in response to changing user demands, geographic coverage, and operational requirements. This capability is essential for accommodating growth and ensuring that the DRT solution remains relevant over time.

Key dimensions of scalability are:

- **Geographic expansion**: A scalable DRT system must be able to extend its operational boundaries. This includes the capability to serve new neighbourhoods or districts, especially those with limited public transport access. Understanding demographic shifts and urban development plans can guide strategic geographic expansions, ensuring that DRT services align with areas of emerging need.

Guiding Questions:

- What operational, financial, or technological barriers could constrain scaling?
- How can services be incrementally expanded without compromising quality?

- **Service diversification**: Scalability also encompasses the ability to diversify service offerings. This might include introducing different vehicle types—such as larger vans for peak times or smaller electric vehicles for low-density areas—or adjusting service models to cater to specific user groups, such as seniors or persons with disabilities. Flexibility in service design allows DRT operators to adapt to varied user profiles and preferences.
- **Operational scaling:** Efficient scaling involves optimising operational processes to handle increased demand without sacrificing service quality. This includes the ability to integrate more vehicles into the fleet, hire and train additional drivers, and implement advanced scheduling algorithms that efficiently manage resource allocation based on real-time demand patterns.
- **Technological adaptability**: The technology underpinning DRT solutions must be designed for scalability. This includes robust booking platforms that can handle higher volumes of users and enhanced data analytics capabilities to track usage patterns, user feedback, and performance metrics. The infrastructure should allow for seamless integration with other transport services, enabling users to transition smoothly between different modes of transportation.
- **Community engagement and support**: Building a scalable DRT system also relies on fostering strong community ties and stakeholder engagement. Engaging local communities in the planning and evaluation processes ensures that services meet their needs. By fostering ownership among residents, operators can promote user loyalty, encourage higher ridership and facilitate service expansion.

6.3.3. Ensuring Long-Term Sustainability and Resilience

Ensuring the long-term sustainability of DRT systems encompasses operational efficiency, technological resilience, and diverse funding strategies.

- **Operational Efficiency:** Sustainable operations hinge on establishing practices that maintain service quality while managing costs. This includes developing training programs for staff, implementing rigorous maintenance schedules for vehicles, and employing efficient scheduling systems that maximise resource use. An ongoing feedback loop with users will help refine these operational practices, ensuring they remain aligned with user expectations and needs.
- **Technological Resilience**: The integration of advanced technology is essential for sustaining DRT systems over the long term. Investing in scalable infrastructure—such as cloud-based systems that can grow with demand—ensures that the service remains relevant and effective. Moreover, exploring innovative solutions like electric or autonomous vehicles can reduce operational costs and environmental impact, reinforcing the sustainability of the service.
- **Diverse Funding Models**: Financial sustainability is crucial for the longevity of DRT services. A diversified funding approach that combines public investments, fare revenues, and potential partnerships with private entities can create a more resilient financial base. Engaging community stakeholders in discussions about funding not only promotes transparency but also fosters a sense of shared ownership, which can lead to increased support for the DRT initiative.

The interplay between scalability, funding, and long-term sustainability is fundamental to the success of DRT initiatives. By developing a flexible service model that harnesses technology and data, cities can create responsive DRT systems that meet the diverse needs of their communities. Furthermore, a strategic focus on operational efficiency and financial diversity will enhance resilience, ensuring that DRT remains a viable and integral component of urban mobility solutions. This holistic approach paves the way for DRT systems to thrive, adapt, and contribute to sustainable urban development over time.

By integrating learning, scaling, and sustainability principles, cities can transform DRT from a pilot or niche service into a robust component of the broader urban mobility system. Embedding adaptive governance and

continuous feedback loops ensures that services remain responsive to user needs, efficient in operation, and aligned with long-term policy objectives.

6.4. From Monitoring & Evaluation to Sustainable DRT Implementation

The Implementation, Monitoring, and Learning phase consolidates the operationalisation of DRT services by connecting performance insights with adaptive management, scalability, and sustainability strategies. Through real-time and periodic monitoring, systematic evaluation of social, environmental, and operational outcomes, and iterative learning loops, cities gain the capacity to refine services, address emerging challenges, and align DRT with broader mobility and policy objectives. The insights generated in this phase provide the evidence base necessary to scale services effectively, ensure long-term financial and operational sustainability, and embed DRT as a responsive, user-centred component of the urban mobility ecosystem.

Building on these foundations, the final chapter draws together lessons from each planning and implementation phase to provide concluding remarks, actionable policy recommendations, and a comprehensive checklist of activities. This serves as a practical guide for decision-makers and practitioners seeking to implement, monitor, and sustain successful DRT solutions in diverse urban contexts.

7. Concluding Remarks: Advancing DRT Planning

This chapter consolidates insights from previous phases of DRT planning, from preparation to implementation, and provides actionable guidance for decision-makers, transport authorities, and operators. It highlights key takeaways, evidence-based policy recommendations, and lessons learned throughout the SUMP-aligned DRT planning process. By bridging strategic objectives with operational realities, this chapter supports the adoption, scaling, and long-term sustainability of DRT services in diverse urban and peri-urban contexts.

The chapter is divided into two main subchapters:

- Key Takeaways and Policy Recommendations – synthesising lessons, providing guidance tailored to each SUMP phase, and highlighting general recommendations for inclusive, sustainable, and scalable DRT solutions.
- Recommended Activities Checklist – offering a practical, phase-by-phase guide to implementing DRT interventions, ensuring consistency with the SUMP framework and local mobility goals.

7.1. Key Takeaways & Policy Recommendations

Demand Responsive Transport represents a strategic, flexible solution to the accessibility challenges faced by rural and peripheral areas across Central Europe. Integrating DRT within existing public transport networks, the DREAM_PACE project envisions a more connected and inclusive mobility landscape that bridges urban-rural divides, enhancing access to essential services, education, and economic opportunities for residents in underserved areas. By leveraging the SUMP methodology, DREAM_PACE aligns DRT planning with broader mobility goals, creating a collaborative framework that prioritises adaptability, scalability, and long-term sustainability, ensuring DRT solutions are resilient and responsive to evolving needs.

This subchapter distils the key lessons from the preceding chapters and outlines evidence-based recommendations for DRT planning, drawing on operational insights, stakeholder engagement experiences, and SUMP-aligned methodology. Recommendations are organised into **general policy guidance** and **phase-specific guidance**, reflecting the sequential approach of SUMP-based DRT integration.

General Policy Recommendations and key takeaways:

1. **Embed DRT into broader mobility strategies:** Ensure DRT is aligned with regional and local public transport policies, MaaS platforms, and sustainability goals to maximise accessibility, environmental benefits, and modal shift.
2. **Prioritise inclusivity and social equity:** Design services to meet the mobility needs of underserved populations, including older adults, people with reduced mobility, youth, and low-income households.
3. **Implement co-design processes:** Engage stakeholders through participatory design and consultation workshops to ensure services meet real mobility needs, increase adoption, and build shared ownership.
4. **Adopt data-driven, adaptive planning:** Use real-time and periodic monitoring to inform operational adjustments, evidence-based decisions, and iterative service improvements.
5. **Foster multi-actor collaboration:** Promote integrated governance between transport authorities, operators, technology providers, and community stakeholders to strengthen service coordination, scalability, and accountability.
6. **Ensure financial and operational resilience:** Develop diversified funding models combining public investment, fare revenues, and private partnerships, while optimising operational efficiency and technology integration for long-term sustainability.

7.2. Action Checklist for Integrating DRT in SUMPs

The SUMP-based Action Checklist provides a practical roadmap for implementing Demand Responsive Transport (DRT) in urban and regional mobility systems.

The Action Checklist is structured around the four main SUMP phases: Preparation & Analysis, Strategy Development, Measure Planning & Co-design, and Implementation, Monitoring & Learning; it translates strategic objectives into concrete actions. For each phase, key measure pillars guide the activities, ensuring that operational, digital, financial, social, and governance dimensions are addressed in an integrated manner. Recommended tools and methods are provided to support planners, operators, and stakeholders in executing activities effectively, promoting evidence-based decision-making, participatory planning, and sustainable service design. This checklist serves as a reference for cities seeking to embed DRT within existing mobility frameworks while ensuring inclusivity, efficiency, and long-term resilience.

Phase 1 - Building a Baseline for DRT Integration in Mobility Systems

Phase Objective: Establish a solid understanding of the local mobility context, stakeholder landscape, and governance environment to inform DRT planning and ensure alignment with community needs and urban mobility objectives.

Box 17: Key Actions for Building a Baseline for DRT Integration in Mobility Systems

Measure Pillar	Key Actions	Recommended Tools & Methods
1. Bringing the Right Voices to the Table: Stakeholders & Users	• Identify and map key stakeholders, including transport authorities, operators, and community groups • Engage potential users to understand needs and expectations- • Create platforms for multi-stakeholder dialogue	• Stakeholder mapping templates • Surveys, interviews, focus groups • Participatory workshops and online consultation platforms
2. Understanding the Policy, Planning, and Governance Environment	• Review relevant legislation, policies, and planning frameworks • Identify regulatory barriers and opportunities for DRT • Assess governance structures for decision-making and coordination	• Policy and regulatory analysis checklists • Governance assessment frameworks • Benchmarking against best practices from similar cities
3. Understanding Local Mobility Gaps, Needs, Opportunities, and Travel Behaviour	• Analyse transport demand and service gaps • Assess accessibility and equity for underserved populations • Identify local mobility patterns and opportunities for modal shift	• GIS-based spatial analysis • Travel surveys and mobility diaries • Data analysis from existing transport systems

Phase 2 - Developing a Strategic Framework for DRT Integration

Phase Objective: Define a strategic vision, objectives, and measurable targets for DRT, ensuring alignment with broader mobility and sustainability goals.

Box 18: Key Actions for Developing a Strategic Framework for DRT Integration

Measure Pillar	Key Actions	Recommended Tools & Methods
1. Exploring and Evaluating DRT Scenarios & Service Models	• Develop alternative service scenarios based on demand, fleet types, and operational models • Evaluate scenarios for feasibility, efficiency, and social impact • Conduct participatory workshops to co-assess scenarios with stakeholders	• Scenario planning matrices • Multi-criteria analysis tools • Stakeholder workshops and Delphi method
2. Defining Strategic Objectives and Target Outcomes	• Establish specific goals for accessibility, equity, environmental sustainability, and operational performance • Prioritise objectives based on feasibility and impact • Align objectives with wider urban mobility strategies	• SMART objectives templates • Logic models for goal mapping • Policy alignment frameworks
3. Establishing DRT Performance Indicator Metrics	• Define operational, social, and environmental indicators • Determine real-time and periodic monitoring requirements • Align metrics with strategic objectives for iterative improvement	• KPI dashboards • Indicator matrices and reporting templates • Digital data collection platforms

Phase 3 - Designing and Enabling DRT Measures and Actions

Phase Objective: Translate strategic goals into concrete measures, operational frameworks, and community-oriented solutions, integrating technology, finance, and governance.

Box 19: Key Actions for Designing and Enabling DRT Measures and Actions

Measure Pillar	Key Actions	Recommended Tools & Methods
1. Service Design and Operational Frameworks	• Define routes, schedules, and coverage areas • Develop operational processes for fleet, drivers, and demand matching • Establish governance roles and responsibilities	• Route optimisation software • Operational flowcharts • Co-design workshops with operators and stakeholders
2. Digital Platforms, Integration, and User Interfaces	• Design booking, payment, and information systems • Ensure integration with MaaS platforms and public transport • Develop accessible and inclusive digital interfaces	• User experience (UX) design tools • API and integration framework • Usability testing with target user groups
3. Financing, Procurement, and Partnership Measures	• Identify funding sources and business models • Develop procurement strategies and partnership agreements • Ensure financial sustainability and affordability	• Cost-benefit analysis tools • Funding mapping templates • Public-private partnership frameworks
4. Social and Community Measures	• Conduct outreach to vulnerable groups • Implement awareness and engagement campaigns • Collect user feedback for iterative service design	• Community surveys and focus groups • Participatory planning methods • Feedback platforms (digital and non-digital)
5. From Strategic Intent to Integrated Action	• Consolidate operational, digital, financial, and social measures into an actionable plan • Align measures with governance and regulatory requirements • Ensure coordination across stakeholders	• Integrated planning dashboards • Action plan templates • Stakeholder coordination platforms

Phase 4 - Implementation, Monitoring, and Continuous Learning for DRT

Phase Objective: Operationalise DRT services, ensure continuous improvement through monitoring and evaluation, and enable scalable, sustainable, and adaptive service delivery.

Box 20: Key Actions for Implementation, Monitoring, and Continuous Learning for DRT

Measure Pillar	Key Actions	Recommended Tools & Methods
1. Monitoring DRT Operations and Service Quality	• Track service performance in real-time and periodically • Monitor fleet efficiency, wait times, and reliability • Evaluate user satisfaction and digital platform performance	• GPS tracking and telematics • KPI dashboards • User surveys and app analytics
2. Evaluating DRT Outcomes and Social Impacts	• Assess accessibility, equity, and modal shift outcomes • Analyse environmental and liveability impacts • Review integration with public transport and MaaS	• Before-and-after studies • Environmental impact calculators • Social impact assessment frameworks
3. Continuous Learning, Scaling, and Ensuring Long-Term Sustainability	• Identify lessons learned and best practices • Plan for service expansion and fleet scaling • Establish financial, operational, and technological resilience	• Workshops and learning loops • Scenario-based planning for scaling • Sustainability assessment tools and funding strategies

The Action Checklist composed by the Key actions above synthesises the core steps necessary to plan, implement, and sustain DRT services within the SUMP framework. By following the structured approach across phases, cities can ensure that stakeholder engagement, strategic planning, service design, and monitoring processes are systematically addressed. Each measure pillar highlights critical dimensions of DRT integration, from operational frameworks and digital platforms to social inclusion and financial sustainability. The accompanying tools provide practical support for data collection, analysis, and co-design processes. Overall, this checklist acts as a practical bridge between strategic intent and operational delivery, enabling cities to implement DRT solutions that are user-centred, adaptable, and aligned with broader urban mobility and sustainability objectives.

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9. Annex: Visuals for the publication

The visuals for the publication of the "Topic guide DRT 3.0 in Sustainable Urban Mobility Plans (SUMPs)" are elaborated in line with the other Topic guides on Cycling and Inclusive Shared Mobility that are under finalization by Rupprecht.

They are presented in the following pages.

DEMAND RESPONSIVE TRANSPORT

PLANNING GUIDE

IMPRINT

About
This document is elaborated provides a comprehensive guide for planning, implementing, and evaluating Demand Responsive Transport, offering practical tools, checklists, and lessons from international good practices to ensure inclusive, sustainable, and demand-responsive transport solutions for all.

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2026

Guide to the Reader

This guide has been developed within the framework of the Interreg Central Europe DREAM_PACE project – Demand REsponsive trAnsport integrating regional Mobility networks for PAssengers in Central Europe. DREAM_PACE supports cities and regions in advancing more flexible, user-oriented and integrated public transport services by embedding Demand Responsive Transport (DRT) into strategic and regional mobility planning processes. As part of this ambition, the project promotes the vision of DRT systems that are efficient, accessible, and aligned with wider sustainable mobility goals.

DREAM_PACE brings together a Consortium of twelve partners across five countries and nine regions in Central Europe, including public transport authorities, regional and local administrations, research organisations, technology partners, and mobility operators. The project is grounded in collaborative, cross-border learning and the co-creation of practical tools for strengthening the role of DRT within multimodal mobility systems. Across the project lifetime, six DRT Living Labs were piloted in real operational environments. These pilots tested diverse DRT models, digital solutions, governance approaches and user engagement practices, generating valuable insights into the challenges and opportunities linked to planning, deploying, and scaling DRT services. The Living Labs were guided by principles of openness, mutual learning, co-creation, and transferability, ensuring that solutions remain adaptable to other European contexts.

Drawing from these Living Labs, as well as comprehensive consultation activities, extensive literature review, expert knowledge and practitioner input, this guide consolidates the experiences, key lessons, and recommendations for strategic planning of DRT systems. It aims to support replication, capacity-building, and structured knowledge transfer among cities and regions seeking to advance DRT as a strategic component of their mobility systems.

Purpose of this Guide

This Planning Guide supports urban and regional authorities in integrating DRT into SUMPs and related mobility strategies. It follows the European Commission's updated SUMP-Guidelines and provides a focused perspective on how

DRT can strengthen multimodal and sustainable mobility systems.

DRT can expand accessibility, extend public transport coverage, and offer flexible mobility options in areas with low or dispersed demand. Yet its strategic integration remains limited, and planners often lack tools tailored to DRT services.

This guide addresses these gaps by outlining a structured approach for embedding DRT throughout the SUMP cycle. It summarises DRT's potential contributions, key planning and governance aspects, operational insights, and enabling technologies. Practical steps are provided to support the planning of DRT measures, informed decision-making, and alignment with local needs and long-term mobility goals.

Target Audience

This guide is intended for a broad range of stakeholders including:

- Urban and regional planners, mobility managers and policy officers
- Local and regional authorities responsible for transport and spatial planning
- Public transport authorities (PTAs) and operators (PTOs)
- DRT service providers, technology companies and platform developers
- Civil society organisations, community groups and NGOs engaged in mobility and accessibility advocacy
- Researchers, consultants and practitioners supporting mobility planning, evaluation and innovation

Each section of this guide provides practical guidance, good practice examples, recommended toolbox and guiding questions to help planners and practitioners understand the role of DRT and apply structured planning approaches in their specific context and supports informed decision-making.