SUMP TOPIC GUIDE

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MOVE21 – Multimodal and interconnected hubs for freight and passenger transport contributing to a zero emission 21st century

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Project Executive Summary

The main objective of MOVE21 is to transform European cities and functional urban areas into climate neutral, connected multimodal urban nodes for smart and clean mobility and logistics. MOVE21 will do this through an integrated approach in which all urban systems are connected, and which addresses both goods and passenger transport together. As a result, MOVE21 will improve efficiency, capacity utilisation, accessibility and innovation capacity in urban nodes and functional urban areas.

The integrated approach in MOVE21 ensures that potential negative effects from applying zero emission solutions in one domain are not transferred to other domains but are instead mitigated. It also ensures that European transport systems will become more resilient. Central to the integrated approach of MOVE21 are three Living Labs in Oslo, Gothenburg, and Hamburg and three replicator cities Munich, Bologna and Rome. In these, different types of hubs and associated innovations are tested and means to overcome barriers for clean and smart mobility are deployed. The Living Labs are based on an open innovation model with quadruple helix partners. The co creation processes are supported by coherent policy measures and by increasing innovation capacity in city governments and local ecosystems. The proposed solutions deliver new, close to market ready solutions that have been proven to work in different regulatory and governance settings. The Living Labs are designed to outlast MOVE21 by applying a self-sustaining partnership model.

MOVE21 partners

The MOVE21 consortium consists of 24 partners from seven different European countries, representing local city authorities, regional authorities, technology and service providers, public transport companies, SMEs, research institutions, universities and network organisations.

- **Norway**: City of Oslo, Akershus County, Ruter, Urban Sharing, Mixmove, Institute of Transport Economics, IKT-Norge
- **Sweden**: City of Gothenburg, Rise Research Institutes of Sweden, Business Region Gothenburg, Volvo Technology, Renova, Parkering Göteborg
- **Germany**: City of Hamburg, City of Munich, Hafencity University Hamburg, DB InfraGO
- **Italy**: Metropolitan city of Bologna, Roma Servizi per la Mobilità, Roma Tre University
- **Belgium**: Eurocities, Polis
- **The Netherlands**: TNO
- **Greece**: Hellas Centre for Technology and Research

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Deliverable Executive Summary

Key words

SUMP, SULP, multimodal hub, mobility, logistics, TEN-T, Functional Urban Area, multifunctional hub, mobility hotel

Executive Summary

Although the Urban Mobility Framework advocates for the development of sustainable and multimodal transport solutions, with multimodal hubs identified as key infrastructure to integrated transport modes and improve the user experience, the development of those hubs is still in an early stage in many urban nodes across Europe. Multimodal hubs are still underrepresented in SUMPs while the new TEN-T regulation sets ambitious targets for their development in European Functional Urban Areas (FUA).

This SUMP Topic Guide Deliverable is primarily based on the results of the Horizon 2020 project MOVE21, yet the recommendations have also been validated with the partners and local authorities of the SCALE-UP project. The results draw from research in the eight EU countries (Bulgaria, France, Germany, Greece, Italy, Romania, Spain and Sweden) and the EEA country Norway which are represented in MOVE21. The results were further broadened to three other EU countries (Belgium, Finland and Spain), represented in SCALE-UP. Project partners from both projects took part in workshops to validate the policy recommendations (an overview of activities and materials used are available in the Annex B and C). Furthermore, experiences from other related EU funded project were references such as the SmartHubs, MoloHub, RESTART projects. Nine semi-directive expert interviews were held to gather relevant information on the state of the art (an overview of interviews held is available in the Annex A). In total experiences from over 15 European cities are featured in this Deliverable.

This Topic Guide is structured in the following way: The document is divided into five main content chapters, in 'Why hubs?" the deliverable provides the policy context to the concept of multi-modal hubs, the chapter then also further explains the state of the art of multimodal hubs. The subsequent chapter draws connections between the eight SUMP principles and the deployment of multi-modal hubs. In the following chapter policy recommendations are provided in thematical order and illustrated by practical examples. The last two chapters provide a visual summary of the policy recommendations and concluding remarks.

The key messages of the deliverable are:

- Link the development of multimodal hubs to SUMPs and SULPs at FUA level.
- Consider multimodal hubs not strictly in the scope of passenger mobility – broadening perspectives and including urban logistics, other social or administrative services etc. allows to foster spatial integration in an urban context where space is scarce.
- Great coordination is required across policy levels when it comes to integrating different transport modes at the interface between the urban and the TEN-T mobility – alignment, cooperation, and capacity to act are key in this endeavour.

The Topic Guide also provides a set of best practices to illustrate the policy recommendations. An overview table in chapter 6 links the SUMP principles, the policy recommendations and the best practices.

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1 List of abbreviations and acronyms

Acronym	Meaning
API	Application Programming Interface
B2B	Business-to-business
B2C	Business-to-Consumer
CO_2	Carbon Dioxide
CRTM	Consorcio Regional de Transportes de Madrid
EC	European Commission
EMT	Empresa Municipal de Transportes de Madrid
EU	European Union
EUI	European Urban Initiative
FUA	Functional Urban Area
GA	Grant Agreement
GBFS	General Bikeshare Feed Specification
GDPR	General Data Protection Regulation
GHG	Greenhouse gas
ID	Identification
KPI	Key Performance Indicator
LDV	Light Duty Vehicle
LEZ	Low Emission Zone
MaaS	Mobility-as-a-Service
MVV	Münchner Verkehrs- und Tarifverbund
MVG	Münchner Verkehrsgesellschaft
NOx	Nitrogen Dioxide
PPP	Public Private Partnership
PT	Public Transport
QR	Quick Response
TEN-T	Trans-European Transport Network
RNV	Rhein-Neckar-Verkehr GmbH
RSM	Roma Servizi per la Mobilità
SUMP	Sustainable Urban Mobility Plan
SULP	Sustainable Urban Logistics Plan
UIA	Urban Innovative Actions
UMI	Urban Mobility Indicators
WP	Work Package

2 Purpose of the deliverable

This deliverable is a user-friendly brochure designed to provide actionable policy recommendations for urban nodes planning multimodal hubs under the MOVE21 conceptual framework, specifically within the scope of a Sustainable Urban Mobility Plan (SUMP). To this end the deliverable will be submitted in the official Deliverable template to the EU, and in addition as a more user-friendly brochure which can be both navigated online on the MOVE21 website under the Urban Nodes Competence Centre and as printed version. The title of the brochure is *A Guide of Multimodal Hubs in Urban Nodes – Policy Recommendations and Best Practices*.

The deliverable emphasises integrating urban mobility planning with the TEN-T network dimension, offering practical solutions and insights derived from MOVE21 Living Labs and replication activities. It also builds on the VitalNodes toolbox and its recommendations to ensure robust and comprehensive guidance. Key focus areas include the planning and development of multimodal hubs that facilitate both passenger and freight mobility within urban nodes of the TEN-T network. These hubs aim to promote sustainable transport systems across the local (urban), regional (Functional Urban Area), and European (TEN-T) scales, aligning with broader sustainability goals.

2.1 Attainment of the objectives and explanation of deviations

The objectives of the deliverable have been met in full in the sense of providing policy recommendations to help urban nodes plan for multimodal hubs in FUAs in light of the new TEN-T requirements and in light of both passenger and freight mobility and within the context of SUMPs and SULPs. However, due to the EU's revision of all SUMP reference material and SUMP guidelines and the resulting freeze on publishing new official reference material, the project has developed a deliverable focused on multimodal hubs in the context of SUMPs and emphasising concrete policy recommendations and best practices. The deliverable is not thus part of the official body of knowledge known as SUMP reference material. The contents of this deliverable remain relevant and should be used when future official SUMP reference material is developed on the topic of multimodal hubs.

2.2 Intended audience

The intended audience for this deliverable includes urban city practitioners, such as mobility experts and urban planners, as well as professionals from other departments beyond mobility, such as planning, economic development, and housing. Additionally, it targets regional transport authorities, and potentially national authorities, as key stakeholders in the planning and implementation of multimodal hubs. The deliverable also contains valuable insights for private mobility operators, such as train and freight operators, who may benefit from the recommendations and strategies discussed.

2.3 Structure of the deliverable and links with other work packages/deliverables

The foundation of D10.7 *Sump Topic Guide* is closely linked to WP6, which focused on testing innovative solutions in multimodal hubs. The pilots conducted under WP6 provided essential lessons on integrating multimodal systems into urban mobility strategies, offering real-world insights into the opportunities and challenges of such implementations. These findings directly informed the development of this deliverable, shaping its recommendations and ensuring their applicability to similar contexts.

WP7 further contributed to this deliverable by leveraging peer-learning activities and replication exchanges. Through city sessions, Knowledge Exchange Webinars, and interactions with replicator and cascade cities, valuable lessons were shared regarding the practicalities of implementing MOVE21 measures. These insights were embedded into the deliverable, reinforcing its emphasis on transferable and scalable solutions.

The Urban Nodes Competence Centre, developed in WP7, contributes with valuable insights for this deliverable. These insights detail the key steps for designing, implementing, and monitoring the efficiency of multimodal hubs. Additionally, the Competence Centre highlights good practices derived from the MOVE21 project to ensure these processes align with proven methodologies.

WP8 also contributed with content from specific deliverables. D8.6 *Ex-post implementation of the Impact Analysis Framework* and D8.7 *TEN-T Analysis: TENT Accessibility and Project Impact on the TEN-T network* provide specific insights into the impact that multimodal hubs can have on advancing sustainable mobility and achieving a city's net-zero targets. These deliverables also propose a detailed framework for monitoring and evaluating the efficiency of such hubs.

WP10 provided the strategic framework within which this deliverable aligns multimodal hub development with the broader goals of the Trans-European Transport Network (TEN-T). Discussions on governance, planning, and decision-making frameworks emphasised the need for coordinated approaches, with multimodal hubs serving as a key example of how such alignments can be achieved. Contributions from the Urban Nodes Forum and the Scan-Med Observatory enriched the deliverable, providing a deeper understanding of regional and transnational connectivity needs.

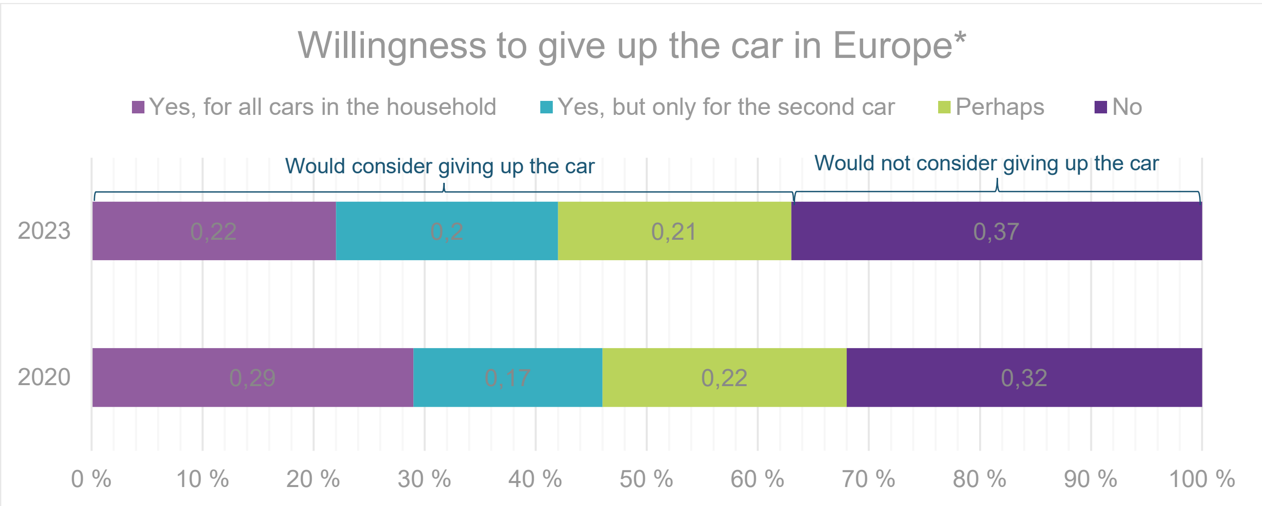
Additionally, D10.7 integrates findings from deliverables D3.3 *MOVE21 upscaling plan and transferability assessment* D4.3 *MOVE21 upscaling plan and transferability assessment - governance* and D5.3 *MOVE21 technologies: upscaling and transferability assessment*, which assessed the upscaling and replication potential of MOVE21 measures. These deliverables offered aligned recommendations that directly relate to multimodal hubs, ensuring consistency and reinforcing the practical relevance of the outputs from this deliverable.

3 Introduction – Why hubs?

The transport sector is a significant contributor to greenhouse gas (GHG) emissions, with road transport playing the largest role. In 2022, road transport accounted for 73.2% of the EU's total transport-related GHG emissions, including domestic activities and international bunkers (European Environment Agency, 2022). Although this share is projected to decrease due to planned and implemented measures targeting road transport emissions, the challenge remains substantial. Urban areas represent a critical focus as they contribute 40% of global passenger transport's carbon dioxide (CO_2) emissions and are major sources of local air pollution (International Transport Forum, 2021a).

Addressing these emissions requires transformative approaches to urban mobility. The International Transport Forum (ITF) highlights the potential of integrated sustainable urban mobility strategies. By improving public transport, incentivizing shared mobility, and investing in infrastructure for collective and active modes of transport, ISUM strategies can reduce CO_2 emissions significantly while accommodating the diverse travel needs of urban populations (International Transport Forum, 2021b). Such approaches underscore the urgency of shifting trips away from privately owned vehicles to sustainable alternatives.

However, recent studies indicate a growing reluctance among Europeans to abandon car ownership, with willingness declining between 2020 and 2023 (Arthur D. Little, 2023). This trend underscores the importance of creating solutions that are not only sustainable but also attractive and convenient for users.



**Based on study made by Arthur D. Little, 2023.*

Figure 1: Willingness to give up on cars in Europe comparison between 2020 and 2023.

At EU level, the New Urban Mobility Framework (European Commission, 2021) advocates for the development of sustainable and multimodal transport solutions, with multimodal hubs identified as key infrastructure. These hubs are defined as infrastructures designed to connect various transport modes, fostering integration between urban, peri-urban, and rural areas. Key features of these hubs include enhanced facilities for cycling, such as bike parking, recharging stations for electric vehicles, and improved accessibility features to ensure inclusivity for individuals with disabilities. These measures align with the EU's broader objectives under the European Green Deal, aiming to create more sustainable and inclusive mobility systems as outlined in the New Urban Mobility Framework (European Commission, 2021).

Besides, the revised Trans-European Transport Network (TEN-T) Regulation (European Commission, 2024) underscores the importance of multimodal passenger hubs within urban nodes along the trans-European network. These hubs are crucial for improving first- and last-mile connectivity, offering integrated services such as park-and-ride schemes and seamless transitions between long-distance and local transport systems in Functional Urban Areas (FUA).

The definition of a FUA has been formally defined through an agreement between the OECD, Eurostat (the European Commission's statistics office), and the Directorate-General for Regional and Urban Policy and is based on "population density to identify urban cores, and on travel-to-work flows to identify the hinterlands whose labour market is highly integrated with the cores" (OECD, 2013).

Furthermore, freight logistics also feature prominently with the TEN-T regulation mandating the establishment of multimodal freight terminals to support sustainable urban logistics. By 2027, all designated urban nodes within the TEN-T network must implement SUMPs, which prioritise the development of mobility hubs as critical infrastructure. These plans are designed to enhance multimodal connectivity, reduce emissions, and facilitate sustainable transport. These frameworks highlight the EU's commitment to integrating multimodal hubs as a cornerstone of sustainable transport strategies, furthering goals of connectivity, inclusivity, and environmental stewardship.

Multimodal passenger hubs are not to be considered as totally new. The node-based concept in Dutch cities dates back to the 1970s in relation to the setup of Park-and-Ride facilities (Rogen et al. 2022). The trend towards new mobility services and new mobility offers from the private sectors do create a new context (Reck & Axenhausen, 2021) and enhance a trend where mobility is linked usership and purchasing of trips, rather than mobility based on ownership of vehicles. Olaf Sakkers coined in this context the terminology of "trip economy" (Sakkers, 2021).

Multiple definitions of hubs exist both in academic literature and in practical applications, reflecting the diverse ways they are conceptualised and implemented. You will often find the term multimodal hub referring to "a recognisable place with an offer of different and connected transport modes supplemented with enhanced facilities and information features to both attract and benefit the traveller" (Mobility Hub Guidance CoMoUK, 2019, 4). As noted by Geurs, K., et al. (2023) all definitions share a common foundation: a multimodal hub is a spatial connection integrating at least two transport modes. This physical integration is a core characteristic that underscores their functional purpose in the transport network.

However, beyond this shared baseline, the literature reveals a lack of consensus regarding the specific requirements for multimodal hubs. Key aspects such as the inclusion of public transport, the range of necessary mobility services, information provision systems, and criteria for size, layout, or optimal locations remain subjects of debate. This variability highlights the flexibility and adaptability of the hub concept to suit different contexts. Despite the absence of universally agreed-upon standards, certain optional characteristics frequently emerge across studies. These characteristics, which can also be viewed as quality standards, include facilities for active mobility, digital integration through real-time information systems, and amenities that enhance the user experience.

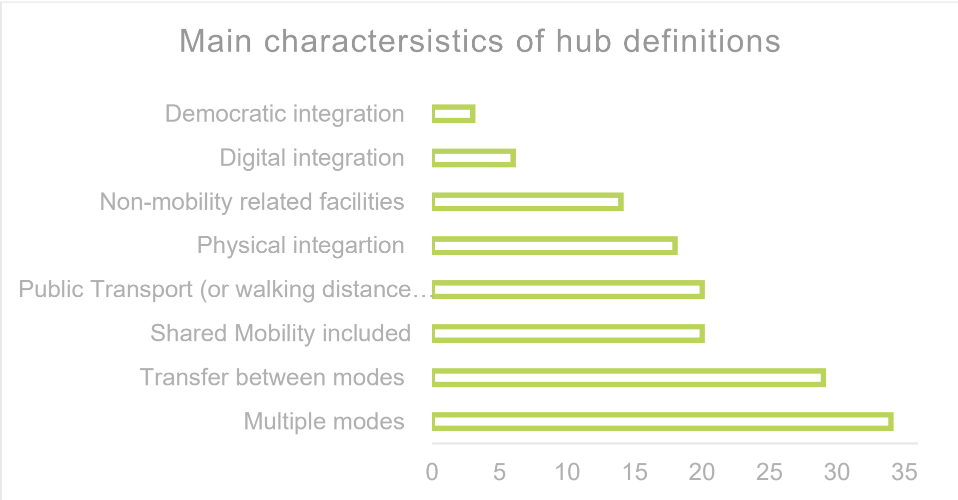


Figure 2: Overview of main characteristics of hubs definitions (based on data set of 36 sources, Geurs et al. 2023).

Furthermore, insights drawn from interviews conducted with representatives of various European cities echo this lack of agreement. Notably, opinions diverge on the role of logistics or non-mobility-related facilities and services within hubs. While elements such as information pillars are often deemed essential, other amenities—ranging from retail spaces to community areas—are considered optional and context-dependent. This diversity reflects the need for a tailored approach to designing hubs, aligned with local priorities and user needs.

In MOVE21, a broader approach has been applied to hubs that covers the different innovative hub concepts that were tested in the project. In MOVE21, more focus has been given to integration aspects between passenger transport and urban logistics, as well as a focus on enabling support services. With MOVE21 measures and other initiatives like the pilots developed in the MoLo Hubs project, greater recognition and exploration of hybrid hub models is essential.

This leads us to understand a multimodal hub as a place where passengers and/or cargo are exchanged between transport services between at least two modes (MOVE21 D5.1 *Draft Technology Solutions*).

- **Multimodal** (passenger) **hubs** thus encompass – for public transport hubs: train stations, rapid transit stations, bus stops, tram stops, airports, and ferry slips. For private transport by car, bicycle, etc., parking areas function as hubs. For micromobility those can be physical or digital drop off points.
- Hubs may not only provide trans-shipment options between transport services. Lack of space and the need to cater for a variety of socio-economic services, may lead to consider hubs beyond the transport aspect. When looking at the integration of transport and other services such as social services, the catering industry, etc. we talk about **multifunctional hubs.** In the framework of MOVE21 such hubs were established in Hamburg for instance in Holstenstrasse combining social use and last mile logistics
- **Multimodal freight hubs** include classification yards, airports, seaports, truck terminals, last-mile micro-hubs – yet those will be kept out of the picture here as they are beyond the scope of this deliverable.
- To achieve the ambition of reducing logistics traffic, a coherent and supporting infrastructure is needed to make use of all types of sustainable transport resources while not functioning as the primary transhipment point. We are speaking here about hubs providing enabling services for

the shift towards sustainable urban mobility and logistics practices in so-called **mobility hotels** such as the **Mobility Hotel Nordstan in Gothenburg or the Kaia Mobility Hotel in Oslo.**

Figure 3: An idea of a multimodal hub (Source: Peaberry, 2024).

In the following section we will connect the concept of multi-modal and multifunctional hubs to SUMP principles to highlight how the development of those connect to the planning concept.

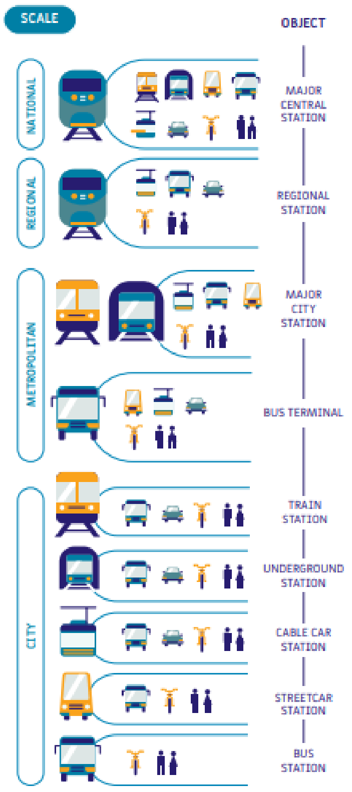


Figure 4: Typology of multimodal hubs (Source: Agence Française de Développement, 2020).

4 SUMP principles and their connection to multimodal hubs development

Sustainable Urban Mobility Planning has become the prevailing approach to urban transport planning in Europe. The policy framework supporting its development has been systematically shaped by European policymakers since 2005. A key milestone in this process was the release of the Urban Mobility Package in late 2013, where the European Commission outlined the concept of Sustainable Urban Mobility Plans in an annex. Simultaneously, the first edition of the Guidelines was introduced. Since the publication of the Urban Mobility Package, the concept of Sustainable Urban Mobility Plans has been widely adopted across Europe and internationally.

While the concept remains robust and relevant, the supporting materials were increasingly in need of updates and the integration of additional mobility policies and measures. To embed the development of hubs in the right planning framework not only at urban but also at TEN-T level it is thus important to understand how hubs implementation match with Sustainable Urban Mobility Planning principles.

The eight SUMP principles are listed below:

1. Plan for sustainable mobility on the ‘functional urban area’
2. Cooperate across institutional boundaries
3. Involve citizens and stakeholders
4. Assess current and future performance
5. Develop a long-term vision and a clear implementation plan
6. Develop all transport modes in an integrated manner
7. Arrange for monitoring and evaluation
8. Assure quality

Beyond that, the SUMP principles are not only considered as requirements for planning documents but also as processual guidelines to apply during the planning and implementation. In this chapter the key points in which there is a relationship between multimodal hubs development and the SUMP process are presented through the connection to the eight SUMP principles.

4.1 Plan for sustainable mobility in the “functional urban area”

One of the new TEN-T regulation objectives is to further integrate urban nodes into the TEN-T network while supporting seamless, efficient and multimodal transport in Europe across all modes. The regulation emphasises that urban nodes play an important role in the trans-European transport network as a starting or finishing point ("first/last mile") for passengers and goods moving on the trans-European transport network and are points of interchange within or between different modes of transport. The planning and development of multimodal hubs are central to achieving the goals outlined in the first SUMP principle. This principle emphasises the need for sustainable mobility throughout the Functional Urban Area (FUA).

Multimodal hubs contribute significantly to this goal in several ways:

- Multimodal hubs serve as essential components within the mobility system, facilitating seamless transitions between various modes of transport for both people and goods. By providing integrated and efficient connections, these hubs enhance the overall functionality and sustainability of urban transport and logistic networks. Beyond that hubs can also serve the

integration of further functions which go beyond transport purposes such as supporting services, administrative and social service etc., thus serving spatial integration purposes.
- Multimodal hubs support the provision of travel times for all available modes within the functional urban area thus enhancing the accessibility to the transport services.
- Multimodal hubs vary in their locations and roles within the network. They connect local mobility systems to broader networks at the FUA level and even beyond, on TEN-T corridor level, fostering a cohesive, sustainable transport ecosystem that reduces reliance on private cars. They can also act as interfaces between urban transport systems and the wider TEN-T network. The TEN-T regulation underscores their importance with specific objectives:
    - By 31 December 2030, urban nodes need to develop multimodal passenger hubs to facilitate first and last-mile connections, improving access to public transport and promoting active mobility.
    - By 31 December 2040, urban nodes need to develop at least one multimodal freight terminal, it may serve several urban nodes and can be in the urban node itself or close by.

These objectives highlight the critical role of multimodal hubs in achieving sustainable and high-quality mobility within the FUA. By integrating various modes of transport and connecting urban and regional networks, multimodal hubs contribute to the overarching goal of improved accessibility and sustainable mobility for all (Fraunhofer-Institut, 2021). Thus, multimodal hubs should not be planned as isolated features but as integral connection points within a complex and interconnected mobility network. Their strategic placement and development ensure a cohesive and efficient transport system at FUA level that aligns with the first SUMP principle.

However, at present stage in most European urban areas, public transport, regional buses and regional train services are often the only modes developed and connected to serve the Functional Urban Area (FUA). This presents significant challenges when planning sustainable mobility offers at the FUA level, particularly when considering the inclusion of additional transport modes such as shared mobility services or potential overlaps with urban last mile logistics. Policy coherence across the FUA is a key aspect to consider in the context. A notable example comes from MOVE21 in Oslo, where micromobility regulations are not harmonised across the different municipalities comprising the Oslo FUA. This lack of regulatory alignment on the FUA-level makes it impossible, at this stage, to plan and implement an interconnected network of hubs which connect public transport, trains and micro-mobility throughout the Oslo FUA. Addressing such disparities is critical for achieving integrated and seamless mobility systems across functional urban areas.

4.2 Cooperate across institutional boundaries

Strong political leadership is – for reasons of successful buy-in in the SUMP process – of utmost importance. The cooperation between different institutional actors (SUMP Cycle step 1.2 and 2.2) is also crucial. The second SUMP principle emphasises the need for extensive cooperation, coordination, and consultation across various levels of government and institutions. In the Functional Urban Area, cooperation can be challenging as there are often no institutionalised authorities overseeing mobility policies at this governance level.

The development and implementation of multimodal hubs perfectly embody this principle through several key aspects:
- Multimodal hubs integrate services provided by multiple transport operators, at times managed by different transport authorities. Adding logistics providers, additional private service providers

or public service provision such as in the case of multifunctional hubs makes the picture even more complex. Ensuring administrative collaboration is essential for the seamless integration of these services, making multimodal hubs a practical example of inter-institutional cooperation. For example, in Antwerp at first there has been a misalignment between the multimodal hub concept and design developed by the City of Antwerp and the one developed by the Antwerp Transport Region (which corresponds approximately to the Antwerp FUA). To ensure coherence and clarity for citizens the two entities finally managed to align and integrate both systems and designs.

- Multimodal hubs provide access to a range of services and cater to present and future mobility needs. This necessitates collaboration across multiple departments in local administrations, including planning, economic development, housing, education, and social services. By working together, these departments can ensure that multimodal hubs are effectively integrated into the broader urban framework, meeting diverse community needs. To ensure that multimodal hubs are consistent and complementary with policies and plans in sectors related to transport - such as land use, spatial planning, health, energy, education - continuous cooperation is necessary. This helps to create a cohesive policy environment that supports sustainable urban mobility goals.
- Multimodal hubs serve as connection points between transport modes operated at various scales, from neighbourhood hubs to international hubs. This requires alignment across different political and administrative levels, such as districts, municipalities, regions, and states. Close exchange and coordination with relevant authorities at each level are crucial for the successful planning and operation of multimodal hubs. This multilevel governance framework also entails specific decision-making powers supported by financial resources. While the Metropolitan City of Bologna has made great efforts in aligning with surrounding municipalities in the region and Trenitalia on developing mobility hub guidelines there has been no agreement on the financial coverage which creates challenges in the implementation of the guidelines and the piloting of hub concepts.

Effective coordination and collaboration with both public and private sector providers of mobility services is vital. This ensures that multimodal hubs can offer integrated and efficient transport options, enhancing the overall user experience and promoting sustainable travel behaviour. There are various ways in which public and private entities can collaborate, many of which are governed by public procurement regulations. These rules are designed to promote competition, ensure transparency, and maximise the efficient use of public funds while maintaining fairness and accountability. Traditional procurement methods are well-suited for standard goods and services that are readily available and relatively straightforward. However, in complex or uncertain environments, such as large infrastructure projects or innovation-driven initiatives, these conventional approaches often fall short. In such cases which can encompass multimodal hubs, traditional supplier-buyer relationships may be insufficient, requiring more flexible and adaptive procurement strategies and collaboration schemes (Ruohonen et al. 2024).

While collaboration is key, strong leadership is also essential for the efficient management of multimodal hub development and maintenance. Various models of governance exist to facilitate this process. There is no one-size-fits-all approach to governance, as different models exist across Europe to manage multimodal transport systems. A key distinction lies in the governance of Functional Urban Areas (FUAs). In countries like Italy and France, FUAs are overseen by Metropolitan City Authorities, whereas in many other European nations, governance structures are more fragmented. For instance, Oslo does not have a one Mayor overseeing its entire Functional Urban Area. The City of Oslo has since 2015 a regional plan for land use and transport in collaboration with its neighbouring county Akershus (a plan that is under revision during 2025), in addition to the Oslo Package 3 and Urban Development Cooperation Agreement which mainly deal with how transport infrastructure and services are financed. This results in a complex but mature system of cooperation that demands strong negotiation skills, clear prioritisation, and firm political backing (Bouma et al. 2024). To ensure effective governance of multimodal hubs, clear leadership is essential. Well-defined roles and responsibilities help align stakeholders towards shared objectives, ensuring that hubs are efficiently managed and contribute to long-term sustainability.

4.3 Involve citizens and stakeholders

The dynamic and ever-evolving landscape of urban mobility requires the engagement of citizens and stakeholders in the development of multimodal hubs. The urban mobility environment is continuously evolving with new service providers and players, such as e-scooters and various types of shared modes. Future innovations will further transform this landscape. To keep pace with these changes and ensure the relevance and effectiveness of multimodal hubs, ongoing engagement with stakeholders is essential. Multimodal hubs are key in structuring network coherence and ensuring the complementarity of services. Close dialogue with private operators and a deep understanding of their needs and plans are increasingly important. Their integration with the public transport backbone is key and ensures a seamless and efficient mobility network. The successful implementation of multimodal hubs requires the involvement of multiple stakeholders. This includes public authorities, private operators, urban planners, and, most importantly, the users themselves—citizens. Engaging these groups ensures that multimodal hubs are designed and operated in a way that meets the diverse needs of the community.

However, as we speak about SUMPs at FUA-level that often go beyond administrative borders or hubs used and crossed by international travellers the scope of citizens and stakeholders to involve needs to be adapted accordingly, which comes with specific challenges. Besides the integration of service beyond passenger transport also calls for stakeholder involvement in a broader and more complex sense.

Citizens are the primary target group for passenger hubs. MOVE21 survey results analysis show that younger individuals (18-35) are more likely to use mobility hubs due to higher environmental awareness, greater use of digital mobility tools and lower car ownership rates. Citizens above 50 years show lower adoption rates due to resistance to digital mobility solutions, higher car dependency and limited physical accessibility to hub. These factors are to be considered, when involving citizens (MOVE21, D8.6, 2025). Their input and feedback are crucial in shaping hubs that are user-friendly and responsive to their needs. By involving citizens in the planning process, multimodal hubs can better serve the community and enhance user satisfaction. Their involvement can be facilitated at the network level or be more intensely around specific hub locations.

In the case of freight hubs logistics operators, shippers and retailers are key partners to involve, however citizens in their role of consumers would also have valuable opinions to take into account. When the use goes beyond mobility purposes further stakeholders with their specific needs are to be taken into account and the different uses of space needs to be balanced. This is exemplified by the Holstenstrasse Hub in Hamburg. There, last-mile logistics and social services are combined in one space owned by a social housing company. The range of stakeholders to involve thus expands from social workers to delivery riders to inhabitants thus complexifying the involvement work.

Engaging citizens and stakeholders in the development of multimodal hubs not only aligns with the third SUMP principle but also ensures that these hubs are relevant, effective, and responsive to the needs of a rapidly changing urban mobility landscape. By fostering a collaborative approach, multimodal hubs can be better integrated into the urban fabric, supporting sustainable mobility and enhancing the overall quality of life.

4.4 Assess current and future performance

The development of a coherent network of multimodal hubs should build on a thorough assessment of the current and future performance of the transport system and land use patterns in the whole functional urban area. As this implies the collection of information and data beyond existing administrative boundaries this principle poses still significant challenges and remains a resource-intensive task.

A comprehensive review of the current situation of the urban core and its commuter belt is fundamental to drawing the baseline against which results can be measured. The quality of the network as well as the use of mobility services shall be assessed as baseline. In the context multimodal hubs, the evaluation of multimodality becomes essential, yet it is hardly being done so far across cities interviewed. The City of Munich is one of the few cities which recently launched a tender for the evaluation of their multimodal hub network.

In its recommendations on National Support Programmes for Sustainable Urban Mobility Planning, the European Commission encourages Member States to support the adoption of SUMP by local authorities but also “to calculate sustainable urban mobility indicators (…), to coordinate and support data collection and facilitate access to, sharing and use of national, regional or private data needed to calculate urban mobility indicators” (European Commission, 2023). Suitable indicators should thus be set in a way to ensure adequate representativeness for the whole functional urban are in accordance with the Urban Mobility Indicator principles. In fact, by 31 December 2027, Member States should ensure the collection of urban mobility indicators (UMIs) for each urban node in the areas of sustainability, safety, and accessibility, with the aim of supporting both the current and future performance of the TEN-T network.

The new TEN-T regulation states that these indicators should be adopted in close cooperation with Member States and their local and regional authorities. It also specifies that the availability and accessibility of data at the local level should be considered. To monitor accessibility for all users, disaggregating data by age, gender, and disability should be encouraged where possible and in accordance with national law. There are still a lot of alignment efforts needed in that regard. In fact, data is often being collected yet not necessarily at the appropriate level. For instance, in Finland modal share data is based on National Travel Survey conducted every four years, yet the data is not representative on the city level, merely on the regional level (SCALE-UP D7.3, 2022).

Citizen science practices, Information and Communication Technologies (ICT) systems, floating data, and cooperation between the transport operators, the mobility service providers and the local authorities is fundamental in that endeavour.

4.5 Define a long-term vision and a clear implementation plan

The long-term vision can be translated into intermediate objectives, with intermediate targets, that will help prioritise the different interventions across the whole functional urban area over a long period of time. This prioritisation can occur through a prioritisation of locations in the network or of different layers of multimodal hubs. The prioritisation can be based on existing users' figures, nudging of mobility service use through the development of hubs in specific locations, or on the willingness to implement alternative mobility service in a coherent way in a new development area to establish sustainable mobility behaviour from the start. For instance, in Gothenburg, agreements have been established between the city and property owners to adjust parking requirements and encourage sustainable transport alternatives. Research highlights a strong correlation between parking availability, car ownership, and car usage, reinforcing the need for policies that promote alternative mobility solutions. Under these agreements, property developers and owners commit to reducing parking spaces for new buildings in exchange for sustainable transport options for residents. These mobility measures must be in place before residents move in and maintained for at least 10 years. Since the pilot launched in 2017 in Gothenburg, over 100 mobility agreements have been signed for residential developments. While participation is voluntary, these agreements form part of the standard parking requirement process, with the City of Gothenburg working alongside researchers to assess their impact. By reducing parking provision, developers can cut construction costs while fostering more sustainable travel behaviours. This initiative demonstrates how public-private collaboration can effectively drive urban mobility transformation (Ruohonen et al. 2024).

4.6 Develop all transport modes in an integrated manner

The sixth SUMP principle emphasises the balanced and integrated development of all relevant transport modes while prioritising sustainable mobility solutions. This principle aligns well with the added value of multimodal hubs for sustainable urban mobility. Multimodal hubs, where passengers and goods can transfer between various vehicles and transport modes, are directly linked to the integration of transport modes in terms of infrastructure, service availability, and digital integration. Multimodality, enabled by these hubs, is crucial for creating an integrated and climate-resilient transport system.

From MOVE21 evidence shows that over 60% of users who took part in the evaluation process of both Oslo and Gothenburg pilots consider hubs as important or very important in future urban mobility planning (MOVE21, D8.6, 2025). Furthermore, evidence shows that the provision of multimodal hubs is associated with increased use of shared mobility services. For example, the SmartHub D5.1 report identified a significant population group, known as Mobility Chameleons, who have embraced shared mobility, making up about 30% of the population. Analyses indicate that the potential for shared mobility rises with the greater presence and accessibility of these services. A survey conducted in Bremen on carsharing-based mobility hubs found that the density of hubs increases user satisfaction. One of the most important factors for user satisfaction was the short distance to the nearest station, just behind vehicle availability. Additionally, 24% of women (compared to 16% of men) in the survey considered the visibility of stations in the public realm to be very important (UITP 2023).

Cities are motivated to develop mobility hubs for various reasons. In some cases, geofencing and the management of micro and shared mobility systems serve as key drivers. For instance, in the Rhein-Neckar Transport Association (Verkehrsverbund Rhein-Neckar), discussions on multimodal hubs were sparked by concerns over curb-side management amid the rapid growth of micromobility options. In other cases, the primary focus is on improving connections between public transport, park and ride and last-mile solutions. For instance, in the City of Gothenburg the reflection on multimodal hubs started on the basis of the MOVE21 pilot focussing on better integration of the shared bike system and car parking managed by the municipal parking company. The learnings from this pilot in Klippan were embedded into a strategic document to steer future hub development in the city. Regardless of the specific motivation, the overarching goal remains the same: to design transport systems that render private car ownership unnecessary, fostering more sustainable and efficient urban mobility. Besides a greater design and infrastructure coherence in the urban space, the digital integration is a key component and touches upon ticketing and pricing questions which requires great alignment and cooperation between the different mobility service providers.

4.7 Arrange for monitoring and evaluation

The implementation of a SUMP requires close monitoring to ensure progress towards its objectives and targets. Urban Mobility Indicators will become the main monitoring dataset used for SUMPs by 2027. Regular assessment, based on selected performance indicators, is essential to evaluate the effectiveness of the plan. This ongoing monitoring helps identify necessary data and statistics, enabling timely corrective actions and revisions of targets if needed. Sharing a monitoring report with citizens and stakeholders keeps everyone informed about the plan's development and implementation.

Multimodal hubs, being a relatively new concept, have unknown impacts that need thorough evaluation. MOVE21 suggest 13 KPIs to evaluate multimodal hubs cluster under following themes: Long term decarbonization, Safety, inclusiveness and security, Accessibility and efficiency of transport networks, Economic development (MOVE21, D8.6, 2025). The SmartHub D2.2 report also provides a comprehensive list of key performance indicators (KPIs) to assess the state, performance, and impact of multimodal hubs. These KPIs are divided into descriptive and performance categories. Descriptive KPIs indicate the current state of a multimodal hub and allow for comparisons between hubs, while performance KPIs help detect trends over time.

Several dimensions must be considered when evaluating the performance and impact of a multimodal hub:

- Assessing the range and quality of transport services available at the hub.
- Evaluating the digital services provided to access the mobility services.
- Ensuring that the hub is easily accessible to all users.
- Monitoring the safety and security measures in place for passengers.
- Examining how well the hub integrates with the local community and its governance structures.
- Evaluate the gains for the logistics chain in using the hub (cost-wise, emission-wise).

Additionally, it is crucial to measure the impact of multimodal hubs on various aspects of the transport network and user behaviour:

- Impact on Network: How the hub influences the overall transport/logistics network's efficiency and connectivity.
- Impact on Modes: The effect on different modes of transport, such as public transit, cycling, walking, e-van use, cargo bike use, etc.
- Impact on Use: The level of utilisation of the hub and its services.
- Impact on Behaviour: Changes in user behaviour, such as increased use of shared mobility services.
- Impact on Modal Shift: The extent to which the hub encourages shifts from private car use to more sustainable transport modes, shift from van to e-vans or cargo-bikes.

By systematically monitoring and evaluating these aspects, multimodal hubs can be optimized to better serve their purpose in sustainable urban mobility and the achievement of SUMP goals.

4.8 Assure quality

The elaboration of a coherent network of multimodal hubs at FUA-level ensures harmonised access to mobility solutions on a given area. To ensure coherence and quality across the network, municipal quality requirements can be defined in a coordinated manner by the different stakeholders involved. The provision of a jointly established document ensures a baseline to which hubs can be evaluated against. The level of coordination can differ between the urban, the FUA, the Regional and the National level. The use of Kew Performance Indicators (KPIs) in tendering processes (for instance for public transport services or micro or shared-mobility services) is a common practice to ensure that quality requirements are met. In this case it is important to go beyond metrics that look at each services individually. Performance shall also be considered in an integrated manner, looking for instance not only to the improved use of shared services but if that user share has effectively transited from car use to a more sustainable use.

5 Policy recommendations on multimodal hub implementation

There is a strong alignment between the principles of SUMPs and the goal of developing multimodal hubs to enhance mobility both within urban areas and beyond. This chapter offers actionable policy recommendations, complemented by best practices, to guide urban practitioners and policy makers at local, regional, national and EU level in the effective development of enabling policy frameworks which ultimately allow for a better planning and implementation of multimodal hubs.

5.1 Defining multimodal hubs locally

To successfully develop and implement multimodal hubs, it is essential to start with establishing recommendations regarding their definition in policies and planning documents. While Chapter 3 highlighted the variation in definitions of multimodal hubs across different urban contexts and academic literature, it is advisable to identify a common denominator that can serve as a unifying framework for their conceptualisation.

*R1. Hubs should connect at **least two** transport modes to qualify as multimodal. However, their specific definition should remain flexible, tailored to the context and location.*

In the context of limited urban space and the trend to limit soil sealing, there is increasing potential to integrate functions not only across passenger and logistics modes but also between mobility, logistics, housing, and socio-administrative activities. In MOVE21 several hubs have been piloted with those types of integration such as the Mobility Hotel in Gothenburg and the Kaia Mobility Hotel in Oslo or the Holstenstrasse Hub in Hamburg. Further information is provided on those cases in the best practices below on page 25. The MOVE21 survey run in Hamburg has also shown that people expect more services in hubs such as parcel stations (24%) and recycling containers (14%) (MOVE21, D8.6, 2025). This evolving approach significantly influences the scope that can be given to the definition of multimodal hubs.

R2. When defining the scope of multimodal hubs in regulations, SUMPs etc. keep a certain flexibility for considering multifunctional uses.

a. Further services can complement a multimodal hub and can include housing, social services, administration, hotels, etc.
b. Multifunctional uses can combine passenger mobility with last mile logistics such as the installation of parcel lockers.
c. Mobility hotels can be envisaged through the provision of enabling services that facilitate the shift from LDVs to cargo-bikes or form car to bike, offer facilities for drivers or riders, repair centres, etc.

R3. EU and national regulations and funding programmes should accommodate and remain flexible to support the implementation of multifunctional purposes for multimodal hubs.

R4. While prescriptive requirements for specific modes may not be practical, local authorities are encouraged to establish categories of hubs tailored to their local context and define corresponding quality standards. These categories could be based on factors such as the hub's significance within the network or the types of connections it facilitates. Key quality standards should prioritise universal design to *ensure accessibility for all users and promote digital integration where appropriate, enhancing user experiences and operational efficiency.*

Public transport is often the natural backbone for developing a network of hubs, providing accessibility and encouraging modal shifts to more sustainable forms of travel. However, in a network not all multi-modal hubs need to be linked to public transport infrastructure.

R5. When engaging in the development of a hub network strategy look at existing infrastructure and networks as starting points – they should reflect the climate and mobility policy objectives of the urban area and functional urban are. For instance:

a. Public transport station network can enhance accessibility and encourage shifts towards sustainable urban modes.
b. Harbours and airports can focus on promoting sustainable last-mile connectivity.
c. Train stations can facilitate greater accessibility and promote rail as a preferred mode of long-distance transport.
d. Shared and micro-mobility drop off points can allow to further foster active mobility and a sustainable first and last-mile.
e. Park-and-ride facilities can reduce car usage in urban areas by linking private vehicles to public transit, other transport modes for the last mile(s).

Policies should remain adaptable, selecting the most suitable backbone to meet local objectives and prioritising sustainable, inclusive, and efficient mobility solutions. Yet to comply with the TEN-T regulation, additional considerations should be taken into account when defining multimodal hubs. We recommend that national, regional, and local policymakers map and assess existing hubs to determine how effectively they meet the objectives of the TEN-T Regulation. Several policy papers have addressed this matter and the need for thorough mapping (Florence School of Regulation, 2024; Bouma et al. 2024).

R6. If no existing hub complies with the TEN-T Regulation, we recommend that urban nodes together with the relevant regional and national authorities prioritise upgrading or developing a multimodal hub that meets the following criteria:

a. Ensure by 31 December 2030, the development of a hub as a connection point between at least two transport modes for passengers, where travel information, access to public transport and transfers between modes are ensured, such as park-and-ride stations, and which acts as an interface within and between urban nodes and between urban nodes and longer-distance transport networks;
b. Facilitate first and last mile connections, including the facilitation of access to public transport infrastructure and active mobility, and be equipped with at ***least one recharging station*** *as defined in Article 2, point (52), of Regulation (EU) 2023/1804 dedicated to serve buses and coaches.*
c. Ensure that by 31 December 2040, the development, subject to a socio-economic cost-benefit analysis, of at least one multimodal freight terminal, if such a terminal does not already exist, allowing for sufficient transshipment capacity within or in the vicinity of the urban node. According to the TEN-T regulation a 'multimodal freight terminal' means a structure equipped for transhipment between at ***least two transport modes****, or between two different rail systems, and for temporary storage of freight, such as terminals in inland or maritime ports, along inland waterways and in airports, as well as railroad terminals.*

Most practitioners interviewed do not see a necessity for every hub at the interface between urban and TEN-T flows to include a bus charging station. Charging stations for buses are considered highly dependent on the specific charging systems in use, and multimodal hubs may not always be the most suitable locations for such infrastructure. Alternative solutions, such as charging buses at depots, may often prove more efficient and practical.

Example of hub categorisation in different cities and regions across Europe

Antwerp: Five Types of hubs ('BVR Mobipunten'): 1) Interregional (network logic) 2) Regional (network) 3) Local (network) 4) Neighbourhood (network) 5) Neighbourhood (proximity logic).
Mannheim: Three Types of Hubs 1) Urban hub, 2) Regional hub, 3) Local hub.
Bremen: Bremen's network consists of **two types of hubs** and puts a strong emphasis on stationary car-sharing: 1) *mobil.punkte*: larger mobility points with 4-12 carsharing vehicles, the offer of public transport, easy cycling and pedestrian access as well as taxi stands and other neighbourhood facilities. 2) *mobil.pünktchen*: smaller mobility points in neighbourhoods with 2-3 carsharing vehicles. The mobil.punkte make up approximately 1/3 of the total carsharing stations in the City of Bremen. The hub system was adopted by many German and European cities, such as Rostock, Nürnberg and Bergen.
SmartHubs typology based on SmartHubs Open data Platform (i.e. (inter)national hub, central urban hub, rural hub, suburban/urban fringe hub, urban neighbourhood hub.
MOVE21 typology based on D5.1 *Draft Technology Solutions*:

- Nano-Hub: Movable hub serving individuals. These are focused on freight. They can be positioned whenever and wherever needed (space permitting) and removed when mission completed – if needed.
- Micro-Hub: Permanent hub serving a community. Relevant for people and/or freight.
- District Hub: Permanent hub servicing a set of Micro- and Nano Hubs. It may act as a Micro-Hub for surrounding community and is relevant for people and/or freight.
- Regional Hub: Permanent hub serving a set of District Hubs and possibly Micro-Hubs. Relevant for people and/or freight.

Best practice – The Nordstan Mobility hotel in Gothenburg

Gothenburg's mobility hotel, situated in the shopping centre Nordstan in the heart of central Gothenburg, is a zero-emission micromobility hub with multiple functions. In 2024 it included shared fleet of vehicles and bikes for service providers, mobility companies sharing space for the provision of services and sales, a battery swap station for micromobility operators, an unmanned 24/7 open warehouse store wholesaler for professional service providers and cargo bike hub with consolidation of goods and last mile delivery as well as a co-working space. Central Gothenburg faces challenges with congestion, environmental quality, safety and vacant shop premises. A shift from cars to micromobility will make the city centre more spacious, cleaner and more pleasant where services are located closer to the citizens. The location, in a large business and shopping centre in the heart of the city, is a result of a collaboration between the three founders of the hotel: the Urban Environment Department in the City of Gothenburg, Business Region Gothenburg, and Nordstan business and shopping centre. All share a vision of sustainable urban development and saw the Mobility Hotel as a concrete step in the transition towards that vision. The private partners in the collaboration represent micromobility operators, urban logistics operator, a B2B retail wholesaler, micromobility sale and service, battery swap and the property owners. The public partners are the Urban Environment Department of the City of Gothenburg and the public business development organisation. The different actors in the mobility hotel shares spaces, risks, successes and costumers, and develop new collaborations and services together.

Best practice – Kaia Mobility hotel Oslo

The city of Oslo aims to implement a zero-emission zone (ZEZ) in the central area of the city. The city is waiting for a national amendment for the city to be allowed to implement a ZEZ, but in the meantime the city explores ways of facilitating the transition to more zero-emission service and delivery transports. The Kaia Mobility Hotel was set up in a vacant container facility at Filipstad. Filipstad's location is key for freight and delivery solutions as it is close to one of Oslo's main highways, as well as the city centre. The location provided the opportunity to pilot a new urban logistics concept. The Kaia Mobility hotel aims to facilitate and enable more bicycle-based urban logistics in the centre of Oslo and in the area designated as a future zero-emission zone. The Mobility Hotel provides leasing of weather protected cargo bikes, as well as service, maintenance and storage. It also provides a rest area for workers and a battery swap station. The Mobility Hotel is looking into expanding to include small-scale consolidation, an outdoor battery swapping station and a small-scale warehouse. The Kaia Mobility Hotel was established in collaboration with Mobility Solutions, Wolt, Nordic FM Group, and Posten Norge at Filipstad.

Figure 5: Kaia mobility hotel in Oslo (Source: Rikke Dahl Monsen, City of Oslo).

Best practice – Neighbourhood hub Holstenstrasse in Hamburg
Hubs can address a wide range of neighbourhood needs beyond mobility, including logistics services like waste collection, social services, cultural offerings, and other enhancements that improve the overall quality of a location. Hamburg has adopted a multi-functional concept using a modular approach, which can be tailored to suit the unique structural conditions of different neighbourhoods and areas within the city. The City of Hamburg collaborates with numerous private and semi-private companies under various contractual or cooperative arrangements. As a city-state, Hamburg often handles framework contracts and binding agreements at a level beyond the district administrations, which function more as local communal authorities. In the MOVE21 project, the development and implementation of measures are led by the District of Hamburg-Altona. However, the collaboration models and business frameworks used there may differ from those applied when the measures are scaled or replicated across other parts of the city. Neighbourhood hubs in Hamburg are diverse, offering a wide variety of services and involving actors from multiple sectors. For instance, the neighbourhood hub in Hamburg-Altona integrates social use cases with commercial logistics and mobility services. A notable example is the distribution centre operated by Deutsche Bahn in Holstenstrasse, which serves as a transshipment point for last-mile parcel deliveries using cargo bikes. Parcel service providers like GLS, Hermes, and CityLog and DeinTopf e.V., with a social organization that primarily serves food and essential items to the homeless and people in need ultimately use the same space which allows them to reduce rental costs. They all collaborate with DB InfraGO AG.

Figure 6: Hub in Holstenstrasse, (Source: District Altona).

5.2 Governing hubs

Some countries, such as the Czech Republic, manage large mobility infrastructure projects centrally, encompassing transport, urban planning, and land use. However, affected urban areas and municipalities may hold differing opinions and raise concerns. While cities often invest in stakeholder engagement, most cities and regions face challenges in involving all relevant stakeholders. Additionally, reaching consensus in projects with multiple stakeholders remains complex. Although setting specific deadlines can provide structure, they are often insufficient to ensure efficiency. A potential solution lies in empowering existing governance bodies within cities and regions, granting them the authority to engage stakeholders effectively and make informed decisions (Finger, M., J. Montero & E. Petrozziello, 2024).

Vos et al. (2017) highlight that governance must employ balancing mechanisms to address three inherent tensions: fostering collective sense-making to resolve cross-organisational tensions, aligning goals to manage cooperation-competition dynamics, and enforcing joint management to strike a balance between rigidity and flexibility. These tensions significantly influence the effectiveness of public-public and public-private collaborations, directly impacting the achievement of desired outcomes. Multimodal hubs address the need for coherence by integrating modes that are often managed by different authorities or operators, making governance a critical determinant of their success or failure. (Ruohonen et al., 2024).

This section provides key recommendations for effectively governing multimodal hubs in various contexts, drawing on best practices from recently developed hubs to illustrate successful approaches.

R7. When developing multimodal hubs network, it is essential to define a clear governance structure from the start and throughout the implementation, and the service phase.

a. *Distinguish who should be involved from the start and who shall be involved in later implementation stages. Define which partners of the quadruple helix (public authorities, academia, private sector and civil society) to involve at which stage.*
b. *Establish a coherent vision with different political instances – beyond administrative borders if necessary – to cover the Functional Urban Area. This can take different forms from a simple working group to a more institutionalised organisation.*
c. *Define a lead partner and/or a neutral orchestrator of the stakeholder group.*
d. *Multifunctional/logistics hubs with a more complex structure require strong partnership and or collaboration with the private and logistics sector.*

An appropriate operational structure is essential for the successful development and commissioning of a multimodal hub. While this structure may vary depending on the local authority, it is crucial to define and clarify the interactions between key stakeholders—such as the potential mobility association or transport region, local authorities, licensing bodies, service providers, citizens and the civil society (NGOs, Local initiatives and others)—before the multimodal hub is built (Verkehrsverbund Rhein-Neckar GmbH, 2023). In the framework of the CEF co-funded project RESTART, the city owned parking management company Emel co-created with the City of Lisbon, the national transport authority and the transport operators, different governance scenarios for five bus terminals depending on the level of upgrades they would undergo. While three of them are currently city owned and managed, upgrading those to multimodal hubs with further integrated services beyond mobility would require adapting the governance structure according to the augmented complexity.

Overview of possible operation models			
	Coordination and Planning	**Construction**	**Tendering & Operations**
Small municipalities with few, smaller mobile stations	Planning by municipality.	Construction, operation by municipality.	Tendering of mobility services
Municipality as indirect operator	Coordination and planning by municipality.	Construction by municipality.	Transfer to in-house operations; tendering of services by in-house operation.
Public company as operator	Coordination and planning by municipality.	Municipality provides space for the mobile stations. Construction by public company.	Operation by public company.
Big transport hub (harbour, airport, international train station)	Planning and coordination by national/federal/regional authority.	Construction by facility manager/ public company.	Operation by public or private company.
Privately run model	Planning coordination by municipality, planning by private company.	Construction by private company.	Operation by private company.

Table 1: *Overview of different types of governance structures.*

Governance of hubs often involves collaboration models that extend beyond public authorities such as micromobility operators, private car-sharing operators, etc. Some collaboration models also include cost-sharing mechanisms, which allow for experimentation and testing in a financially lower-risk environment, while fostering the emergence of new business models, either within a single sector or across entire value chains. In certain cases, sharing revenues may also play a crucial role in ensuring success (Ruohonen et al., 2024).

R8. Start by establishing simple governance structures that facilitate revenue and risk-sharing. Public-private partnerships can help distribute risks and costs among multiple entities, enabling stakeholders to take on greater risks than they would if operating independently.

By involving stakeholders in the policy-making process, public authorities can align both stakeholder goals and internal (governmental) objectives. A locally standardised engagement process with the private sector can foster focused and inclusive knowledge exchange on urban logistics, informing the development of effective, fit-for-purpose policies. The emphasis should be on the three “C”s: collaboration, communication, and consolidation, as highlighted in a public-private roundtable on urban logistics in Oslo (Urban Logistics for Ambitious Climate Cities Policy Brief, 2024). While the Rome Sustainable Urban Logistics Plan provides a strategic framework for policies, it lacks the specific implementation steps required to achieve its goals. To address this, the Logistics Living Lab of Rome has been tasked with discussing and implementing the zero-emission zone and micro-logistics hubs, a key policy within the Rome Sustainable Urban Logistics Plan.

R9. Local public authorities require dedicated fora to discuss and mediate the differing interests of urban logistics stakeholders when developing hubs which include logistics operations.

Furthermore, when it comes to governance, the importance of engaging with citizens shall not be underestimated as it ensures a greater social acceptance and the mobility service uptake. The engagement with citizens from an early stage and throughout the planning allows to best fit the hub development to their needs. In the RESTART project in Lisbon, not only did users of mobility services take part in the co-creation process but also residents and communities around bus terminals took part to voice their needs and vision for upgrading those terminals. In MOVE21, a guidance document has been developed to this end (D6.8 *Practitioners' guide for setting up self-sustaining innovation co-creation partnerships*).

R10. Co-create services as much as possible. Co-creation models, like the ones deployed in MOVE21, can accelerate the deployment and execution of seeding innovation ideas. For example, MOVE21 gave the push needed to existing city partnerships to create effective conditions for the execution of a long-term for public-private collaboration.

R11. Depending on the location in the urban area and the purpose of hubs specific stakeholders' groups shall be targeted:

a. Commuters, workers, elderly, parents, children, individuals with disabilities, residents etc.

b. Especially when looking at the development of peri-urban hubs, it is essential to broaden the scope not only to local-residents but to commuters.

c. Work with the logistics supply chain: broaden the scope of interested parties: think beyond parcel logistics and include for instance the handy man sector, construction sector etc and other potential sectors that drive demand.

R12. Be clear on the scope of the participatory process yet be open to receive ideas that are out of the box. Structure the participation process in such a way that it allows for constructive problem and solution finding not only (dis)-agreement on a given plan.

Best practice – Governance of multimodal hubs in Flanders Hoppin Points

The management of Hoppin Points in Flanders is a collaborative effort involving various stakeholders, ensuring the effective construction, maintenance, and operation of multimodal hubs. The system provides a clear division of responsibilities, support mechanisms, and funding opportunities to municipalities, enabling the development of high-quality infrastructure that supports sustainable mobility.
Infrastructure Management: The responsibility for the construction and maintenance of Hoppin Points is allocated based on road classification:
• **Municipal Roads** are managed by the respective municipalities.
• **Regional Roads** are overseen by the Roads and Traffic Agency, with additional contributions from entities such as De Werkvennootchap, Lantis, and De Lijn.
Support and Coordination: The Transport Agency plays a key role in assisting municipalities:
• Consortia within the Transport Region help cities and municipalities draft the "Unieke Verantwoordingsnota" (Unique Justification Note), supporting the preparation of 367 files.
• Since September 2021, external support has been available through the Hoppin Points Manager to guide municipalities in the planning and implementation process.
Subsidies and Funding: Municipalities can apply for regional subsidies to finance the (re)construction of Hoppin Points adjacent to municipal roads.
• **Application Process**:
  ○ Municipalities submit requests to a dedicated steering group for approval.
  ○ All submissions must comply with public tendering legislation.
• **Funding Limits**:
  ○ Subsidies are capped at a maximum percentage and amount based on the type of Hoppin Point, ensuring equitable distribution of resources.

Best practice - Stakeholder engagement in Groningen
In Groningen, citizen engagement plays a significant role in the development of multimodal hubs. The participation process is primarily focused on deciding the location of the hubs. Citizens are informed about the projects and invited to provide feedback within a specified period. In sensitive areas, such as parks, more detailed consultations are conducted with neighbourhood associations to determine exact locations.The engagement approach varies by area. In some cases, discussions are limited to traffic experts, while in others, a broader group of stakeholders, including residents and businesses, is involved. The municipality strives to align hub projects with other ongoing community initiatives to minimize disruption and enhance the perceived benefits for the neighbourhood. Currently, citizen influence is largely limited to the placement of the hubs rather than their design or additional features. However, there are instances where residents contribute to decisions about supplementary services integrated into the hub. For example, in one neighbourhood, a community space was co-designed to include shared mobility options alongside social amenities like a living room area and a shop. Feedback from citizens is mixed—while some view the hubs as improvements, others see them as unnecessary additions. The city navigates these differing perspectives through structured discussions and coordination with multiple stakeholders, including maintenance teams, to ensure smooth implementation and upkeep. This flexible and area-specific approach reflects Groningen’s efforts to balance community needs with urban mobility goals.

5.3 Hub network thinking and TEN-T relevant hubs

Developing TEN-T relevant hubs might imply to work with complex infrastructure such as port, airport, train stations which might be run by PPPs, and dependant on regional, national or international decision making. Those hubs require even further coordination and multi-level governance efforts such as the ones outlined in the second SUMP principle.

R13. We recommend active dialogue between corridor, national, regional, and urban nodes level. Local authorities are invited to reflect the TEN-T relevance of hub infrastructure in their SUMPs. National SUMP Support Programmes should support the collaborative efforts around TEN-T relevant multimodal hubs process.

R14. For the development of multimodal hubs with TEN-T relevance the EU, National, Regional level should ensure a greater alignment of policy objectives and related funding schemes.

R15. Harbours, Airports, Bus and Train stations with national and international relevance are clear interfaces between the urban and the TEN-T transport system. The collaboration between the local public transport operators the local and regional authorities with the Airport, harbour or train operators is a key factor to ensure a greater integration of the urban and TEN-t transport systems.

R16. Set up collaboration mechanisms to ensure a greater coherence between urban and TEN-T mobility systems around:

- *Time-tables alignment.*
- *Ticketing integration.*
- *Upgrading existing station infrastructure and creating more compact and qualitative transfers.*
- *Mode availability.*

Beyond the development of individual multimodal hubs, it is also crucial to recognise that coherence begins with the creation of a network vision or strategy. When establishing a network of multimodal hubs, it is thus essential to have a clear understanding of the relevant FUA or FUAs as well as the existing degree of governance integration. This alignment efforts and network vision has already been adopted by several urban nodes or cities in collaboration with the actors of their FUA. The City of Munich is developing a network of multimodal hubs together with the municipalities of the FUA. In another German case it is at the level of Transport Associations where the multimodal hub networks cover parts of Baden-Württemberg, Rhineland-Palatinate and Hesse in south-west Germany. Similarly, the Flanders Region developed a regional brand of multimodal hubs. In Spain the Consorcio Regional de Transportes de Madrid is an autonomous body which is tasked with coordinating the public transport operations across multiple providers in the Community of Madrid. Besides harmonising fares for commuter rail, rapid transit, light rail and bus transport services provided by entities such as Renfe Cercanías, Metro de Madrid S.A. or the Empresa Municipal de Transportes de Madrid (EMT) it also manages the network of large multimodal hubs “intercambiadores”. CRTM also acts as a bridge between Madrid’s Regional Government and the different municipalities (including the City of Madrid).

R17. When planning a network of multimodal hubs, we recommend mapping the mobility and logistics FUA and identify all key stakeholders having an authority and decision power.

R18. National and federal authorities should provide support to local governments in defining and mapping the relevant systems, including the governance structures in place. Additionally, a comprehensive mapping of the mobility ecosystem within and around the Functional Urban Area (FUA) should be conducted, alongside a clear overview of facilities and land ownership. The self-assessment tool developed by the

SCALE-UP project can be a valuable resource in supporting this process and find in the SCALE-UP Deliverable 1.8.

R19. Define network of hubs at FUA level and develop a strategy document with relevant partners (Municipalities, PTA, PTO, New Mobility Service Operators, Train operators, Airport and Harbour if applicable) that is aligned with the relevant SUMP(s) and SULP(s).

Best practice – Polish SUMP Competence Centre and Collaboration

Poland has established a comprehensive approach to support the development and implementation of SUMPs through a dedicated SUMP Competence Centre. This centre collaborates with the Centre for EU-funded Transport Projects and a SUMP Steering Committee, which brings together representatives from various ministries and key stakeholders at regional and municipal levels. These stakeholders include the Association of Polish Cities, the Association of Polish Smaller Cities, the Association of Polish Regions, and the Association of Communes. Financial support is provided in two forms: technical assistance, where experts assist cities in preparing and drafting plans, and ongoing support through the technical support instrument. Effective resource allocation depends on the active engagement of all stakeholders, with the ministry playing a central coordinating role. To measure impacts and report to the European Commission, sustainable urban mobility indicators are utilised. Additionally, Poland places emphasis on integrating freight and logistics into urban planning, addressing an aspect often overlooked in cities. The country also employs a system to evaluate the comprehensiveness and effectiveness of SUMPs. Consequently, Poland's model offers a replicable framework for other countries and regions seeking to enhance sustainable urban mobility through multi-level collaboration (Finger, M., J. Montero & E. Petrozziello, 2024).

Best practice – Vertical integration self-assessment tool

Organising a policy change requires a debate on the governance, certainly when the local measure has an impact on regional mobility, bridges governance levels (local, functional urban area, regional, national; named vertical integration) or overarches municipalities and competencies. The SCALE-UP project has proposed step-by-step guidance to facilitate the discussion on vertical governance integration. This discussion could bring clarity to stakeholders and optimise cooperations across governance layers. This methodology can be applied when starting a multimodal hub project or strategy to ensure the right level of collaboration and coordination across governance levels. The framework consists of several steps, of which the first consists of a ‘performance scan’ of the existing vertical integration. This joint discussion amongst stakeholders can map current and wanted governance integration. Do we cooperate well, in our urban node, do we have the required staff to make things work, do we have political alignment and the needed finances?

KPIs to measure the vertical integration are split into four categories (political support, financial resilience, legal power and capacity). A survey will help to identify viewpoints of the various stakeholders on these pillars, and to identify diversions of opinions. The second step consist of identifying key stakeholders and to engage a meaningful conversation with them around needs, gaps and a potential common vision. Based on identified gaps in the KPIs and governance needs, urban nodes should discuss the usefulness of 12 governance typologies. This set is developed with criteria in mind: complexity of the cooperation (number of actors), formality of the cooperation (informal to legally binding cooperation) and scope of the measure (local to TEN-T, or only transport or wider with attention for climate, transport poverty etc.). This discussion, with the framework at hand, can inspire and support the improvement of vertical governance integration. The below Figure 8 shows the typology of governance models and the way the methodology has been applied to the Regional Council of South-West Finland. Further information are available in the SCALE-UP D1.8.

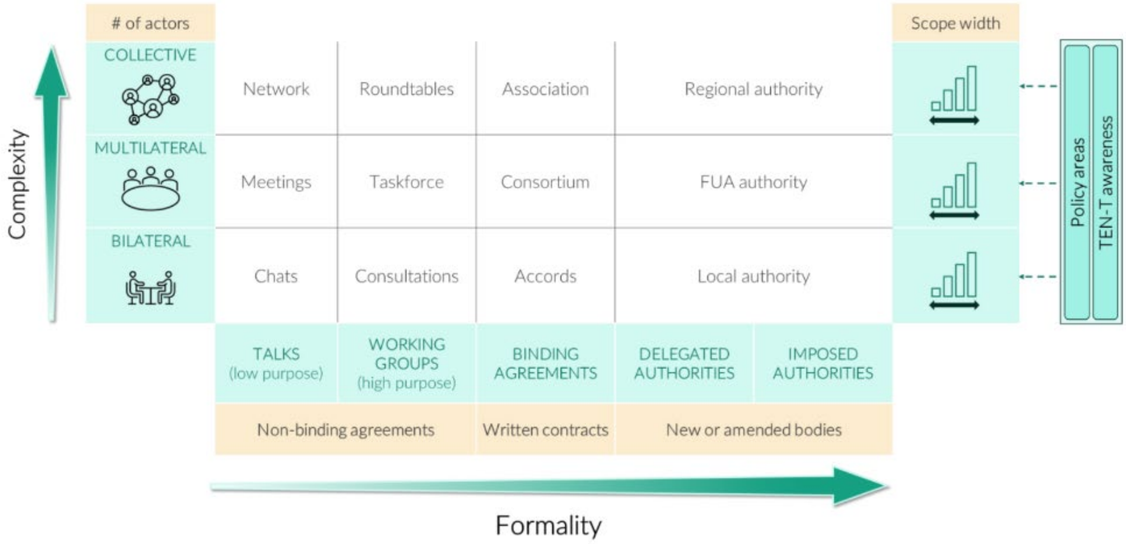


Figure 7: Typologies of governance models (Source: SCALE-UP, D.1.8, 2024).

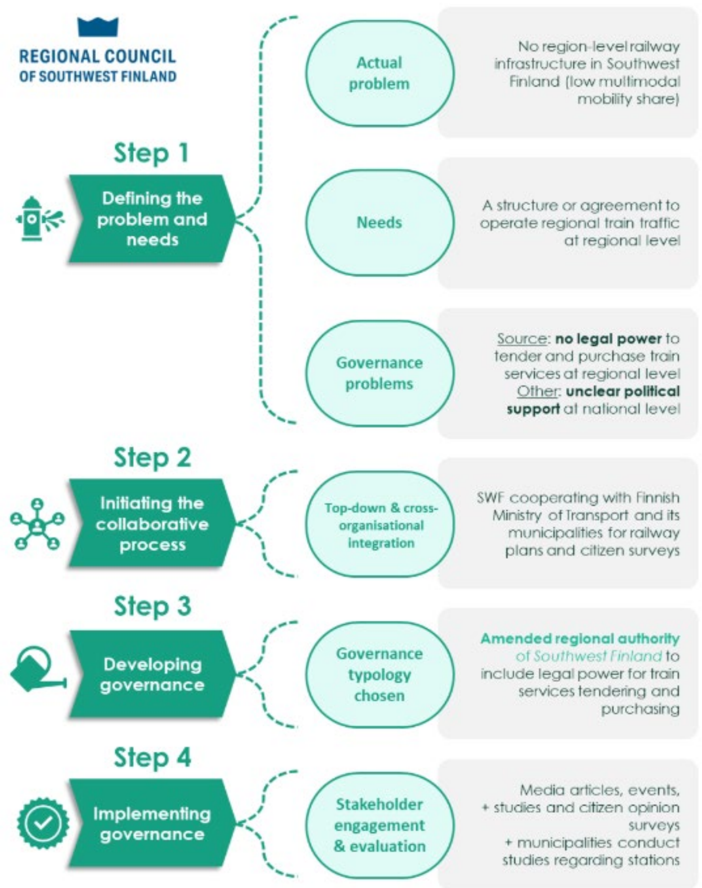


Figure 8: Methodology applied to the Regional Council of South-West Finland. (Source: SCALE-UP, D.1.8, 2024).

Best practice – The management of larger hubs with TEN-T relevance: Multimodal Hubs in Madrid

Madrid's multimodal transport hubs play a vital role in the city's public transport network, offering seamless connections between different modes of transport. The Madrid Transport Consortium's Interchange Bus Stations represent a strategic effort to consolidate suburban bus terminals into unified interchange hubs. These hubs facilitate the efficient transfer of passengers between suburban buses, Metro lines, urban buses, and regional rail services, ensuring a smooth and convenient travel experience.

Key Features of Madrid's Multimodal Hubs:

- **Optimised Connectivity:** Hubs act as key nodes where suburban bus lines converge, allowing passengers to seamlessly switch to the Metro network and urban bus services.
- **Reduced Travel Times:** The integration of transport services minimises transfer delays, improving the overall efficiency and quality of public transport.
- **Improved Passenger Experience:** The hubs simplify transfers, providing a more user-friendly and accessible transport system.
- **Operational Efficiency:** By centralising bus operations, these hubs enhance service frequency, reduce congestion, and improve traffic management, benefiting both public and private transport users.

Infrastructure and Development:

Madrid's intermodal hubs are large-scale infrastructure projects, often developed underground and promoted by the Consorcio Regional de Transportes de Madrid under a public-private partnership (PPP) model. These hubs are strategically located, with most connected to Metro Line 6. The city continues to expand its network.

Zoom on the Moncloa Interchange Station:

Originally opened in 1994, Moncloa Interchange Station has grown into one of Madrid's most significant multimodal hubs. The facility handles over 50,000 daily users and accommodates 1,400 intercity bus trips serving the A-6 corridor. In 2008, the interchange was expanded adding 20,000 m² of space and 20 additional bus bays.

The Moncloa hub now integrates:

- 56 intercity bus lines from the northwest corridor
- Connections to Metro Lines 3 and 6
- 20 urban bus routes operated by EMT
- Regulated bus areas to improve traffic flow and reduce surface congestion

A direct connection via a High-Occupancy Vehicle (HOV) lane has further reduced travel times for nearly 5,000 intercity buses passing through the Moncloa area daily. The hub's expansion has streamlined operations, improved environmental conditions, and enhanced the overall efficiency of Madrid's transport network.

Besides the *Intercambiadroes* the *Madrid 360 strategy* and the new city Sustainable Urban Mobility Plan lay out the goal to develop a network of multimodal hubs as designated spaces where services that promote sustainable urban mobility coexist, such as shared active mobility, vehicle electrification, and logistics optimisation. These hubs are often built in existing parking facilities or park & rides with public transport connections. In August 2022, EMT Madrid launched the first of these hubs, **"Canalejas 360"**, located under Sevilla Street and Canalejas Square near Puerta del Sol. This hub, occupying 5,500 m², was created by transforming an underground level -1 of an existing infrastructure (owned by the City of Madrid and managed by EMT Madrid) into a sustainable mobility living lab.

Canalejas 360 integrates various services to enhance sustainable mobility, including:

- Spain's largest EV charging station (12 points up to 400kW)

- A zero-emission shared mobility area (carsharing and 4 moped-sharing companies)
- Battery swapping for mopeds
- Bike parking/storage
- A last-mile distribution point with parcel lockers and a pick-up/delivery hub

EMT Madrid also operates park & ride facilities, offering free parking for users combining car parking with public transport use. To qualify, vehicles must be parked for 5 to 16 hours in connection with public transport travel, with the user presenting both the parking and transport tickets for validation. As of February 2025, EMT Madrid manages 3 hubs (Canalejas, Recoletos, and Artilleros) and is planning a new one. Additionally, 6 park & ride hubs and 11 new locations have been studied.

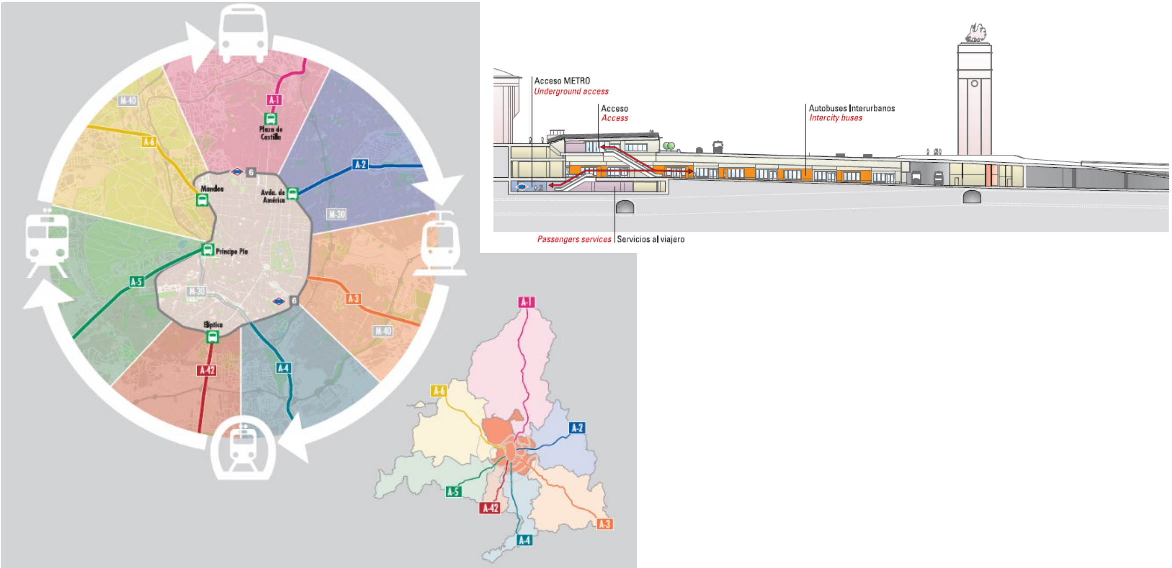


Figure 9: Map of the *Intercambiadores* in Madrid with focus on the Moncloa hub (Source: CRTM, 2013).

Figure 10: Different views of the services included in “Canalejas 360” mobility hub (Source: EMT, 2024).

Best practice – TEN- T relevant hubs in a polycentric functional urban area: The Rheinau compact railway station

The Rhein-Neckar Transport Association, in collaboration with local transport operators and municipalities, has developed a hub network alignment strategy to standardise hub design and wayfinding. This strategy establishes clear guidelines to ensure consistency across the network while providing municipalities with detailed instructions on various hub models they can set up and their integration into the broader transport system. This FUA approach is key to ensuring an efficient integration of the different mobility levels as well as the integration of urban and wider TEN-T mobility networks through multimodal hubs as key connecting infrastructures. Besides this strategic and coordinated approach there have been renovations to major train stations in the FUA covered by the transport association which illustrate how the integration can happen practically.

The S-Bahn stop of DB infraGO AG and the light rail terminus of Rhein-Neckar-Verkehr GmbH (rnv) have been transformed into a modern connection point between public transport and private transport. Between May 2017 and August 2018, rnv renewed around 650 metres of track and catenary systems, converted both the light rail and bus stops to make them barrier-free and equipped them with the latest generation of passenger shelters and dynamic passenger displays (DFI). At the same time, 50 Park + Ride and 36 Bike + Ride spaces were built. In May 2018, pupils from Rheinau schools also had the opportunity to design and visually enhance the existing subway as part of a graffiti art workshop. DB infraGO AG began the barrier-free expansion of Mannheim-Rheinau station in October 2016. The measure included the demolition and new construction with raising the platforms to S-Bahn level as well as the construction of a lift system on platform 2 for barrier-free access to the existing pedestrian subway. For this purpose, the existing staircase from the pedestrian subway also had to be dismantled and rebuilt in a different position, including a staircase enclosure.

Figure11: The Rheinau compact railway station (Source: rnv).

Best practice – Bologna's path to Sustainable Mobility: A Case Study in Regional Collaboration between the Metropolitan Area Region and RFI

The Metropolitan city of Bologna, encompassing the Municipality of Bologna and its 54 surrounding municipalities, has a diverse modal split and a longstanding commitment to increasing the share of sustainable mobility. Recognising the need for a cohesive transport and mobility network across the Functional Urban Area (FUA), the Metropolitan city Council sought to strengthen integration between Bologna and its neighbouring municipalities.

This vision took a significant step forward with the approval of the Sustainable Urban Mobility Plan (SUMP), the first in Italy having a wider metropolitan region perspective, that defines a network of mobility hubs in 30 railway stations in urban and suburban areas. In the framework of the SUMP, Bologna established a formal collaboration agreement with the Italian Railway Manager RFI, having the primary goal to develop and pilot Mobility Hub Design Guidelines. These guidelines acted as a catalyst for the creation of FUA-wide multimodal mobility hubs, designed not only to encourage a sustainable modal shift but also to drive urban redevelopment and regeneration of public areas, and enhance green spaces.

A Unified Approach to Mobility

The collaboration led to the establishment of an interinstitutional taskforce, bringing together key stakeholders, including the Municipality of Bologna, representatives from the Emilia-Romagna region, and the in-house mobility agency of the Metropolitan city of Bologna. The taskforce featured dedicated departments for sustainable mobility, urban planning, and transport, as well as a coordination group for pilot projects.

The taskforce's work has already yielded tangible results. Mobility hub projects inspired by this collaboration are currently being implemented, driving significant progress in sustainable mobility together with urban regeneration.

Lessons Learned

The success of Bologna's efforts can be attributed to several key factors:

Strategic Funding: National funding opportunities played a critical role in securing resources for the first projects developed at preliminary level with a co-design process.

Public-Private Partnerships and Participation: Engaging public administration, citizens, associations, and private stakeholders (particularly in the commercial and tourism sectors) in the first projects, allowed the establishment of future public-private partnership agreements for the next implementation phases.

Adaptability: The taskforce model proved highly effective but also highlighted the potential benefits of a more structured and permanent collaboration framework.

Bologna's experience demonstrates the power of collaboration, innovation, and strategic planning in driving sustainable mobility and urban quality design. By leveraging partnerships and integrating urban redevelopment with transport and mobility planning, the city has not only advanced its own goals but also set a blueprint for other cities to follow. The journey of the Metropolitan city of Bologna continues to serve as an inspiration for regional cooperation and long-term commitment to sustainability.

Figure 12: Guidelines development timeline (Source: Metropolitan City of Bologna).

Best practice – Reviving Regional Railways in Southwest Finland: A Collaborative Path
Over the last century, Finland experienced a shift towards road-based mobility, leading to a decline in regional railway use and infrastructure. This trend was particularly evident in Southwest Finland, where Turku serves as the regional capital. Smaller cities and villages in the region found themselves excluded from the railway network, with no organisation holding the mandate to operate regional train traffic. As a result, bus services became the sole form of public transport for many areas, with decisions about railway development confined to the national level. Despite the absence of a clear mandate for regional railway development, Southwest Finland took proactive steps. Collaborating with the Finnish Ministry of Transport and its municipalities, the region began formulating plans for a regional railway system. These efforts were consolidated into the Train Traffic Vision 2040+ for Transport in Southwest Finland, which outlined long-term objectives for sustainable and inclusive mobility. To generate awareness and foster interest in its goals, Southwest Finland undertook a multi-faceted engagement strategy. This included: • Media Campaigns: Raising the profile of the issue through publications and news coverage. • Events and Workshops: Facilitating public dialogue on regional railways. • Surveys and Studies: Conducting extensive research to capture residents' opinions and preferences regarding train services. Over the years, these efforts revealed growing public support for a regional train system. This shift in sentiment encouraged municipalities, coordinated by Southwest Finland, to carry out detailed studies on potential train station locations and service plans. The collaborative efforts between Southwest Finland, the national government, and local municipalities have borne fruit. An upcoming amendment to Finnish law will enable regions to tender for and purchase train services, significantly enhancing the legal authority of Southwest Finland to drive railway development. This marks a pivotal step in realising the region's vision for an integrated and sustainable transport network. The process of reviving regional railways in Southwest Finland has provided valuable insights that can guide similar efforts elsewhere: • Engage All Stakeholders: Involve every municipality affected by a shared issue to ensure alignment and broad support. • Foster Regular Dialogue: Maintain constant interaction through debates, events, and discussions to establish common goals. • Plan Resources Effectively: Allocate sufficient financial and human resources from the outset to sustain long-term development efforts.

- Leverage Data and Monitoring: Collect and analyse data to support ongoing progress and facilitate the replication of successful strategies in other regions.

Southwest Finland's journey demonstrates the power of collaboration, public engagement, and persistence in overcoming institutional and structural barriers.

5.4 Identifying the right location for hubs

Defining the location of multi-modal hubs is a critical task for Urban Nodes and quadruple helix partners (encompassing public authorities, academia, private sector and civil society), as it requires a thorough understanding of mobility data, push/pull factors, and potential space opportunities. These factors collectively determine the hubs' ability to attract users and integrate seamlessly into urban ecosystems. MOVE21 surveys targeting hub users in Gothenburg show that 40% of the users see the main difficulty in finding the mobility service, understanding the services offered is the second most challenging aspect (MOVE21, D8.6, 2025). Moreover, the purpose and goals of multimodal hubs should guide not only their placement but also the range of services they offer, ensuring their alignment with the specific needs of the communities they serve. The same MOVE21 study also shows that users surveyed in Gothenburg see the main benefits of hubs in practicality and time saving.

R20. The location criteria should ideally be defined in a guidance document which can be applied for the development of a network of hubs at FUA-level.

The definition of a good location for multimodal hubs varies across local contexts. In MOVE21 users ranked locations close to residence and work as most important (MOVE21, D8.6, 2025). Yet one can distinguish a set of indicators that show a relevance in the different experiences and research on hub location across the Europe.

R21. For the strategic identification of possible hub locations following criteria should be taken into account:

a. Pre-existing Public Transport infrastructure
b. Parking data and geo-fencing data from micromobility users are key indicators of existing use. Those data can help identify hot spots in which micromobility users are parking, thus identifying spots where a hub infrastructure might be relevant and have a natural uptake
c. Space availability is a key factor to consider
d. Mobility needs
e. Already planned interventions (street improvements etc.)
f. Pull factors: get people to use services in specific areas
g. Qualitative observation on available space
h. Population density
i. Mobility accessibility
j. Consider development strategies and plans
k. Points of interests
l. Freight activities and flows (if applicable)
m. Proximity to businesses and consumers

How to prioritise hub locations? Different factors can be considered not only in the location of hubs but also in the prioritisation of which hubs to develop first.

R22. Local authorities can priories hub's location based on following criteria:

a. Transport network optimisation
b. Opportunity (planned road works) or upgrade of existing infrastructure

c. Modal shift for areas with restrictions
d. New area development
e. Relevance to meet policy objectives, SUMP and SULP objectives or such as TEN-T requirements
f. Relevance to meet modal shift objectives and active mode objectives
g. Relevance to improve shift from vans to cargo bikes
h. Relevance to improve the sustainability of last mile logistics

Given the wide range of possible mode and function combinations, it can be helpful to assign multi-modal hubs to different hierarchy levels to ensure that their equipment features are selected appropriately based on local conditions. The City of Munich has developed a very detailed ranking system which is explained in the best practice on page 41. This requires a flexible and modular categorisation approach that is both practical and easy to implement.

R23. Start by considering the specific conditions of the selected location and the existing space, which can then be supplemented with additional factors. For each type of station, minimum standards and tailored recommendations for equipment features can be provided to guide their development.

When it comes to selecting specific locations, local authorities often face limited space availability and zoning regulations which limit the options in terms of selecting the best hub location.

R24. Regulatory barriers in parking and zoning regulation limiting the capacity to experiment different uses on parking spots should be lightened.

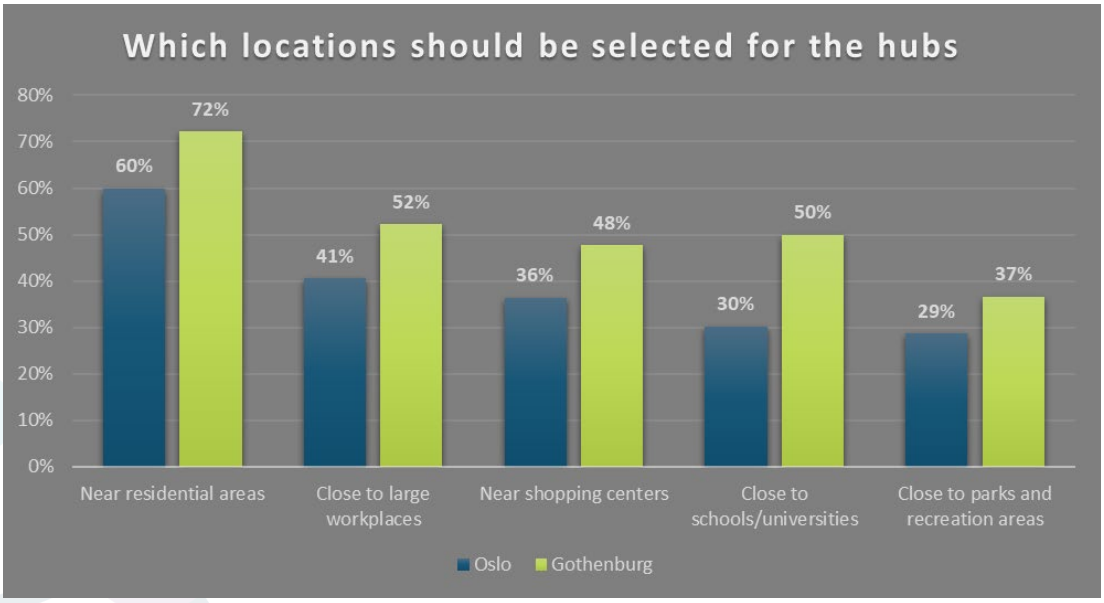


Figure 13: Findings on location for hubs (Source: MOVE21, D8.6, 2025).

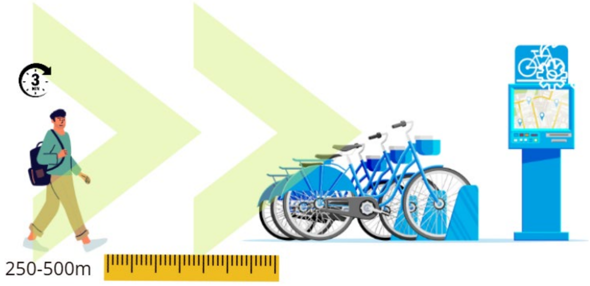


Figure 14: A good hub location is no further than 3 min walk or 250-500 min away (SmartHubs findings).

Figure 15: The most common factors to locate hubs are the density of population and points of interest (SmartHubs findings).

Best practice – Setting quality standards for hubs in Munich

The City of Munich uses a strategic and structured approach to identify minimum quality criteria for mobility hubs. The process begins with long-term planning to determine the number of hubs needed and their ideal placement to provide maximum value to residents. Hubs must meet clear quality standards to ensure reliable and user-friendly services. A key requirement is that at least two mobility services, such as public transport and bike-sharing, are available at the site. To qualify as hub a location needs to comply with a standardised points system which assesses 29 criteria across five categories:

- Transport Options: Includes public transit services, shared mobility offers like bike-sharing and car-sharing, and taxi services.
- Mobility Facilities: Such as parking spaces, e-charging stations, and repair points for bikes.
- Quality of Stay: Features like benches, Wi-Fi modules, toilets, and drinking water fountains to improve user comfort.
- Logistics Features: Includes parcel or neighbourhood lockers and secure storage options.
- Other Amenities: Examples are climate-adaptive measures, emergency call points, defibrillators, and parking management systems.

A site must score at least 20 points to qualify as a mobility hub, with at least 14 points coming from the transport options category. For instance, a bus stop combined with bike-sharing or two station-based services like bike and car-sharing meets these criteria.

The City of Munich has also developed a checklist to guide the location selection process. Once a potential location is identified as suitable for a **multimodal hub** and meets the relevant criteria, micro-location is performed. This process involves positioning the sub-elements of the **multimodal hub** (e.g., information pillars or parking spaces) within the selected area.
The following criteria are essential for successful micro-localisation:
General Criteria:

- **Visibility:** The location must be easily visible and well-lit, preferably in or near busy squares and high-traffic streets.
- **Findability:** The site should be easy and intuitive to find, situated in a well-frequented area.

- **Space Requirements:** The location must offer sufficient space for the defined mix of services, all within clear sight.
- **Accessibility:** The location should be fully accessible (e.g., no steps, clear signage).
- **Reception:** There should be good mobile phone reception to facilitate the booking of mobility services via an app.
- **Quality of Stay:** Ideally, the site should offer a high-quality experience for users.

Construction Criteria:

- **Minimally Invasive: Multimodal hubs** in urban areas should primarily be placed in existing parking spaces.
- **Protection of Green Spaces:** The placement of **multimodal hubs** should not interfere with green spaces, with the exception of installing information columns.
- **Protection of Listed Buildings: Multimodal hubs** should not be located in front of listed buildings, and their protection must be ensured.
- **Conflict Avoidance:** Existing parking regulations, signage, special exemptions, and street furniture should be evaluated during planning. Potential conflicts with property access, fire service routes, public transport stops, and other planned construction must also be assessed. Additionally, utility lines, cables, and sewers must be considered during construction planning.

Safety-Relevant Criteria:

- **Speed Limits:** Shared parking spaces for micromobility should ideally be situated in 30 km/h zones. They should be avoided in 50 km/h zones unless there is a designated cycle path between the car lane and the parking bay.
- **Obstruction of Visibility:** The design of the **multimodal hub** should not obstruct views of key traffic routes.
- **Consideration for Road Users:** The **multimodal hub** should be clearly visible to all road users, with measures taken to prevent conflicts. When placing shared parking for micromobility on sidewalks, heavily frequented areas, such as school routes, should be avoided.
- **Positioning of Columns:** Information columns should be positioned on the sidewalk rather than the carriageway to enhance safety.

Best practice – SmartHhb Methodology for Identifying Optimal Mobility Hub Locations

The most common factors to locate hubs are the density of population and points of interest. The SmartHub methodology employs a two-tiered approach—macro and micro levels—to identify the best locations for mobility hubs within a city.

Macro-Level Analysis: At this level, broader areas such as neighbourhoods or zones within the city are ranked based on their suitability for hosting a mobility hub. The process involves: 1) Key Objectives: Ensuring the hub connects public transport, complements existing networks, and promotes sustainable mobility; 2) Selection of Variables: Factors influencing the location are identified through spatial analysis and citizen surveys, then weighted according to the priorities of decision-makers; 3) Outcome: This phase narrows down areas with high potential for mobility hubs, serving as a foundation for more detailed analysis.

Micro-Level Analysis: This stage focuses on refining the search within the selected macro areas to identify specific street-level locations for hubs. It involves: 1) Identifying Existing Hubs: Unbranded mobility hubs may already exist within the transport network. These locations are assessed based on factors such as walking distance, visibility, wayfinding, and minimizing conflicts between mobility options. Enhancements can be made to improve their integration; 2) Ranking Potential Locations:

Street-level locations are evaluated and ranked within the selected areas to either upgrade existing hubs or implement new ones.

By combining these two levels, the SmartHubs methodology ensures a comprehensive and targeted approach to mobility hub placement, balancing strategic goals with practical implementation.

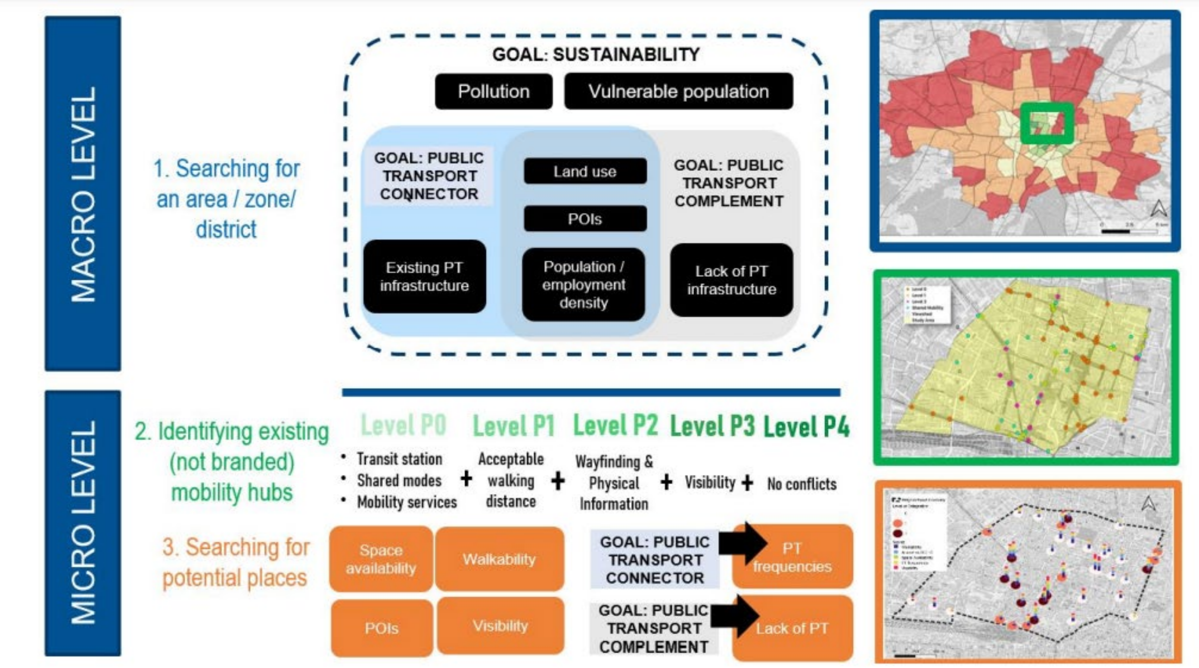


Figure 16: Overview scheme to select the right location for a hub (SmartHubs D3.1, 2022).

5.5 Spatially integrating and upgrading hubs

When discussing integration, it is essential to emphasise that multimodal and multifunctional hubs must be physically and contextually embedded within their socio-spatial environments (Queirós, Hidalgo González 2019, 10). This involves two key aspects: first, the integration of transport modes should be supported by coherent spatial design and physical features that are intuitive and recognisable for users and citizens. In the case of the hub piloted in Klippan in Gothenburg, a major dilemma was related to connecting in the future not only the tram-stop, the parking, the shared bike station but also the ferry-stop 200 meter further down the street. Intensive reflection went into improving wayfinding and the curb side in the future to create a sense of connection between existing transport stops and spaces.

Second, hubs must also account for their socio-political context, requiring dedicated efforts in placemaking to ensure they serve the community effectively. Additionally, in an era of limited urban space and increasing densification, it is crucial to integrate diverse functions within these hubs, extending their role beyond mobility and logistics. In Hamburg for the hub developed in Holstenstrasse it has been crucial to understand the social needs of the neighbourhood thus seeing not only the strategic location of the hub for last-mile logistics operations but also for understanding the social needs in an area where homelessness is peaking.

Many development projects focus on upgrading existing structures rather than building hubs from scratch, underscoring the need for innovative approaches that maximise utility. The following sections present recommendations to address these considerations.

R25. Develop simple and easy understandable signage at and around hubs. It is key success factor – adhere to universal design principles.

R26. Create coherent design and wayfinding, ideally at Functional Urban are level in a coordinated manner.

R27. National harmonisation strategies can be of support when no local wayfinding and designs have emerged yet.

R28. For a qualitative physical integration, procurers and designers of multimodal hubs should be mindful of following aspects:

a. Universal design
b. Safety
c. Distances/time between modes and services
d. Gender specific requirements
e. Area of influence of the hub
f. Surrounding infrastructure

R29. Adhere to creative uses of scarce space in dense urban environments. They create win-wins - both by coupling seemingly unrelated activities such as urban logistics and social services, and by actively using temporary dark spaces for services and businesses. In particular, there is great potential for more collaboration between public and private sectors to scope and ring-fence suitable locations, also temporary ones, for urban logistics.

R30. Future collaboration with housing associations and parking facilities is a recommended strategy to create more multifunctional hubs and rent out (temporarily) empty, but still useful buildings.

R31. We encourage to use metropolitan/regional (cargo) bikes sharing programmes as vectors for expanding the uptake of the multi-modal hub concept.

Best practice – Integration areas of a Multimodal hub in the metropolitan area of Bologna

In the Mobility Hub Guidelines developed by the Metropolitan city of Bologna jointly with RFI, there are clear technical indications on the spatial integration efforts to be made at a hub location and around it. These concentric circles help creating an understanding of service and infrastructure needs beyond the hub location the below figure provides an overview of those according to the distance to the railway station to be qualified as new mobility hub.

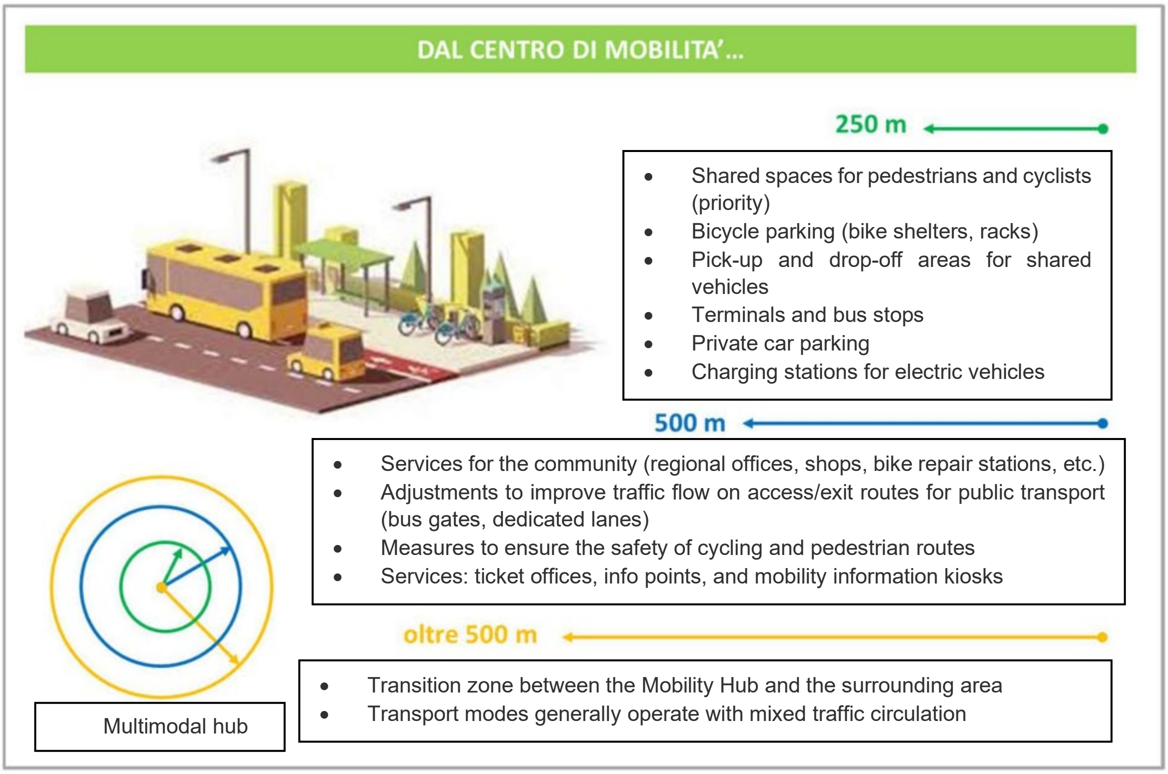


Figure 17: Service and infrastructure needs from around the hub location (Source: Metropolitan City of Bologna).

Best practice – Mobility Hub Management in Munich's Functional Urban Area

Mobility transcends municipal boundaries, encompassing private cars, suburban railways, underground trains, trams, buses, and cycle paths. To provide seamless and attractive mobility options, cooperation among stakeholders is crucial. Users expect cohesive services without needing to differentiate between institutions or transport companies. In the Munich FUA, the City of Munich cooperates with the Munich Transport and Tariff Association (MVV) and municipalities in Munich's FUA.

- Münchner Verkehrsgesellschaft (MVG): A subsidiary of Stadtwerke München, responsible for operating underground trains, trams, and city buses.
- Munich S-Bahn: Operated by Deutsche Bahn AG, handling local S-Bahn services.
- Regional Bus Companies: Financed and coordinated by districts, operating under the standardised MVV design.

The MoveRegioM project, funded by the Federal Ministry of Education and Research (BMBF), has significantly advanced inter-municipal cooperation and the network-wide development of a unified mobility hub concept, thanks to the collaborative efforts of stakeholders who prioritised cooperation as an explicit goal. To enhance usability and recognisability, a single, memorable symbol was created to represent mobility hubs across the MVV area. This design standard, developed with input from all relevant stakeholders, ensures that all mobility hubs, regardless of their provider or digital application, have a uniform and recognisable appearance. A common design for the mobility hub pillars was also established:

- **Variant C**: A simple sign variant, offering low acquisition and maintenance costs. As of January 2025, this version has been installed at 100 locations in Munich.
- **Variant B**: A more flexible option with illuminated elements powered by solar panels or a direct power connection, suitable for regional use.

- **Variant A**: The most advanced option, featuring a power connection and digital screens, tailored for high-profile or central locations.

This standardisation strengthens the identity of shared mobility across the Munich area and ensures high recognition value for users. Munich's approach to mobility hub management illustrates the importance of collaboration, standardisation, and user-focused design. By fostering inter-municipal cooperation, developing a unified symbol and design, and ensuring seamless service integration, the region has set a benchmark for effective mobility hub management.

Best practice – Upgrading the San Paolo Metro Station into a Multimodal and Multifunctional Hub

How can a standard metro station be transformed into a multimodal and multifunctional hub? This question has been central to Roma Servizi per la Mobilità's (RSM) work around the San Paolo Metro Station in Rome. The San Paolo area is densely populated and home to numerous businesses and offices. With the rise of e-commerce, three parcel lockers (two from Amazon and one from Poste Italiane) have recently been installed to meet growing delivery demands. The station is in the Green Area of a Low Emission Zone (LEZ), where the access of vehicles will be progressively restricted according to their emission category. It is located next to St. Paul's Cathedral, visited by pilgrims during the current Jubilee making sustainable transport solutions particularly relevant. However, the area suffers from a lack of designated loading and unloading zones, leading to illegal temporary parking and associated safety and congestion issues. This makes San Paolo an ideal location for encouraging greater use of bicycles and cargo bikes.

To enhance first- and last-mile connectivity, efforts have been made to better integrate public transport with cycling. Secure bike boxes have been installed at the metro station to promote cycling as a viable alternative. As part of the MOVE21 project, RSM launched a tender to implement a cargo bike service for both businesses and private users. The service includes:

- Three e-cargo bikes available Monday to Saturday, 8:00–18:00, free of charge.
- A secured space for storing cargo bikes and a temporary parking area for delivery vans.
- The service also includes a reservation and tracking system for recording the use of cargo bikes as well as a maintenance service

During the pilot the service received good uptake both from local businesses and individuals which encourages RSM to find a long-term solution and provide similar offers at other metro stations. Further infrastructure enhancements around the station will focus on improving cycling infrastructure and better connecting the cycling lane to the multimodal hub, ensuring a smoother and more efficient transition between transport modes.

Best-practice - Amsterdam from petrol station to multimodal hub

The E-lympic project in Amsterdam is an initiative that transforms a traditional petrol station into a smart mobility hub, integrating clean energy, fast charging for road vehicles as well as boats, and shared mobility. This transformation aligns with the city's commitment to phasing out fossil fuels and capitalises on the expiration of existing fuel station leases.

At the heart of E-lympic is the installation of 17 rapid EV chargers, ensuring that electric vehicle users have reliable access to fast charging infrastructure. In addition, a 185 m² space is dedicated to shared mobility, offering e-cars, e-bikes, and e-cargo bikes, enhancing accessibility and reducing car dependency. The hub also features an advanced energy management system (EMS), supported by a 1MW battery storage system, which optimises electricity use and prevents grid congestion. Uniquely, the project integrates electric boat charging stations, reinforcing Amsterdam's commitment to multimodal transport by connecting land and water-based mobility. The hub's modular and sustainable design ensures adaptability for future urban needs, while active engagement with local stakeholders guarantees alignment with broader urban mobility strategies.

The implementation of E-lympic followed a structured process. The initial phase focused on market consultation, residence meetings, identifying suitable locations based on fuel station lease expirations and assessing the technical feasibility regarding grid capacity and transport demand as well as specific needs; those outcomes entered into a procurement strategy and resulted ultimately in a tendering process. TotalEnergies and Pon got awarded. This was followed by close collaboration with municipal authorities, energy providers, and mobility operators to ensure policy alignment and operational viability. Stakeholder engagement played a crucial role, with consultations involving residents and businesses to shape the hub's design. In the design collaboration phase the development of a new type of a lease agreement has been crucial.
E-lympic can serve as a blueprint for the future of urban mobility, demonstrating how cities can replace fossil-fuel infrastructure with sustainable alternatives. By integrating shared transport, energy efficiency, and multimodal connectivity, the project highlights a viable path towards fossil-free transport while improving accessibility and reducing urban congestion.
E-lympic is expected to be operational in the second part of 2026. Below you can find the first sketches. These are still prone to adjustments, as long as the tendering phase is in progress.

Figure 18: Visualisation of the future E-lampic hub (Source: City of Amsterdam).

5.6 Digital integration

For multimodal hubs, digital integration primarily involves the digitalisation of access to mobility services. As an increasing number of services are application-based and therefore require users to own a smartphone, it is essential to ensure seamless accessibility for all. The primary function of hubs is to facilitate smooth transitions between transport modes and enable multimodal trips. Digital tools play a crucial role in this by simplifying trip planning, ticket booking, and access to real-time information. Digital integration thus involves providing users with the necessary tools to find information and purchase tickets, either through personal digital devices or publicly available systems. This often includes the integration of applications and the development of Mobility as a Service (MaaS) platforms, which streamline the user experience while collecting valuable data for service optimisation. When integrating micromobility and scheduled public transport services or parking services, two key challenges thus need to be addressed:

1. **Differing payment models:** Public transport typically charges a fixed fare per trip, determined by the journey's start and end points within zones or between zones. In contrast, micro-mobility services often charge users based on time of use, distance travelled, or similar metrics. Here one can distinguish a station based shared bike from an e-scooter rent. The station-based bike can be rented by paying a fixed price for a single ticket of 60mins (approx.) Th e-scooter rent will either be charged by kilometres driven by the customer or by minutes used by the customer (or monthly card of 300min). To deliver seamless end-to-end services, ticketing and payment models must be harmonised. This ensures that travellers pay for a single, unified journey while service providers receive fair compensation.
2. **Integration of information systems:** Effective integration of information systems is essential to present travellers with coherent details about combined services. This integration also ensures that the necessary data is exchanged seamlessly between the systems managing various mobility services. There are various levels of integration that can be aimed for. Deep integration encompasses the transfer of Personal Identifiable Information (PII) which are often more complex to set up and requires stringent measures to comply with GDPR regulations to safeguard user data. A less complex approach, such as the one implemented in MOVE21 (see below example of the Urban Sharing API), involves integration through APIs. This method avoids the need to process or exchange PII, mitigating potential data privacy risks while still enabling effective communication between systems.

Difficulties mainly lie in the compliance with GDPR, the governance and the business models behind this end-to-end service provision. Often operators face different (legal) requirements and use cases are not aligned. Technical difficulties for the integration are rather limited.

Digital integration also facilitates reporting to authorities, ensuring better access to information for planning, policy-making, and enforcement. To support this, both certified and de facto standards can serve as guiding frameworks. However, significant governance challenges remain, and many use cases for mobility data spaces are still underdeveloped. The EU-funded deployEMDS project aims to address these gaps by defining concrete use cases for establishing mobility data spaces. At the same time, local authorities are developing their own mobility management tools. One such example is Antwerp, which is highlighted in the following best practice case.

Finally, not all users are equally digitally savvy, this remains an issue when it comes to providing travel information digitally. In a survey done by the SmartHub project, 82% of the participants stated that a digital pillars at hubs would help them to use mobility services (SmartHub D3.3).

R32. Ensure the digitalisation meets users' needs and skills. Real-time information provision and ticketing integration are key features to develop according to users.

R33. Do not only rely on citizens' personal devices. Citizens should be able to visualise different transport options (i.e., real-time and pricing) at the mobility hubs without having to rely on their own smartphone to overcome the barrier of digital exclusion.

R34. Coordination at national or European level should support the harmonisation and trust-building regarding the digital integration of mobility services. National (through the National access points) or even European (through the Mobility data space) wide alignments could support

a. The mapping of transfer methodologies between standards.
b. The identification of common use-cases.

R35. At local level it is important to identify or set-up an orchestrating organisation able to take on a user-centric perspective able to encompass road traffic, public transport and micro-mobility.

R.36 Public Transport Authorities or Operators can take on an orchestrating role in the digital integration, yet this requires adapting their KPIs accordingly away from pure optimisation of PT-use towards optimisation of sustainable trips.

R.37 When it comes to regulation and procurement processes defining the use-cases is often more complex than selecting and agreeing on standards, we advise to start defining use-cases (why, when and how to receive the data) first and then define the standards to be used.

R38. Building a digital integration to facilitate access to the mobility services in a seamless manner does not necessarily require a new standalone mobile application, it can mainly mean integrate existing ones (such as integrating micromobility service in the PT app or car-sharing services into a parking application). For the integration consider:

a. *Defining the use-case and a common purpose.*
b. *Using stable standards related to passenger mobility which are gradually being updated to include micro-mobility such as Transmodel, or de facto standards such as GBFS.*
c. *Using APIs to integrate the applications.*
d. *Finding mutual legal agreements for business models, monetisation and earnings.*

Best practice - Seamless Digital Integration of Oslo's City Bike Service into Public Transport

A key success of the Oslo Living Lab has been the seamless digital integration of Oslo's City Bike Service into Ruter's public transport system. This initiative allows users to view, book, and pay for bike rentals directly through the Ruter App, which is already widely used for public transport journey planning and ticketing. By making shared bikes an integral part of the public transport network, the initiative enhances accessibility and encourages multimodal travel. Through this integration, users can:

- Plan a journey combining public transport and shared bikes.
- Rent a bike at a convenient location.
- Pay for the entire trip in a single transaction.

The Ruter App collects real-time data on bike availability and facilitates bike unlocking using the REST API provided by Urban Sharing. All rental-related events are communicated asynchronously to the app, ensuring continuous updates. Once a bike is parked, the rental ends automatically, and the payment is processed without any user intervention. Urban Sharing has leveraged this opportunity to develop an advanced API designed to integrate micro-mobility services into Mobility as a Service (MaaS) platforms. This enhances the efficiency and accessibility of urban transport by allowing different modes of transport to be bundled into a single, user-friendly system. Key features include:

- GBFS Integration: Uses the General Bikeshare Feed Specification (GBFS) to provide real-time micro-mobility data, ensuring accurate information for users.
- Seamless Integration: Enables effortless incorporation of shared mobility services into MaaS applications, promoting multimodal transport.

- Consistent User Experience: Micro and Shared-mobility providers retain control over branding and customer service, ensuring a unified user experience.
- Data Privacy Protection: Implements a bespoke ID system to facilitate secure data exchange without sharing personal information, ensuring GDPR compliance.
- Operator-Agnostic: Any micro-mobility operator supporting the GBFS feed can be easily integrated into local or regional MaaS platforms.

API Capabilities Include:

- Trip initiation via vehicle ID, QR code, or station ID.
- Live trip status updates, sent as event notifications.
- Real-time trip state management (pause, resume, cancel, end).
- Reporting of vehicle damage.

The Oslo model demonstrates that integrating public transport with micro-mobility is scalable and transferable. The underlying system architecture, open API standards (GBFS, MDS, GTFS), and the Urban Sharing MaaS API can be adapted by cities across Europe. The API is commercially available, and it is up to local authorities, public transport providers, and mobility operators to leverage this tool to integrate public transport with shared and active mobility solutions.

Best practice – Smart Ways to Antwerp the Mobility management Tool

As mobility solutions and providers rapidly increase, it's more important than ever to monitor their impact and ensure they align with the goals of cities and regions. Defining clear boundaries for mobility providers is crucial to ensure that both users and cities benefit. Effective monitoring and enforcement require mobility providers to share data, and tools are needed to analyse it uniformly, making reporting easier. The NXTMobility management tool which is part of the Smart Ways to Antwerp ecosystem integrates data, analysis, and reporting. Data sharing involves balancing the interests of multiple stakeholders. Sharing data with third parties can be costly, require additional development, and may expose sensitive business intelligence. It's essential to find the right balance between strict data-sharing policies, enforcing data standards, and determining what details should be shared.

In Antwerp, the need to define specific data use cases has become critical. These use cases ensure all stakeholders understand what can and cannot be done with the data. For instance, real-time availability data can be shared with third parties to feed tools like the Smart ways to Antwerp route planner, while other data, such as internal reporting and monitoring information, can only be used within the city and cannot be shared externally. As a result of SCALE-UP, the mobility manager is now operational and is used by the mobility department to monitor whether mobility providers comply with agreed limitations, such as vehicle numbers and distribution. The platform is employed to generate uniform reports on the performance of integrated mobility providers. Currently, all three shared scooter providers and two shared car providers are integrated, with the integration of the shared moped provider ongoing. Each of these providers supplies both a General Bikeshare Feed Specification (GBFS) and a Mobility Data Specification (MDS) feed, which are utilised by the mobility manager.

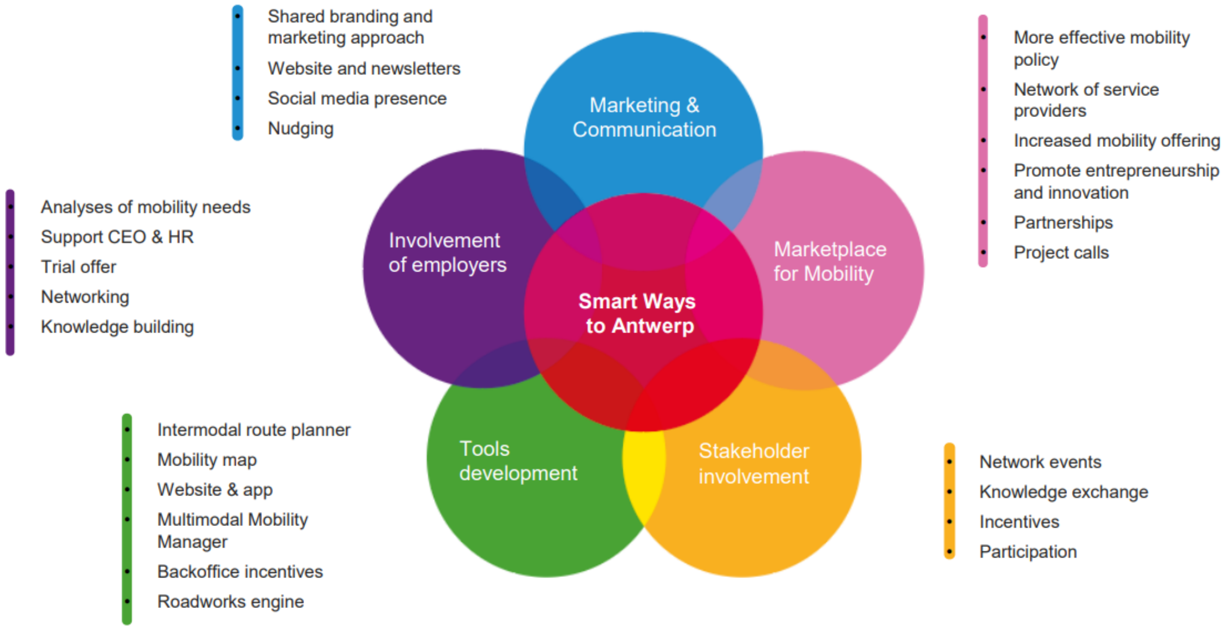


Figure 19: The Smart Wasy to Antwerp ecosystem (City of Antwerp, 2024).

5.7 From piloting to financially sustainable hubs

Piloting multimodal hubs in European cities has emerged as an effective strategy to address the lack of locally established institutional frameworks on the topic. Implementing pilot hubs through national or EU-funded projects is a recommended approach for building a strong case for the development of hub networks and the institutionalisation of related processes and strategies in urban areas. These pilot projects provide valuable data and compelling arguments, helping to secure in a second stage local resource allocation and drive long-term planning efforts. By piloting multimodal hubs in the Grorud Valley the City of Oslo encountered mismatches in the policy frameworks related to micromobility. The piloting sparked constructive dialogue between the city and micromobility providers and the need to embed the deployment of a multimodal hub network in the future SUMP.

R39. Allocating more funding in budgets to testing/experimenting/piloting shall be considered as a way of creating more predictability and enabling better planning for both the private and public stakeholders. For example, if a multimodal hub is intended to be a permanent installation with support from a city then the City Council should allocate funds accordingly. Predictability and the associated potential to develop a long-term strategy will make such innovations more attractive for private partners to participate in.

R40. Local Authorities can also make use of National and EU projects for piloting innovating testing new concepts to build a case for multimodal hubs networks (Horizon, UIA, EUI, Interreg etc.). Those topics shall thus remain in the focus of the EU for the next programming period.

R41. Pooling smaller private, public and non-profit funds proofs to make the launch of smaller tests possible which than take on a more stable fixture in multimodal offers.

R42. There is momentum and opportunities to further consider Public-Public and Public-Private Collaboration and Partnerships to finance Multimodal and *multifunctional hubs with Parking Facility Managers, Housing Companies, Railway Infrastructure Managers.*

R43: Secure investment in safe cycling lanes (consider needs for cargo logistics) and parking, curb site improvement, as those are key for the successful update of mobility services provided at the hubs.

R44: Consider modular hub concepts, which are promising solutions to test a collaboration scheme between operators or to test a specific hubs location.

Public-private collaboration schemes around multimodal hubs vary depending on how the hub is organised. Establishing clear partnerships between public and private entities helps define the framework and operational rules governing collaboration. This typically involves formal agreements that specify the roles, responsibilities, and expectations of all involved parties. These agreements can range from initial, non-binding arrangements—such as a Memorandums of Understanding (MoU), which sets out the intent to work together —to more structured Public-Private Partnerships, where contractual agreements outline aspects such as governance, financing, and risk-sharing. Selecting the right level of formalisation requires careful consideration of the collaboration’s objectives and context. A more flexible approach may be suitable in some cases, while others benefit from a structured agreement to ensure long-term cooperation. For instance, Gothenburg’s mobility hub was established through a successful partnership between the Urban Environment Department, Business Region Gothenburg, and Nordstan shopping centre. Their shared vision led to a formal collaboration agreement, reinforcing their commitment to developing a mobility hotel within a major commercial and business district.

R45. Through the provision of locations, or the provision of grants for a piloting phases local authorities can actively contribute to the development of business cases (especially in the case of logistics hubs, multifunctional hubs and mobility hotels). Those grants should not be permanent yet give it the needed first financial support.

Smaller municipalities are often less equipped to develop multimodal hubs. To ensure the deployment of a hub network at FUA level the use of specific financial and procurement mechanisms can be of help. This is the case in Flanders, where joint procurements of hub information pillars are made by smaller municipalities.

R46. For setting up multimodal hub networks in the Functional Urban Areas joint procurement practices can support small and medium size municipalities in and around a FUA to adopt coherent multimodal hub concepts.

R47. Urban Nodes should have direct access to funding from CEF, and other European programmes for TEN-T Urban Nodes projects, streamlining the process and enabling them to implement necessary multimodal hub projects efficiently. Currently, agreement by the concerned Member State (benefitting from the project) is required for all CEF-applications. This requirement should be lifted: unfortunately, urban nodes are currently sometimes blocked by their national government to deploy strategic projects. In this context, care must be taken to ensure that not only public authorities are eligible for funding, but also municipal companies (e.g. PTO) that actually implement the investments in infrastructure. Financial instruments should be adapted also to smaller public sector organisations (Urban Nodes Alliance, 2024).

Best-practice – Modular and scalable building concept in the District of Altona with DB InfraGO
The modular and scalable building concept at Kaltenkircherplatz aims to optimise available parking spaces for multimodal mobility hubs. The core idea is to develop standardised modules that match the size and weight of individual parking spaces, ensuring quick setup and easy relocation. Fiatec is responsible for manufacturing and designing the modules, while DB InfraGO handles financing (approximately EUR 50,000 per unit), equipment, and operations. Tricargo, as a primary user, oversees operations and testing. The District of Altona is the property owner handling permissions, mobility ensuring the connection to the electricity grid. Logistics companies and other stakeholders contribute by providing feedback through post-construction workshops. The focus is on efficiency, cost reduction, and aesthetic integration. The modules are designed to be at least 2.6 metres high, with features such as solar power, wooden and green facades, and multi-purpose use, including ECOHUB applications. The integration of electric power connections ensures sustainability. Key lessons from the project highlight the importance of a quick and damage-free setup, reducing the footprint of common spaces, and maintaining costs below EUR 10,000 per module. This pilot presents a scalable model for cities, with potential expansion supported by strategic funding and partnerships.

Figure 20: Modular hub concept (Source: Kruska, 2024).

Best practice – Biciqui: Temporary Hubs for Micromobility at Major Events in Bologna
To promote sustainable mobility during major events in Bologna, temporary hubs for bicycles and cargo bikes are established. These hubs, set up with the name Biciqui, encourage the public to opt for greener transport options, reducing traffic congestion and pollution. Selected areas, originally designated for car parking, are repurposed as dedicated bicycle and cargo bike parking zones. These spaces, typically 250–300 m² in size, are clearly marked with recognisable barriers, branded signs, and wayfinding posters. To accommodate cyclists, removable bike racks and an information gazebo are set up, providing up to 100 parking slots (25 rack modules, each holding four bikes). The service operates from two hours before the event until two hours after, with surveillance and minor maintenance support available throughout. Once the event concludes, the equipment is dismantled, and the area is restored to its original condition. Key success factors include: • Public-Private Synergy: The pilot's success was largely driven by strong collaboration between public and private sectors. In Bologna, political commitment from the local government was matched by significant interest from private stakeholders, such as event organisers, local associations, and non-profit organisations. Early activation of public-private partnerships is crucial for the long-term success of similar initiatives.

- Eco-Friendly Motivations Beyond Economic Profit: While economic considerations remain important, private sector actors were also motivated by the opportunity to appear eco-friendly. This demonstrates how sustainability can drive corporate social responsibility initiatives and align with broader environmental goals.
- Local Context and Regulatory Knowledge: A deep understanding of the local context, including the regulatory landscape, is essential for the successful implementation of such initiatives. Factors like the differentiation between public/private spaces, the characteristics of roadside versus green areas, and other local conditions must be carefully considered in planning.
- Choice of Bike Rack Models: Selecting the right (cargo) bike rack model is crucial for success. Racks need to be functional, portable, practical, and ideally, innovative. This ensures that the hubs remain attractive to users and easy to set up and remove after each event.
- Extended Use Across Multiple Days: For events lasting several days, the use of the hubs increased as the event progressed. This underscores the potential for long-term engagement, as visitors become more accustomed to and reliant on sustainable mobility options as the event unfolds.
- Cost Considerations: The estimated cost for implementing the service for one day (excluding racks and equipment) was around EUR 400. This figure is important for future planning, helping to balance the financial investment with the benefits of reduced traffic congestion and environmental impact.
- Requests for Expansion: Following the pilot, there was significant interest in further expanding the initiative. In some cases, private actors even offered to cover the costs, demonstrating strong demand and the potential for scaling up the program in future events.

BiciQui has showcased how pooling smaller private, public and non-profit funds have made it possible to test small-scale pilots that can later turn into more stable features in the city. The public success of BiciQui has made private sector partners and organisations positive towards covering costs of future implementations.

Figure 21: Advertisement for the BiciQui service (Source: Metropolitan city of Bologna, 2024).

5.8 Evaluate the performance of hubs

There are various methodologies for assessing transport projects, both before implementation (ex-ante) and after completion (ex-post). Common evaluation methods include Cost-Benefit Analysis (CBA), Multi-Criteria Analysis (MCA), Social Impact Assessments, and Decision Analysis (Tsamboulas & Mikroudis, 2000). Among these, CBA is one of the most widely used tools for estimating the potential effects of transport initiatives (Macharis & Bernardini, 2015). Each method relies on structured techniques such as matrices, checklists, network analysis, and overlay mapping to evaluate project outcomes, efficiency, and overall impact. Public authorities often incorporate Key Performance Indicators (KPIs) when procuring transport services or developing infrastructure. However, there is no universally accepted framework for assessing multimodal hubs, and only a few local governments have established KPIs specifically for these types of projects. In Munich, a procurement process launched in late 2024 aims to define relevant KPIs for multimodal hubs. The following section outlines recommendations to address these gaps and improve the evaluation of multimodal hubs.

R48. It is advisable to set up evaluation and performance assessment frameworks for multimodal hubs from early stages on and ensure the evaluation framework can contribute to the collection of UMI indicators. The application of KPI's in tendering processes is another key feature local authorities should use to ensure the quality and efficiency of hubs is being measured and checked upon. National and European authorities should support the streamlining of relevant KPI's.

R49. Further instructions, capacity building support and funds for that should be provided by higher (National, EU) levels.

R50. Although few evaluation frameworks have been developed so far in European cities to assess the quality of multimodal hubs or the impact of multi-modal hubs, one basic approach could be to consider evaluation criteria in terms of:

a. *Qualitative user experience*
b. *Impact on mode use*
c. *Impact on multimodal trips*
d. *Emissions reductions*

Best practice – List of KPIs applied in the evaluation of MOVE21 hub pilots

Long term decarbonisation

- CO_2 reductions from passenger/freight transport
- Reduction in passenger/freight transport related Nox air pollution
- Reduction in passenger/freight transport related PM2.5 air pollution
- Increase in zero emission light duty electric vehicles

Safety, inclusiveness and security

- Increase in Public Transport use
- Increase of self-perceived inclusiveness from transport solutions' implementation
- Increase of perceived security in the city-transport system
- Reduction in passenger/freight transport related noise pollution

Accessibility and efficiency of transport networks

- Increase in active modes
- Increase in charging stations
- Reduced number of heavy (freight) vehicles in circulation
- Modal shift due to decrease of travel time

Economic development

- Economic sectorial contribution to the welfare to the metropolitan area from city transport

Best practice – Performance evaluation in Madrid
CRTM Madrid has a long-standing experience in evaluating the performance of multimodal bus terminals. In the first six months of the year 2024, the Community of Madrid has exceeded 47 million users of the five major public transport interchanges that currently exist in the region. This figure represents an increase of 8% compared to the same period in 2023. The most used intermodal area was Moncloa with 17 million passengers from January to June 2024. In second position is Príncipe Pío with 9.7 million passengers, followed by the Plaza de Castilla interchange with 8.6 million. Finally, the fourth and fifth positions are occupied by Avenida de América with 7.8 and Plaza Elíptica with 4 million, respectively. The figures for the first half of the year show that the interchanges, which are managed by the Regional Transport Consortium, are a crucial part of the region's public transport system, enabling citizens to make a wide range of journeys in a convenient and easy way. They are points of confluence of intercity lines and suburban trains that access the capital and are distributed throughout the city by the Metro network and urban buses. Madrid's multimodal hubs are also being evaluated by the SUDOE Stop CO_2 tool that evaluates the energy efficient management of transport buildings. The five main transport facilities of the Spanish capital get four stars according to the tool. The multimodal hubs of Avenida América, Plaza de Castilla, Moncloa, Principe Pío and Plaza Elíptica run by the regional transport authority (Consorcio de Transportes de Madrid) scored highest on the list encompassing 65 stations assessed with the Southwest Europe Interreg project.

5.9 Needs and gaps

Even though recent years have observed a surge in research and application of multimodal hubs concepts, there remains research gaps to be filled. Several open questions remain.

R51. Future research at EU and National level on multi-modal hubs should address following topics: (EU and national level)

a. *What is the influence area of multimodal hubs?*
b. *How to assess and evaluate the impact of hubs on the mobility network?*
c. *Which KPI's are essential in the assessment framework?*
d. *Typology / hierarchy / role of different hubs in a network*
e. *Business models and type of partnership for multimodal hubs*
f. *Supporting measures and their impact: hubs supporting access restrictions like ZEZ/LEZ; integration with PT and impact on PT improvement and attractivity (i.e. modal share); multimodal hubs supporting electrification strategies*
g. *How to influence behaviour from owned mobility to mobility services*

6 Summary of recommendations in relation to SUMP principles and cycle

Figure 22: MOVE21 application of the SUMP cycle for implementation of multimodal hubs (CERTH, 2024)

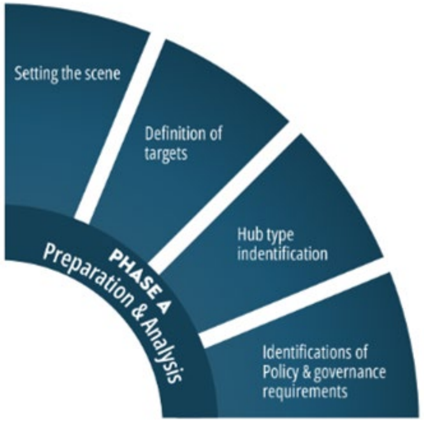
Alongside policy recommendations, MOVE21 has developed a conceptual framework for the development of multimodal hubs, inspired by the SUMP cycle. This framework is available in the Urban Nodes Competence Centre on the MOVE21 website and reflects the methodological approaches applied in the MOVE21 project for testing and piloting multimodal and multifunctional hubs/hotels.

In local applications, the steps may not always follow the exact order presented, as many processes are iterative and may overlap. Therefore, it should be seen as a flexible guide, adaptable to the complexities of practical implementation. Practitioners may find it helpful to use these steps as a checklist of key aspects to consider when piloting or developing a mobility hub.

The following chapter presents the policy recommendations in summarised tables. For each group of recommendations, the relevant SUMP principles are indicated, along with the phase of the cycle in which they should be considered (see Figure 22).

Policy recommendations on « Defining hubs »	Related to SUMP Principle(s)
R1. Hubs should connect at **least two transport** modes to qualify as multimodal. However, their **specific definition should remain flexible, tailored to the context** and location.	6
R2. When defining the scope of multimodal hubs in regulations, SUMPs etc. **keep a certain flexibility for considering multifunctional** uses such as including housing, social service, administration, hotels, multifunctional uses with last mile logistics such as the installation of parcel lockers, enabling services that facilitate the shift from LDVs to cargo-bikes or form car to bike, offer facilities for drivers or riders, repair centres, etc.	6
R3. EU and national regulations and funding programmes **should accommodate and remain flexible** to support the implementation of **multifunctional purposes** for multimodal hubs.	6
R4. While prescriptive requirements for specific modes may not be practical, local authorities are encouraged to establish categories of hubs tailored to their local context and define corresponding quality standards. These categories could be based on factors such as the hub's significance within the network or the types of connections it facilitates. Key quality standards should prioritise universal design to ensure accessibility for all users and promote digital integration where appropriate, enhancing user experiences and operational efficiency.	6, 8
R5. When engaging in the development of a hub network strategy look at existing infrastructure and networks as starting points – they should reflect the climate and mobility policy objectives of the urban area and functional urban area.	5, 6, 8
R6. If no existing hub complies with the TEN-T Regulation, we recommend that urban nodes together with the relevant regional and national authorities prioritise upgrading or developing a multimodal hub that meets the criteria detailed in the TEN-T regulation.	2, 6

The policy recommendations on the definition of hubs are closely related to the preparation and analysis phase of the SUMP cycle when applied to the implementation of multimodal hubs – the definition of multimodal hubs is in fact key when assessing the state of the art of such infrastructure as well as identifying the type of hubs that fit needs. Finally, hubs also need to be reflected as such in policy and planning documents.



Policy recommendations related to « Governing hubs »	Related to SUMP Principle(s)
R7. When developing multimodal hubs network, it is essential to define a clear governance structure from the start and throughout the implementation, and the service phase.	2
R8. Start by establishing simple governance structures that facilitate revenue and risk-sharing. Public-private partnerships can help distribute risks and costs among multiple entities, enabling stakeholders to take on greater risks than they would if operating independently.	2, 3
R9. Local public authorities require dedicated fora to discuss and mediate the differing interests of urban logistics stakeholders when developing hubs which include logistics operations.	2
R10. Co-create services as much as possible. Co-creation models, like the ones deployed in MOVE21, can accelerate the deployment and execution of seeding innovation ideas. For example, MOVE21 gave the push needed to existing city partnerships to create effective conditions for the execution of a long-term for public-private collaboration. A practitioners' guide to setting up such partnerships developed in MOVE21 can support the process.	2, 3
R11. Depending on the location in the urban area and the purpose of hubs specific stakeholders' groups shall be targeted.	3
R12. Be clear on the scope of the participatory process yet be open to receive ideas that are out of the box. Structure the participation process in such a way that it allows for constructive problem and solution finding not only (dis)-agreement on a given plan.	3

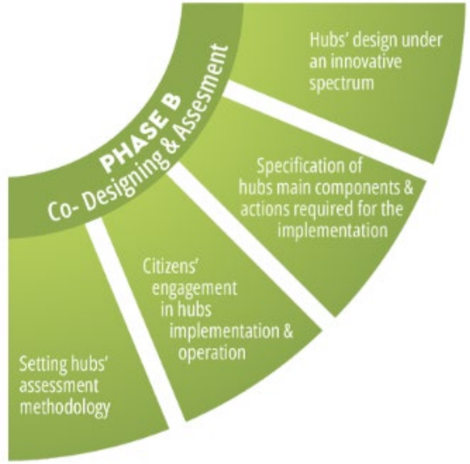
The policy recommendations on the governance of hubs are related to all phases of the SUMP cycle. From the initial reflections and analysis to the implementation, operation and evaluation, governance considerations are essential across all phases and steps.

Policy recommendations related to « Hub network thinking and TEN-T relevant hubs »	Related to SUMP Principle(s)
R13. We recommend active dialog between corridor, national, regional, and urban nodes level. Local authorities are invited to reflect the TEN-T relevance of hub infrastructure in their SUMPs. National SUMP Support Programmes should support the collaborative efforts around TEN-T relevant multimodal hubs process.	1, 2, 4
R14. For the development of multi-modal hubs with TEN-T relevance the EU, National, Regional level should ensure a **greater alignment of policy objectives** and related funding schemes.	1, 2, 4
R15. Harbours, Airports, Bus and Train stations with national and international relevance are clear interfaces between the urban and the TEN-T transport system. The collaboration between the local public transport operators the local and regional authorities with the Airport, harbour or train operators is a key factor to ensure a greater integration of the urban and TEN-t transport systems.	6
R16. Set up collaboration mechanisms to ensure a greater coherence between urban and TEN-T mobility systems around time-tables alignment, ticketing integration, mode availability, upgrading existing station infrastructure and creating more compact and qualitative transfers.	1, 2, 3
R17. When planning a network of multimodal hubs, we recommend mapping the mobility and logistics FUA and identify all key stakeholders having an authority and decision power.	2, 3, 4
R18. National and federal authorities should provide support to local governments in defining and mapping the relevant systems, including the governance structures in place. Additionally, a comprehensive mapping of the mobility ecosystem within and around the Functional Urban Area (FUA) should be conducted, alongside a clear overview of facilities and land ownership. The self-assessment tool developed in the SCALE-UP project can be a valuable resource in supporting this process.	2, 3
R19. Define network of hubs at FUA level and develop a strategy document with relevant partners (Municipalities, PTA, PTO, New Mobility Service Operators, Train operators, Airport and Harbour if applicable) that is aligned with the relevant SUMP(s) and SULP(s).	1, 5

The policy recommendations on the hub network thinking and TEN-T relevance are related to all phases of the SUMP cycle.

Policy recommendations related to "Identifying the right location for hubs"	
R20. The location criteria should ideally be defined in a guidance document which can be applied for the development of a network of hubs at FUA level	6
R21 For the strategic identification of possible hub locations following criteria should be taken into account: pre-existing public transport infrastructure, parking data, and geo-fencing data from micromobility users are key indicators of existing use. Those data can help identify hot spots in which micromobility users are parking, thus identifying spots where a hub infrastructure might be relevant and have a natural uptake.	6
R22. Local authorities can priories hub's location based specific criteria (see full list on page 39)	3, 4, 6
R23. Start by considering the specific conditions of the selected location and the existing space, which can then be supplemented with additional factors. For each type of station, minimum standards and tailored recommendations for equipment features can be provided to guide their development.	3, 4, 6
R24. Regulatory barriers in parking and zoning regulation limiting the capacity to experiment different uses on parking spots should be lightened.	5
R25. Develop simple and easy understandable signage at and around hubs. It is key success factor – adhere to universal design principles.	3, 4, 6, 8
R26. Create coherent design and wayfinding, ideally at Functional Urban are level in a coordinated manner.	3, 4, 6, 8
R27. National harmonisation strategies can be of support when no local wayfinding and designs have emerged yet.	1, 2
R28. For *a* qualitative physical integration, procurers and designers of multimodal hubs should be mindful of specific aspects: Universal design, Safety, Distances/time between modes and services, Gender specific requirement, Area of influence of the hub, Surrounding infrastructure.	6
R29. Adhere to creative uses of scarce space in dense urban environments. They create win-wins both by coupling seemingly unrelated activities such as urban logistics and social services, and by actively using temporary dark spaces for services and businesses. In particular, there is great potential for more collaboration between public and private sectors to scope and ring-fence suitable locations, also temporary ones, for urban logistics.	6

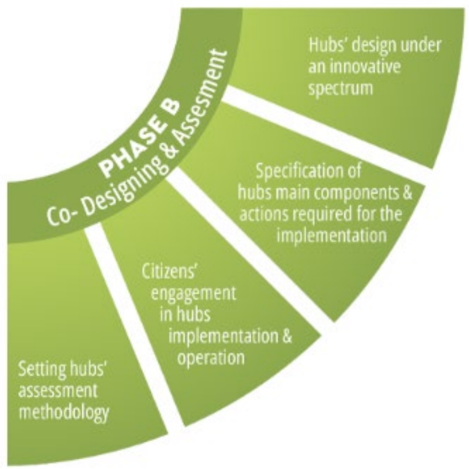
The policy recommendations on the identification of the right location are mainly related to phase B of the cycle.



R30. Future collaboration with housing associations and parking facilities is a recommended strategy to create more multifunctional hubs and rent out (temporarily) empty, but still useful buildings.	3
R31: We encourage to use metropolitan/regional (cargo) bikes sharing programmes as vectors for expanding the uptake of the multi-modal hub concept.	1, 2

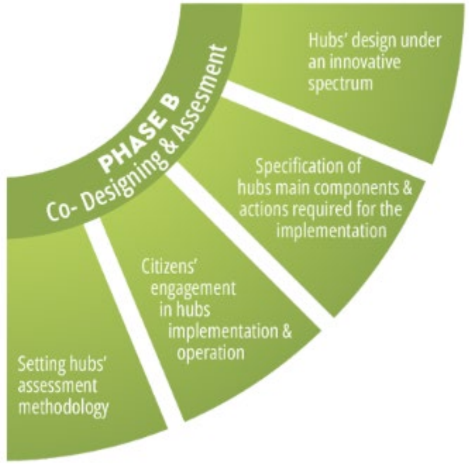
Policy recommendations related to "Spatially integrating and upgrading hubs"	Related to SUMP Principle(s)
R25. Develop simple and easy understandable signage at and around hubs. It is key success factor – adhere to universal design principles.	6
R26. Create coherent design and wayfinding, ideally at functional urban area level in a coordinated manner.	1, 6
R27. National harmonisation strategies can be of support when no local wayfinding and designs have emerged yet.	2
R28. For a qualitative physical integration, procurers and designers of multimodal hubs should be mindful of following aspects: universal design, safety, distance, time between modes and services, gender specification, area of influence of the hub, surrounding infrastructure.	
R29. Adhere to creative uses of scarce space in dense urban environments. They create win-wins - both by coupling seemingly unrelated activities such as urban logistics and social services, and by actively using temporary dark spaces for services and businesses. In particular, there is great potential for more collaboration between public and private sectors to scope and ring-fence suitable locations, also temporary ones, for urban logistics.	6
R30. Future collaboration with housing associations and parking facilities is a recommended strategy to create more multifunctional hubs and rent out (temporarily) empty, but still useful buildings.	3
R31: We encourage to use metropolitan/regional (cargo) bikes sharing programmes as vectors for expanding the uptake of the multi-modal hub concept.	1, 6

The policy recommendations on spatial integration mainly applies in the phase when the hub specifications are defined hence in phase B of the cycle.



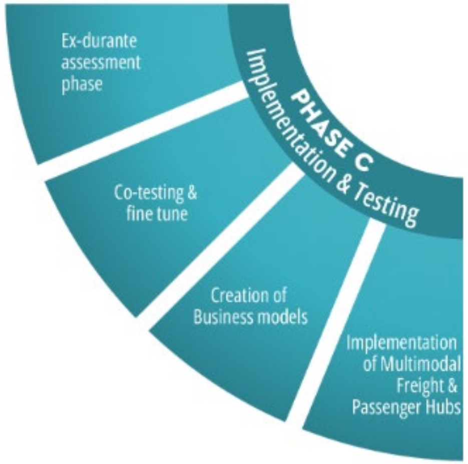
Policy recommendations related to "Digital integration"	Related to SUMP Principle(s)
R32. Ensure the digitalisation meets users' needs and skills. Real-time information provision and ticketing integration are key features to develop according to users.	3
R33. Do not only rely on citizens personal devices. Citizens should be able to visualise different transport options (i.e., real-time and pricing) at the mobility hubs without having to rely on their own smartphone to overcome the barrier of digital exclusion.	3
R34. Coordination at national or European level should support the harmonisation and trust-building regarding the digital integration of mobility services. National (through the National access points) or even European (through the Mobility data space) wide alignments could support: a. The mapping of transfer methodologies between standards. b. The identification of common use-cases.	2
R35. At local level it is important to identify or set-up an orchestrating organisation able to take on a user-centric perspective able to encompass road traffic, public transport and micromobility.	1, 2
R.36 Public Transport Authorities or Operators can take on an orchestrating role in the digital integration, yet this requires adapting their KPIs accordingly away from pure optimisation of PT-use towards optimisation of sustainable trips.	1, 2
R.37 When it comes to regulation and procurement processes defining the use-cases is often more complex than selecting and agreeing on standards, we advise to start defining use-cases (why, when and how to receive the data) first and then define the standards to be used.	1, 2
R38. Building a digital integration to facilitate access to the mobility services in a seamless manner does not necessarily require a new standalone mobile application, it can mainly mean integrate existing ones (such as integrating micromobility service in the PT app or car-sharing services into a parking application). For the integration consider: Defining the use-case and a common purpose; Using stable standards related to passenger mobility which are gradually being updated to include micro-mobility such as Transmodel, or de facto standards such as GBFS; Using APIs to integrate the applications; Finding mutual legal agreements for business models, monetisation and earnings.	1, 2

The policy recommendations on digital integration mainly apply in the definition of the hub specification in phase B.



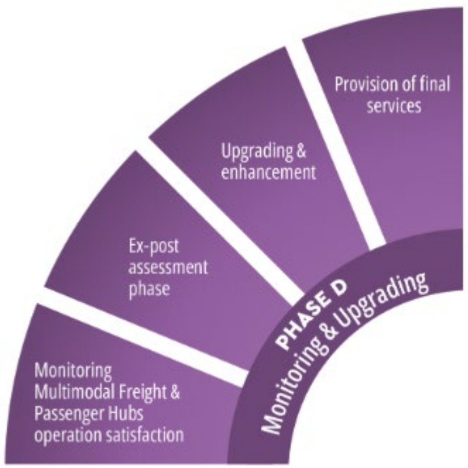
Policy recommendations related to "From piloting to financially sustainable hubs"	Related SUMP principles
R39. Allocating more funding in budgets to testing/experimenting/piloting shall be considered as a way of creating more predictability and enabling better planning for both the private and public stakeholders. For example, if a multimodal hub is intended to be a permanent installation with support from a city then the City Council should allocate funds accordingly. Predictability and the associated potential to develop a long-term strategy will make such innovations more attractive for private partners to participate in.	5
R40. Local authorities can also make use of National and EU projects for piloting innovating testing new concepts to build a case for multimodal hubs networks (Horizon, UIA, EUI, Interreg etc.). Those topics shall thus remain in the focus of the EU for the next programming period.	2, 5
R41. Pooling smaller private, public and non-profit funds proofs to make the launch of smaller tests possible which than take on a more stable fixture in multimodal offers.	3, 5
R42. There is momentum and opportunities to further consider Public-Public and Public-Private Collaboration and Partnerships to finance multimodal and multifunctional hubs with Parking Facility Managers, Housing Companies, Railway Infrastructure Managers.	3
R43: Secure investment in safe cycling lanes (consider needs for cargo logistics) and parking, curb site improvement, as those are key for the successful update of mobility services provided at the hubs.	8
R44: Consider modular hub concepts, which are promising solutions to test a collaboration scheme between operators or to test a specific hubs location.	6
R45: Through the provision of locations, or the provision of grants for a piloting phases local authorities can actively contribute to the development of business cases (especially in the case of logistics hubs, multifunctional hubs and mobility hotels). Those grants should not be permanent yet give it the needed first financial support.	5, 6
R46. For setting up multimodal hub networks in functional urban areas joint procurement practices can support small and medium size municipalities in and around a FUA to adopt coherent multimodal hub concepts.	1 , 5
R47. Urban Nodes should have direct access to funding from CEF and other European programmes for TEN-T Urban Nodes projects, streamlining the process and enabling them to implement necessary multimodal hub projects.	1, 2, 5

The policy recommendations related to piloting and financial sustainability are closely linked to the phase C of the SUMP cycle which relates to testing and the business model development of hubs.



Policy recommendations related to “Evaluating the performance”	Related SUMP principle(s)
R48. It is advisable to set up evaluation and performance assessment frameworks for multimodal hubs from early stages on and ensure the evaluation framework can contribute to the collection of UMI indicators. The application of KPI’s in tendering processes is another key feature local authorities should use to ensure the quality and efficiency of hubs is being measured and checked upon. National and European authorities should support the streamlining of relevant KPI’s.	4, 7
R49. Further instructions, capacity building support and funds for that should be provided by higher (National, EU) levels.	4, 7, 8
R50. Although little evaluation frameworks have been developed so far in European cities, to assess the quality of multimodal hubs or the impact of multi-modal hubs, one basic approach could be to consider evaluation criteria in terms of: Qualitative user experience, Impact on mode use, Impact on multimodal trips, Emissions reductions	4, 7
Needs and gaps	**Related SUMP principle(s)**
R51. Future research at EU and National level on multi-modal hubs should address following topics: (EU and national level) • What is the influence area of a multi-modal hubs? • How to assess and evaluate the impact of hubs on the mobility network and on the corridor, it is located on? • Which KPI’s are essential in the assessment framework? • Typology / hierarchy / role of different hubs in a network • Business models and type of partnership for multimodal hubs • Supporting measures and their impact: hubs supporting access restrictions like ZEZ/LEZ; integration with PT and impact on PT improvement and attractivity (i.e. modal share); multimodal hubs supporting electrification strategies • How to influence behaviour from owned mobility to mobility services	4, 8

The policy recommendations related to evaluating the performance and future research needs are particularly relevant when looking at Phase D of the cycle and the assessment steps as well as the reflection on future enhancements for implemented hubs.



7 Conclusions

This deliverable has outlined comprehensive policy recommendations for local authorities (cities, urban nodes, regions), national authorities, and the EU to support the development and implementation of multimodal hubs. These hubs are vital for enabling seamless, sustainable, and user-friendly mobility systems, contributing to the broader goals of reducing emissions, enhancing accessibility, and fostering urban and regional development as well as a greater integration of urban and TEN-T mobility.

For local authorities, the recommendations emphasise the importance of embedding hubs within their socio-spatial environments, integrating them into urban planning frameworks, and engaging communities through placemaking initiatives. Clear guidelines on governance, public-private partnerships, and operational frameworks were also provided to ensure that hubs address local and FUA needs effectively. Further practical recommendation can be found in the MOVE21 Urban Nodes Competence Centre online.

At the national level, the focus is on establishing enabling policies and funding mechanisms that support local implementation. This includes streamlining regulatory processes, offering financial incentives for hub development and upgrades, and providing technical support to municipalities, particularly in data management, digital integration, and multimodal coordination. It also calls for greater readiness in taking urban needs into account when it comes to planning TEN-T mobility as urban mobility is ultimately part of it.

For the EU, the recommendations highlight the need to create a harmonised framework that encourages cross-border and inter-regional cooperation. By supporting the development of standards, fostering knowledge exchange, and funding innovation and pilot projects, the EU can play a critical role in scaling multimodal hubs across Europe and aligning policy and governance frameworks.

In conclusion, the effective implementation of these recommendations will require collaboration across all governance levels and sectors, with a shared commitment to prioritising multimodal hubs as key enablers of sustainable mobility. By working together, local, national, and European public and private stakeholders can transform the transport landscape, delivering integrated solutions that meet the mobility needs of today while paving the way for a greener and more connected future.

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Annex A. Overview table of semi-directive interviews

Nr.	Date	Name, Surname, Organisation, Country
1	17 June 2024	Sarah Mellberg, City of Gothenburg, Sweden
2	01 July 2024	Sarah Boshuizen, Terry Albronda, City of Groningen, The Netherlands
3	16 July 2024	Jan-Hendrik Müller, City of Munich, Germany
4	22 August 2024	Tim Neugebauer, City of Mannheim, Germany, Julian Schrögel, Rhein-Neckar-Verkehr GmbH, Germany
5	23 August 2024	Stijn Vernaillen, Michiel Penne, City of Antwerp, Belgium
6	30 August 2024	Johannes Rodenbach, External Hoppinpunt Manager, Belgium
7	13 January 2025	Jan Tore Pedersen, MixMove
8	17 January 2025	Stijn Vernaillen, City of Antwerp, Belgium
9	12 February 2025	Sofia Taborda, Federico Henriques, Emel, Portugal

Annex B. Overview of activities organised for the content gathering and the validation of the recommendations

- **MOVE21 and SCALE-UP joint E-course on *Integrating mobility services to foster sustainability in urban nodes* running from 25 September 2024 to 30 October 2024 with five units.**

Date	Title
25 September 2024 - Block 1	Multimodal hubs for regional and peri-urban connections
10 October 2024 - Block 2	Integrating multimodal-modal mobility services and logistics
17 October 2024 - Block 3	Digital tools and integration of mobility services
25 October 2024 - Block 4	Physical integration and adaptation – design, wayfinding, adaptability to weather and temporary uses
30 October 2024 - Block 5	Integrating at various levels of governance and strategies for a mobility network approach

- **The recommendation development and validation followed a 3-steps process**

Annex C. Self-assessment table used during the Workshop in Antwerp on 14 November 2024

SCALE-UP
User-Centric & Data Driven Solutions for Connected Urban Poles

Recommendation Validation Workshop 14.11.2024

Multimodal Hubs in Urban Nodes

For each recommendation you work on in groups – take 1 minute time to do a short individual assessment.

Validation - Self-assessment **Name, Surname: ....** **Organisation: ....**						
Recommendation number	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Short justification or comment

Annex D. Table report table used during the Workshop in Antwerp on 14 November 2024

SCALE-UP

User-Centric & Data Driven Solutions for Connected Urban Poles

Recommendation Validation Workshop 14.11.2024

Multimodal Hubs in Urban Nodes

Each group assesses on the basis of the self-assessment which Recommendations are rejected approved or approved under condition of undergoing some amendments. The results will be indicated in the Table report below.

Table report **Table Number: ……………**			
Recommendation number	Recommendation Rejected/ Approved/ Approved under condition	Proposed amendment	Example to illustrate