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Best practices report

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Summary sheet

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Subpartner: Statens vegvesen	SVV	Norway
Subpartner: Tønsberg kommune	TK	Norway
Promotion of Operation Links with Integrated Services	POLIS	Belgium
City of Amsterdam	AMS	Netherlands
City of Leuven	LEU	Belgium
University of Antwerp	UAntw	Belgium
Transport Authority for the Amsterdam Region	VRA	Netherlands
Mpact	Mpact	Belgium
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City of Rotterdam	ROT	Netherlands
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1. Summary

This best practice report summarises the experiences, lessons learned and challenges encountered by the partners involved in the upscaling activities outlined in Work Package 2 (WP2) of the ShareDiMobiHub project. Additionally, it incorporates the recommendations discussed in a dedicated workshop at the sixth PMT in Denmark, during which regional and city authorities, universities, transport authorities and networking organisations engaged in discussions on the implementation and outcomes of the upscaling efforts.

Further, this report also includes valuable insights from stakeholders outside of the consortium, such as experts in shared mobility and Mobility-as-a-Service, who contributed to different meet-ups. Finally, the report also reflects key learnings from workshops focused on data visualisation and data management, both of which are essential to evaluate shared mobility services and mobility hubs.

The findings of this report are mainly intended to inform policymakers and practitioners to learn the approach that the SDMH-partners took when considering upscaling strategies and which hurdles they encountered. Furthermore, it provides an overview of information from other (practical) projects that also tested the upscaling of shared mobility hubs, which is useful to quickly grasp their main findings and compare those with this project's findings.

2. Introduction

Shared mobility can be an important part of the mobility transition, one of the puzzle pieces to be moving towards a multi-modal mobility system. The supply and use of shared mobility is growing, but compared to overall transport volumes, it remains small. Clustering shared mobility at hubs and connecting it to public transport can be a way to increase the use of shared mobility.

This report first summarises the current knowledge on success factors for scaling up shared mobility hubs, in cities and in regions. Best practices from around Europe are described to offer insights into possibilities to scale up shared mobility hubs and learn about challenges. Project reports of multiple European research projects, reports of governmental institutions, scientific papers and homepages of initiatives have been reviewed. Later, the report dives into the specific examples and best practices gathered during the workshops and scale-up activities of the SDMH project.

3. Literature review

In order to identify factors influencing the scaling up of shared mobility hubs, reports from research projects as well as academic literature were reviewed. The focus of the review lies on the upscaling of shared mobility hubs in practice. Literature was identified through keyword searches and knowledge of the shared mobility field of the authors and the ShareDiMobiHub partners. Additionally, best practice case studies were identified in the reviewed literature and are described in the following section. See Table 1 below for the resources used to identify the factors and best practice cases.

Table *1*: Overview of the literature resources

Resource	Description	Success factors	Local cases
Advier (2021) **A Planner's Guide to the Shared**	SHARE-North project (Interreg North-Sea). Guidebook covering	Listing essential and optional elements of mobility hubs, types of mobility hubs and	Bremen Bergen North Holland

Mobility Galaxy. SHARE-North project.	different aspects of planning for shared mobility. Chapter 6.3 on Mobihubs (physical integration of shared mobility)	other topics important for a successful development, implementation. And monitoring of mobility hubs. Additionally listing success factors for specific case studies	Flanders
Witte et al. (2021) **Verkenning van het concept mobiliteitshub. KiM.**	This report by KiM, the knowledge institute of the Dutch Ministry of Infrastructure on mobility policy explores mobility hubs, including success and failure factors. With a specific perspective on national policy.	Identification and description of success and failure factors. Additionally listing 6 case studies with additional factors.	Regional hubs: • Groningen-Drenthe • Flanders • Karlsruhe region City hubs • Utrecht Merwedekanaalzone • Amsterdam Arena • Bremen
Coenegrachts (2023) **Analysing the supply-side dynamics of the shared mobility transition** **The shared mobility market and potential role for mobility hubs. Dissertation University of Antwerp.**	Dissertation on the role of hubs in scaling up shared mobility. Deep and thorough analysis, theoretically and based on case studies.	Identification of factors on multiple aspects of scaling up shared mobility (hubs). Business model factors, location factors, roles of stakeholders	Amsterdam Greater Manchester Leuven Nijmegen Kempten Dreux
Kask (2021) **Hub programme Groningen and Drenthe. State of hubs, governance and future outlook. SMiLES research report #2.**	Research report of the SMiLES project (Dutch NWO funded) on the hub programme Groningen-Drenthe (North of the Netherlands).	Identification of factors that influence the development and implementation of hubs in Groningen-Drenthe	Groningen-Drenthe
Geurs (2024) **Making mobility hubs smarter. 10 recommendations for practitioners & policy makers. Deliverable D6.4 - Final SmartHubs Report.**	Final Research Report of the SmartHubs project, a JPI Urban Europe project that identified ways to make mobility hubs 'smarter' and developed multiple tools for the process of developing and implementing hub networks.	Identification of factors that should be taken into account when developing 'smart' mobility hubs, on physical, digital and democratic integration	Brussels Munich Rotterdam-The Hague Vienna
Koliou & Kühl (Koliou and Kühl, 2025) **Urban Nodes Handbook. SCALE-UP project**	Handbook developed in SCALE-UP project, a Horizon 2020 research project on developing user-centric & data driven solutions for connected urban poles	Identification of lessons learned for different types of interventions for connected urban poles	Antwerp Madrid Turku
Chen et al. (2024) **Shared Modes Strategies and Practices. SUM project**	Literature review on Shared Modes Strategies and Practices	Identification of models of shared mobility services, strategic innovations and	Munich Geneva Rotterdam

		best practices and factors important when initiating or supporting shared mobility	Krakow Frederikstad Coimbra
Van Heijningen (2022) **Shared Mobilty and Hubs City of Amsterdam. Presentation at City Managers Meeting Tomorrow Mobility World Congress.**	Presentation on the hub situation and future plans in the city of Amsterdam	Identification of key requirements or a hub system	Amsterdam
Hachette & L'Hostis (2024)**Mobility hubs, an innovative concept for sustainable urban mobility?**	Research paper on insights of the Interreg Mobi-Mix project looking into requirements, objectives, types, services, stakeholders and difficulties when implementing mobility hubs	Identification of key factors to be considered when implementing mobility hubs and learning from difficulties.	Norfolk Valenciennes
Arnold et al. (2023b) **Mobility Hubs: Review and Future Research Direction.**	Research paper based on a literature review (academic and grey) as well as analysis of case studies on the topic on development and implementation of mobility hubs.	Identifies 4 themes that should be considered when developing and implementing mobility hubs	20 locations in North America, UK, Europe. In Europe: Vienna, Graz, Leuven, Dreux, Bremen, Munich, Amsterdam, Arnhem, Nijmegen, Bergen, Greenwich, Manchester, Nottingham/Derby, Plymouth
Arnold et al. (2023a) **An exploratory study of Mobility Hub implementation.**	Research paper based on interviews on the topic of the decision-making process for implementing mobility hubs	Identifies 4 factors (with subfactors) that should be considered when developing and implementing mobility hubs	
STARS (2020) **How to introduce carsharing in your city? A toolbox for decision-makers. STARS project.**	Research report of the Horizon 2020 project STARS on introducing carsharing.	Identifies factors for successful implementation of carsharing, also putting attention to locations and clustering services in hubs.	Flanders
Autodelen.net (2024) **Analyserapport uitwisseling en visualisatie van lokale autodeel-data**	ShareDiMobiHub report on data exchange and visualization of carsharing data in Flanders.	Specific attention on the importance of the factor data exchange between stakeholders when upscaling carsharing	Flanders
Ideate (2023) **Inclusieve deelmobiliteit. Onderzoeksrapport**	Research report for the Dutch Ministry of Infrastructure on inclusive shared mobility.	Specific attention on the importance of the factor inclusivity.	Buurthub Krachtstation Utrecht
Autodelen.net (2021) **Inspiratiegids**	Research report of the Interreg SHARE-North	Identification of policy measures that adds to	

Inzetten op koolstofvrije deelmobiliteit dankzij het Lokaal Energie- en Klimaatpact	project on introducing and upscaling of shared mobility.	successful introduction and upscaling. Attention on physical and digital clustering of shared mobility	
Petzer (2021) **Partnering for Shared Mobility: Recommendations for Upscaling Residential Carsharing in the Netherlands.**	Research report of Dutch NWO funded project on upscaling residential carsharing	Specific attention on the factor of different actors and collaboration between them. Challenges and recommendations are identified.	

For insights into spatial factors influencing the success of a mobility hub the review article of Geipel et al. (2024) can be consulted. It identifies factors such as population density, employment density and proximity to public transport as important when choosing a hub location. Also the ShareDiMobiHub Deliverable 5.3 on the location tool that was developed at the University of Applied Sciences Utrecht gives insights into this specific topic.

3.1. Factors to be considered when upscaling shared mobility hubs

Based on the analysis of the literature listed in the previous section, a list of factors was identified that influence the upscaling of shared mobility hubs. This list of factors can be used to analyse a local situation in the planning, implementation or operating phase in order to optimise the setting and thus increase the possibilities for successful upscaling. The factors are divided into 4 different categories:

Regulatory framework expansion: The activities included in this category are those related to the change of management, policy and regulation needed to enable the operation of the hubs and shared mobility. It also involves those to establish new regulations, e.g., transit permits, to start the operation of the hubs and SM. Three main factors with sub-factors were identified from the literature review:

- Actors/stakeholders
  - Initiation
  - Regulation and policies
  - Division of roles and responsibilities
  - Knowledge base
  - Competition and collaboration
  - Types of operation agreements
- Funding
- Subsidies

Geographical expansion: This category includes activities related to an increase in physical locations, i.e., activities comprised in the hub's planning, design and construction. Two factors were identified from the literature review:

- Land ownership
- Type of area, location

Communication: This category includes activities that contribute to the knowledge exchange between cities, dissemination work with the neighbourhood inhabitants, and workshops. It also includes key aspects to consider in the design of the hub. From the literature review, one factor was identified:

- Physical (and digital) visibility, branding

Hubs services: This category highlights the importance of the digital and physical context, including services such as Mobility-as-a-Service (MaaS) and neighborhood services such as connecting transport infrastructure and modes.

- Physical and digital accessibility

3.1.1 Regulatory framework expansion

First, it is important to analyse the involved actors or stakeholders. For a successful upscaling of shared mobility hubs, both public and private actors need to be involved. And that is not only because both public and private mobility services, as well as attention for walk- and bike ability, are necessary for a well-functioning multi-modal mobility system. An important role of public authorities is also the provision of clear regulations and policies that support shared mobility as these are crucial for the successful upscaling of shared mobility (hubs). A well-planned process for stakeholder collaboration is important. Typical actors involved include local and/or regional government, shared mobility suppliers, public transport providers and project developers. Residents/communities are a stakeholder group that is not yet often directly involved in the development of hub(network)s during the planning stage, but are of great importance for the successful upscaling through increased use. Next to local and/or regional governmental actors also national governmental actors can support a successful upscaling: by setting up pre-conditions, such as data standards, national branding or national campaigns to increase knowledge and the image of shared mobility.

How different actors interpret their roles and which responsibilities lie with which actor can have a large impact on the upscaling of shared mobility. The division of roles and responsibilities between public, semi-public and private parties influence the offered service level, target groups, processes, speed of processes, and goals.

The knowledge base of the different actors involved can influence the success of upscaling. A great variance in the knowledge base can lead to challenges when collaborating and can slow down processes. Smaller organizations often have limited capacities for knowledge development and efficient knowledge exchange between actors is important.

Also, the number of involved actors and number of services present at a hub are an important success factor. Having multiple modes present at a hub or in a hub network leads to a better service proposition for users. Competition among (shared mobility) service providers can be important if demand is large enough. However, good collaboration between different private suppliers and public providers is crucial for a successful upscaling process. Collaboration can take place during multiple phases: development of the hub (including choosing the operating model and locations), operation and monitoring.

To scale up shared mobility hubs, allowing shared mobility operators in the city or region is of course essential. This can be organized through different types of agreements and have a direct influence on the

development and upscaling of mobility hubs. Depending on the type there are differences in the needed investment, involvement, and ownership of the different stakeholders. Also control and steering possibilities vary as well as the accountability. The different types are listed below and range from a 'free market' approach towards a closed system by the municipality (from top to bottom):

- Open license
    - Any operator can receive license if license terms are met
    - 'Free market'
- Limited license
    - Limited number of licenses available (first-come-first-serve or competition)
    - Oversight/collaboration can vary
- Multi-operator Partnership
    - Competitive process to select multiple operators
    - Multi-year contracts
    - Partnership to develop and operate a program
- Single-operator Partnership
    - Competitive process to select one operator
    - Multi-year contract
    - Partnership to develop and operate a program
- Municipal Program – white label operator
    - City develops and operates making use of resources of a provider
- Municipal Program – internal resources
    - City develops and operates with internal resources and owns infrastructure

Next to the types listed above other options can be considered such as making shared mobility part of the public transport concession so that public transport providers either themselves develop and operate shared mobility services or are required to collaborate with providers. As shared mobility hubs are often connected to public transport stations this is also a relevant option when specifically looking at the upscaling of hubs. Furthermore, including shared mobility and hubs in housing developments can be a valuable opportunity. Project developers can be incentivized, or alternatively, forced, to include shared mobility (hubs) in new developments through e.g. reduced parking norms or through financial support. In new development areas, a municipality can include shared mobility and hubs in the mobility visions right from the start. Furthermore, shared mobility can be organized in a bottom-up community setting where e.g. citizen form a neighbourhood cooperation.

Last, but clearly not least, funding is a factor of great influence to the successful upscaling of shared mobility hubs. It is closely related to the stakeholder network involved and it seems crucial that funding stems from both public and private actors. Some type of subsidy model or public-private partnership is necessary for a successful upscaling, at least initially and in particular for areas outside of city centres.

In order to scale up shared mobility and hubs, there can also be the need to directly and indirectly subsidize shared mobility provision and / or use. This can be through a subsidy per ride, a fixed subsidy per month or year, or a break-even subsidy / minimum income guarantee. These subsidies can also be location-based, for example when operation in specific neighbourhoods of a city (often the outskirts), or in parts of a region (outside of the larger cities). Another form of subsidy can be infrastructure investments that are needed for the initial startup phase such as hub infrastructure or charging infrastructure.

3.1.2 Geographical expansion

When it comes to the type of actors and public and private involvement, the factor of land ownership is of high importance in making a shared mobility hub successful. Having the landowner involved in planning and operation is crucial, as, depending on the type of landowner and their role in a consortium, interventions are easier or harder to implement. Land ownership and the division of responsibilities need to be clearly identified.

The type of area in which the hubs are to be upscaled also makes a difference for a successful upscaling strategy. Differences can be seen between city centre hubs, network of hubs in a whole city including suburbs, or hubs in a city and its connected region. Often, services offered in the city centre are very profitable and can help balance out profits with hubs in lower density and demand areas. Depending on the type of area and main goals a matching service provision needs to be chosen with the right number and types of modalities and vehicles as well as other amenities. Choosing a good location for a hub or a network of hubs is an additional success factor. Deliverable WP 2, 5.3 discusses context factors important to take into account when choosing locations.

3.1.3 Communication

Visibility and recognition of hubs is another important factor in order to attract users and improve accessibility. Branding and marketing are important to promote hub services, to inform residents or visitors, to make services recognizable and it can help register hubs in the public consciousness. Different options in branding can be identified: a strong local brand, a strong international brand, the brand of the local public transport provider, the municipality or region as a local brand. The network of hubs, but also the network of services should be connected in a joint system and design for optimal visibility and comfort for users.

3.1.4 Hub services

Physical accessibility is also an important factor in order to increase inclusivity for all. Furthermore, it supports the success if hubs and the services are digitally connected, for example with a (MaaS) app, allowing access to up-to-date information and streamlining the process of accessing and overall user experience. This requires data-sharing agreements between providers.

3.2 Best practice cases

The analysed literature showcases multiple cities and regions that each have unique elements that can be learned from and that inspired the activities in the ShareDiMobiHub project. These are described in Table 2.

Table 2: Best Practice Case Studies

Case	Description	Unique learning/ Example for…	Resources
Cities (in alphabetical order)			

Amsterdam	Amsterdam wants to use mobility hubs as an essential element in the mobility transition and to deal with the growing scarcity of public space and sustainability goals. Different types of hubs are identified. Key requirements are set on aspects of a unified system, recognizable design, digital connection and accessibility.	- hybrid governance model, combining public oversight with private service provision - innovative approach on **community involvement**: community led hub development and operation at Watergraafsmeer	(Arnold et al., 2023b; Coenegrachts, 2023; van Heijningen, 2022; Witte et al., 2021)
Bergen	Bergen adopted mobil.point system to reduce car ownership, reclaim public space and support multimodal mobility. Bergen City Bike is a docked bikesharing system that is financed by the city and operated by one private operator, chosen through tender process.	- Extra attention on **combining different services** at hubs (e.g. trash collection, charging stations) and inclusive accessibility - Integration with broader urban planning goals - **Strong public stakeholder**: City plans and finances bikesharing system	(Advier, 2021)
Bremen	Bremen is pioneer in shared mobility hubs with its mobil.punkt system of a dense network of low-tech hubs featuring shared cars, bike parking, charging. Two types of hubs (large and small). Targeting areas with high parking pressure. The hubs are part of a broader SUMP and accessibility, visibility and intermodality are emphasized. A modified tendering process is used to select mobility providers (for 8 years) in which providers express interest and are asked to settle issues with each other if multiple providers are interested. The hubs are publicly initiated and managed The system is scalable and replicable (inspiration for other cities) and based on a learning-by-doing approach.	- The mobil.punkt system shows importance of clear **visibility and branding**. Clear and memorable signing is used to ensure recognition and attract people to use hubs. - **Public initiation** and management, enabling fast decision-making - Modified **tendering** process - Focus on **multi-modal living**, not just trips	(Advier, 2021; Arnold et al., 2023b; City of Bremen, 2023; Kask et al., 2021; Witte et al., 2021)
Kempten	Similar to Dreux, as a small city with limited shared mobility service provision, the city of Kempten is investing in hub development and service provision	- Example of **city-led initiative** with financial **investment** by the public authority in a **small city**	(Coenegrachts, 2023)
Leuven	Leuven is implementing different types of hubs that are tailored to local needs Emphasis on reducing car use and increasing awareness of shared mobility Broader social/inclusivity goals	- Example of **strong collaboration with stakeholders** (providers; but also e.g. maintenance partnership with social economy actor)	(Coenegrachts, 2023; Evenepoel, 2024)

		- Example of broader **social goals**	
Nijmegen	Nijmegen has a licensing system for shared mobility providers without restrictions on the number of providers. The hubs aim at reducing the need for car-use, reducing car use and (second) car ownership. The public authority acts as mediator (between providers and users), investor (in infrastructure adjustments) and as a communicator.	- Not restricting the number of providers to introduce as many services as possible	(Coenegrachts, 2023)
Utrecht	At the new neighbourhood Merwedekanaalzone the city of Utrecht is working with mobility hubs as central stations for all mobility needs of residents, providing parking, shared mobility and other services (including a logistics hub) with the goal of reducing car ownership of residents to a minimum. A large and varied mobility provision is of great importance and multiple stakeholders are needed for success. Public and private stakeholders, including the public transit company have set up a joint venture to develop the mobility service for the neighbourhood. Another example in Utrecht on the topic of inclusivity is the neighbourhood hub 'Krachtstation' that is run by the local neighbourhood cooperation and offers shared mobility in area where usually less/no shared mobility is offered. There is experimentation with reduced pricing schemes.	- Example of mobility hubs as the central mobility service point in a **new development**. Possibly including a manned service station. - Example of **intense public-private partnership** to provide the services - Example for shared mobility hub in lower SES neighbourhood increasing inclusivity and example for **community-led collaboration**	(Ideate, 2023; Witte et al., 2021)
Vienna	The public transport provider in Vienna introduced a MaaS app that runs alongside the physical mobility hubs in the city through which the use of different mobility services can be planned and paid for.	- Example for the **digital integration** alongside physical mobility hubs that ease the access for users	(Arnold et al., 2023b)
Regions (in alphabetical order)			
Arnhem-Nijmegen	The Arnhem-Nijgmegen region launched a pilot of 13 hubs in 2020 as part of the eHubs project. These hubs focus on sustainable transport options, including e-bikes, e-cargo bikes, and shared electric cars. The aim was to centralize shared mobility services, increase awareness and accessibility and reduce car dependency.	- Limited existing shared mobility services require **strong public-private coordination** and need for **financial incentives or subsidies** - Exploration of partnerships with	(Coenegrachts, 2023)

		developers and businesses	
Flanders	In Flanders a mobility hub (Hoppinpunt) network is scaled up through a bottom-up initiative of 2 NGOs. These NGOs lobbied for the integration of mobility hubs into Flemish transport policy including a large investment to develop 1000 hubs. The NGOs now act as knowledge brokers and facilitators while local authorities and consultancies lead implementation. Strong political support and regional funding are critical as well as a comprehensive policy framework and regional coordination. The regional government plays a central role in funding, branding and standard-setting. Movement towards digital integration and integration of multiple providers. In more than 30 local governments the municipal fleet is shared with residents outside office hours via a peer-to-peer carsharing provider.	- Example for the role that NGOs can play as **stakeholders** and the importance of **knowledge transfer** - Role of **local** and **regional authorities.** - Alignment of **top-down support** and **bottom-up innovation** - **(Digital) integration** of multiple providers - Coordinated **funding mechanism** for deploying **clear regional brand**	(Advier, 2021; Kask et al., 2021; STARS, 2020; Witte et al., 2021)
Greater Manchester	Hubs with shared mobility as an alternative for car use for short trips. The local authority has the role of facilitator and investor.	- Example of hubs in less dense, car oriented areas outside of city	(Coenegrachts, 2023)
Groningen-Drenthe	In the Groningen-Drenthe region 55 hubs were developed across urban and rural areas which serve as multimodal transfer points (and often include non-mobility services). Every inhabitant in the region has a hub at a maximum of 15km distance from their home. They were developed through a learning-by-doing approach, not strict policy frameworks. Pilots were used to test new services. There has been a strong collaboration between different (semi)public authorities. Broad services are being offered (mobility, logistics, healthcare, retail) that leads to shift from mobility hub to more of 'community centres' Community engagement and branding are crucial for uptake and visibility. ('reisviahub' campaign/branding) Land ownership determines the responsible stakeholders.	- Example of **successful** upscaling of hubs in a **larger region** - Example **on learning by doing** approach and **strong collaboration** between different public authorities (and one authority as a coordinator) - Example of fragmented **land ownership** as crucial challenge. - Example of varying **municipal engagement** and **knowledge and capacity** levels - Example of broad interpretation of hub, offering **varied services.** - **Community engagement** and **branding** are crucial	(Kask et al., 2021; Witte et al., 2021)
Karlsruhe region	In the regiomove project in Karlsruhe digital and physical MaaS infrastructure was developed including hubs in urban and rural	- Example of **digital and physical integration** and role of hubs	(Witte et al., 2021)

	areas that integrates existing mobility services. Important role of the regional public transport provider in development of hubs that will be operator of the hubs. City is land owner.	- Example of crucial role of public transport provider that acts as **hub operator**	
North Holland	In the rural northern part of the province of North Holland multiple mobility hubs were developed. The province of North Holland and multiple municipalities formed a cooperation organization to do so. The mobility hubs were set up to improve accessibility in an area where public transit is limited. A unified branding is used and a marketing campaign is set up. Initiators are looking for efficient collaboration possibilities with local actors to increase upscaling potential through finding positive business cases for different types of actors. A shared mobility knowledge consultancy plays key role in development and collaboration activities. A learning by doing approach is applied. Initially top-down, with the hope that bottom-up developments by local communities will follow. Funding stems from province and municipalities.	- Example of hubs in **rural area** - Example of joined organization of **multiple public authorities** to develop hub network - **Collaboration** with different types of local stakeholders. - Example for importance of **knowledge actor**. - Example for lessons learned on **organizational structures** initiating, developing and operating hubs.	(Advier, 2021; Kask et al., 2021)
South-East Scotland	Mobility hubs are introduced through the Share-North project and initiated by the public transport partnership of the region, SEStran, whose task it is to produce a transport strategy. Initial funding stems from the European research project Share-North. Importance of involvement of local public authorities and transport providers, e.g. because of land ownership. Local authorities are seen as hub operators. Public transport partnership supports local authorities with knowledge, funding. No overarching branding or marketing, instead left to local authorities.	- Example for key initiator role of **public transport** player - Example for importance of including and convincing **local authorities** and communities (e.g. because of **land ownership**)	(Kask et al., 2021)

4 Methodology

Building upon this literature, we then continue to identify the experiences, lessons learned and challenges encountered by the partners involved in the upscaling activities outlined in Work Package 2 (WP2) of the ShareDiMobiHub project. In addition to the insights gathered during the different meetings, discussions

and trials, the main input for this document was summarised during a dedicated workshop at the sixth project meeting in Denmark. During this workshop, regional and city authorities, universities, transport authorities and networking organisations used the Success Criteria Matrix to summarise the categories and factors contributing to the success and challenges within the upscaling plans WP2. The categories are umbrella terms that classify cities' activities for WP2 and were derived from the literature review, although with an extra focus on the operational characteristics and need for digitalisation.

Each city received a copy of the instructions, a description of the categories, and an empty *Success Criteria Matrix* (see Figure 1) to complete. To begin, cities first defined the specific objective they aimed to achieve during the upscaling process. Once the objectives were clear, they outlined the key activities carried out to reach them. Each activity was classified under one of the provided categories.

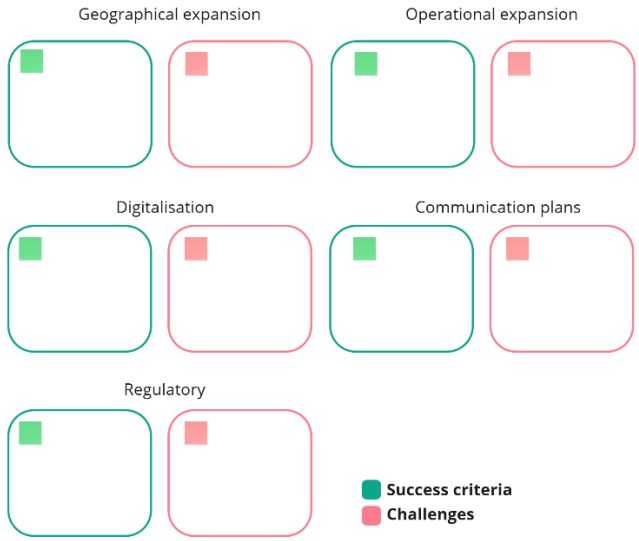

Figure 1 Example of success matrix

To assess elements leading to the to success and challenges encountered, city's representatives should internally reflect on the critical activities that contributed to achieving (or failing to achieve) the objective of the upscaling activities. For example:

- If the upscaling activities involved **operational expansion** (e.g., adding new modes or vehicles to a hub), a success factor could be the marking of designated parking areas for shared mobility (SM) to prevent cluttering pedestrian zones.
- If the upscaling activities included **geographical expansion** (e.g., designing a new hub), a success factor could be repurposing public space to accommodate shared mobility.

Although we specified the *Hubs services* component into *Digitalisation* and *Operational* aspects for the workshop, we summarised the findings according to the earlier introduced typology containing four main components, namely *Geographical expansion, Regulatory framework expansion, Communication* and *Hub services*.

5 Lessons learned

Together with the lessons learned provided in the next sections of this report, a digital platform is available that gathered the learnings from this project and provides a step-by-step learning trajectory regarding piloting and upscaling shared and digital mobility hubs. **This 'Digital Participatory Platform' can be found here: https://dl4sd.org/**

5.1 Regulatory framework expansion

1. **Establish agreements that encourage providers to offer services in peri-urban areas**

Ensuring accessibility in intra- and peri-urban areas requires mobility policies that recognise suburban behavioural patterns while remaining integrated with policies for denser urban zones. *A good example of agreements that led to improved services in peri-urban areas were the minima in the number of vehicles put by Amsterdam to shared mobility providers to encourage expanding their offer towards less dense urban areas.*

Hubs in peri-urban areas should be part of wider expansion policies strengthening rural-urban links, in which providers are encouraged to balance the offer of vehicles within these two urban landscapes. Likewise, there is an opportunity to support integrated tickets with public transport, which can motivate users to try shared mobility. Ultimately, through the agreements (e.g. subsidies included in tendering) to maintain a healthy business model for providers, hubs can help democratise the use of shared mobility in less dense areas. *The Amsterdam transport authority, which is responsible for organising public transport in the broader region around Amsterdam (that includes many smaller municipalities), has provided subsidies for the municipalities to set up mobility hubs, with a larger financial contribution to mobility hubs that accommodate shared micromobility compared to car sharing. Furthermore, they make use of their experience to contract public transport to also put up tenders regarding shared micromobility in the broader Amsterdam region, in which they use the city of Amsterdam as leverage for providers.*

2. **Aligning regulatory frameworks and agreements with the city's and shared mobility providers' needs**

Scaling-up a mobility hub could require reviewing current regulatory frameworks and contractual agreements with SM providers. Defining the type of agreement, e.g., tendering, concession or permit-based systems, becomes a central issue as the provision of shared mobility becomes mature in the city. These frameworks not only define the rights and responsibilities of providers but also influence the pace and effectiveness of scaling efforts.

Cities must assess which contractual models best suit their governance structures and operational goals. *For instance, in Leuven, experimenting with new contractual models helped align hub outcomes with policy goals.* Tendering can offer more control through outcome-based criteria (e.g. modal shift, coverage equity), whereas concessions may enable quicker deployment. Regardless of the model, contracts must clearly address data sharing, service standards, and performance metrics.

A significant challenge is the mismatch between city and regional governance structures. Varying operational guidelines across municipalities and regions can lead to fragmented implementation. In addition, it adds difficulty for mobility providers who must comply with different rules within a single operating area. To mitigate this, *regions should be involved in the development of the baseline regulatory*

framework to facilitate mobility providers to offer their service in various urban settings. *Cities within these regions, should at least align, or better cooperate, with the regional authority to see how they can define a regulatory framework that is also beneficial for the region. However, larger cities could have their own city-specific objectives which are difficult to regulate within a regulatory framework that is defined for a region. An example is the city of Utrecht, which is organising its regulatory framework on a regional level, while also cooperating with the other large Dutch cities to see how their goals can be aligned.*

Another barrier is the misalignment of contract durations. Private operators typically seek longer-term agreements to justify investment, while the political cycles may favour short-term permits or contracts that allow for flexibility. This mismatch can create uncertainty and deter provider participation. Establishing longer-term contracts, with performance-based milestones and adaptive clauses, e.g. subsidies linked to usage or environmental outcomes, provides a balance between flexibility and security.

Ultimately, regulatory frameworks for mobility hubs should shift focus from prescribing business models to enabling outcomes. This means encouraging innovation while maintaining public oversight through clear objectives, accountability mechanisms, and adaptability to evolving mobility needs.

3. Horizontal and vertical participation in the decision-making process

Effective regulatory upscaling of mobility hubs requires coherent participation across all levels of governance and citizens alike. Both horizontal collaboration (across departments and cities) and vertical alignment (between political, administrative, and civil stakeholders) are essential for decision-making.

At a political level, the relatively recent introduction of shared mobility may lead to uncertainty about its role in improving transport accessibility. When the purpose of shared mobility and of hubs is not conveyed, delays and resistance can arise from political actors.

Tønsberg's early horizontal communication strategies helped support long-term commitment to mobility hubs, as it is informed what the main goals of the hubs are, and the potential uses. These strategies also encouraged support from developers interested *in mobility hubs as value-additions to new housing*.

Mobility hub governance should be co-created, with input from elected officials and agencies. For example, *Leuven established a plan with broader collaboration together not only with neighbourhood centres but educational centres as well. The city sought to reach people in difficult situations*, e.g., immigration background, lower education, to gain insights on the challenges on using SM and the hubs.

Operational fragmentation also presents a significant barrier. This is particularly relevant for mobility providers who face inconsistent procedures and policy interpretations across city departments or neighbouring municipalities. For example, differing rules for access, parking, or zoning can reduce the feasibility of cross-jurisdictional operations. Collaborative governance models, such as inter-municipal working groups, can reduce this conflict and offer more unified approaches to regulation, permitting, and hub design.

4. Shared mobility management can only work in a multimodal transport strategy

In reality, many people still prefer to use private cars, despite having alternative options. This preference is often reinforced by an urban fabric that continues to prioritise car use, as reflected in how public space is allocated and the large availability of private car parking (as it is still a considerable source of income for many municipalities). Cities must ask: *are we truly prioritising walking, public transport, and shared*

mobility over private cars? Behavioural change depends on long-term strategies and consistent interventions that build new habits over time. Hence, only expanding shared mobility infrastructure – the carrot – will not be sufficient to significantly improve the modal split. For a truly successful implementation, it should be accompanied by a stick, discouraging private car use. Parking management is by far the most important stick that municipalities have; they can reduce the parking requirements for new real estate developments, reduce on-street parking availability, increase parking fees or decrease the number of free residential parking permits per households.

5. Planning for shared mobility expansion requires insights

Understanding shared mobility use requires combining quantitative usage data with surveys and qualitative insights. On the one hand, mobility dashboards provide baseline insights into usage patterns at mobility hubs, such as parking duration, trip length, and vehicle usage frequency. On the other hand, how this data is evaluated depends on the goals set out in mobility plans and on the stakeholders' ability to extract relevant insights. Running workshops to explore what kind of information stakeholders actually need can help make the evaluation process more effective. The deliverable 'Data and dashboards' provides numerous examples of mobility dashboards, both from within and beyond the project.

A good example of this approach is the work carried out by Mpact. *The outcome of this process was a set of recommendations for improving front-end dashboard design, along with guidance on the types of content policymakers expect.* For instance*, dashboards should offer features to evaluate hub-specific metrics, such as trip frequency or distance travelled.* Stakeholders also mentioned that it would be helpful to be able to generate reports that present usage statistics at the neighbourhood level. *This combination of workshops and existing mobility data led to a better understanding of how policymakers interact with digital tools when making decisions.*

Letting the data tell the story supports transparency and evidence-based decision-making, particularly regarding hub placement or expansion. However, quantitative data must be complemented by surveys that reflect user experiences and perceptions.

6. Clearly define dashboard ownership

While data sharing is crucial for spatial planning, accessibility analysis, and policy evaluation, creating decision support tools such as dashboards to access the levels of accessibility of different demographic groups or results of spatial initiatives is key for evaluation. However, as multiple stakeholders are involved, clearly defining who owns the data and the visualisation within the dashboard becomes critical to ensuring transparent and accountable operations.

A digitalisation plan should be developed to clarify data ownership, access rights, and maintenance responsibilities on the dashboard. Cities and regions must agree on who manages the dashboard and under what conditions data is shared. Clear standards ensure data is consistent, secure, and actionable. It is necessary to define this ownership structure so that mobility providers also know who has access to their data and that the reason for what purpose the data is shared can be clearly detailed.

An essential first step for a dashboard is conducting a shared mobility inventory. *Hogeschool Utrecht conducted such an inventory using a national platform, evaluating shared mobility services by reliability, completeness, relevance, and legal/privacy constraints*[1].

This foundational step lays the groundwork for shared governance of data. Once responsibilities and standards are agreed, dashboards can be effectively deployed to support decision-making across government and mobility providers. Once agreements on data standards and responsibilities are in place dashboards can be effectively deployed and made available to governments at all levels, as well as to mobility providers.

5.2 Geographical expansion

7. The location choice for mobility hubs should be guided by a clear typology framework

Cities undertaking geographical expansion of hubs should establish a clear, context-specific typology of mobility hubs. Although multiple frameworks have emerged in scientific literature and urban policy documents, there is no universal agreement on the most effective way to locate hubs. This is partly due to several aspects, such as the dynamic nature of cities, their urban form, political structure and the relationship with private providers. As such, replicating mobility hub models from one context to another is often more complex than anticipated.

To support this goal, the Hogeschool Utrecht developed a practical guide for identifying potential hub locations (WP 2, Deliverable 5.3), drawing on insights from a literature review and an expert workshop. Although initially focused on shared cargo-bikes, the guide draws on a literature review and expert workshops to identify factors influencing shared mobility use*. By combining demographic data with expert knowledge, the tool allows cities to easily identify and prioritise suitable locations. while initiating discussions around how mobility hubs are defined and located*[2].

8. Be aware this typology is partly context-dependent

In addition to a set of general principles (cfr. the previous point), cities should consider the local context, including infrastructure, policy goals, user behaviour, design, budget, the maturity of relationships with providers, and the shared mobility system itself.

Creating a typology of hubs can be a lengthy process, especially in cities new to the concept. For example, the stakeholders in Tønsberg began researching integration of mobility hubs at least two years before the SDMH project, by engaging regional stakeholders and planners early in the process.

A key learning in developing typologies tailored to the city was the importance of ensuring a clear hub identity distinguishing it from the individual services inside. Input from public transport authorities and providers, together with feedback from consultants and planners, helped develop a clear vision. Several visual concepts were tested with stakeholders to refine the design and branding, ensuring the hub did not resemble other systems like metro or bus lines.

Without a national guideline, Tønsberg had to navigate various design possibilities, including the redistribution of public space to better accommodate shared mobility. *Another key insight from this*

[1] WP2, D14: Inventory of mobility hubs
[2] Deliverable WP2, D5: A guide using GIS to find suitable location of mobility hubs

experience was the need to factor in high initial costs when redesigning public space. However, once the typology is in place, project costs tend to decrease significantly.

9. Expansion should take place according to scale, users and function

From neighbourhood pilots to regional networks, the scale of hub expansion should align with expected catchment areas and accessibility outcomes. Smaller hubs can serve local needs; larger ones may function as regional interchanges. The typology developed by Tønsberg, *accounts for these functional scales and played a critical role in designing the network.*

Typologies must also reflect the diversity of users and spatial settings. Urban, peri-urban, and suburban differences should inform hub features and location. Segmentation by user type (commuters, students, tourists) or by built environment helps ensure relevance and uptake. For example, placing hubs on the urban periphery may require tailored offers that cater to low-density areas and longer-distance travel. Segmentation by user groups (e.g. commuters, students, tourists) and built environment (e.g. high-density vs. low-density areas) can enhance hub relevance and usage.

Finally, any hub typology should also consider their function, for example, as a transfer point, first- or last-mile connector, multimodal node, and catchment size can support better planning and optimisation of travel time. For suburban hubs in particular, this helps integrate less connected areas while avoiding underused infrastructure. *Amsterdam developed their own spatial strategy to create hubs[3], featuring strategies that consider the city's historical areas and main traffic networks*.

10. The type of hub model in relation to the transport system

Cities should explore hybrid models combining station-based and free-floating services. These offer flexibility, support behavioural change, and adapt to different neighbourhood needs. Moreover, integrating both free-floating and station-based services can enhance the complementarity of hubs within the broader mobility network, while responding to the specific requirements of each neighbourhood.

A good example can be found on the typology developed by Tønsberg, where services were tailored around the modes offered in the hub, for example, permanent biking repair shops next to rental and storage biking systems (WP 1, D11.5).

Similarly, the current public transport (PT) serviceability and mobility corridors can be used as a stepping board for expanding the hub network. This approach supports multimodal connectivity and enables better access to key destinations such as commercial or business centres. In areas without existing hubs, the PT network offers a valuable reference point for planning integration.

5.3 Communication

11. Involve all stakeholders in your communication strategies

From regional authorities to citizens, all actors offer insights into mobility challenges, and thus, an opportunity to build a more complete solution adaptable to the specific context. A key stakeholder are politicians. Political uncertainty can delay the creation of mobility hubs or the expansion of shared mobility services. This uncertainty may discourage providers from entering or staying in the market, and

[3] Towards a Spatial Strategy Hubs. District and street hubs as facilities for the residents of Amsterdam

citizens risk losing access to vehicles they rely on for daily mobility. Hence, *involving politicians at early stages can increase confidence in the initiative's success and secure long-term support*. One strategy to do this, can be by including a specific focus of the expansion, for example by ensuring greater accessibility for vulnerable groups in an existing set-up (cfr. point 7).

Multistakeholder management, including engagement with other cities and third-party actors, helps build trust and enhances the overall outcomes of shared mobility initiatives. Each one of these actors, should be addressed with strategies that adjust to their roles and expectations.

12. Pilot programs with feedback sessions for citizens

Community engagement should be embedded in hub planning, from site selection and design to monitoring. Combining this grassroots input with strategic policy ensures that hubs are not only technically feasible but socially accepted and contextually relevant. This approach strengthens local ownership, helps mitigate resistance and increases the chances of long-term success.

Leuven considered a wide range of inclusion activities in their hubs as part of the strategy to understand how the hubs would be used by citizens, for example, a walking tour and computer skills training. These activities were key for reaching population that is not too familiar with shared mobility.

Also Rotterdam engaged in different ways with its citizens residing in the pilot areas. For reaching a large audience, they distributed letters explaining the concept of the mobility hub and the mobility budget that residents could use through the MaaS application. Following this action, they provided more interactive and intense communication possibilities by organising an event in the pilot neighbourhoods and allowing a mobility coach on the streets that could support and attract interested citizens wandering around the hubs.

13. Dedicated communication materials and branding

Leuven created dedicated communication campaigns to promote hub services by informing residents, making services easily recognisable, and embedding hubs in the urban fabric. The communication campaigns involved not only dedicated flyers but having trusted workers in neighbourhood centres to promote the hubs.

Branding is essential for the success of the hub, but finding the right elements when the initiative is new can be challenging. For example, Tønsberg underwent several tests before they selected the best elements that would constitute the identity of the hub. *A key learning was the need to balance input from public transport providers, politicians, and citizens while staying true to the city's vision.*

14. Co-creation workshops

The involvement of different departments is results in strategies that are beneficial to the stakeholders involved, and better accommodate to the urban conditions, e.g., public space available, historic importance, parking zones, of the intervention areas.

Amsterdam presents an interesting case study[4] which involved collaboration with regional departments such as the Department of Space and Sustainability (R&D), Traffic and Public Space (V&OR), Land and

[4] Amsterdam spatial strategy network

Development (G&O) and the city districts to supervise so that short- and long-term goals are met. To determine the best way to approach hubs in each district, in-place interactive workshops were conducted to come up with a concrete action plan. The case studies of the city of Amsterdam produced a series of short-, medium- and long-term actions where the interventions are localised, and applicable to each case study and follow specific goals. The result of these efforts generated a spatial strategy to locate hubs on the district scale, but at the same time embedded in a wider network.

5.4 Hub services

15. Hubs should be digitally and physical connected

Inclusive hubs require both digital integration and physical accessibility. MaaS platforms can support this, but raise challenges around data sharing.

- **Do a MaaS reality check**

While MaaS offers potential to improve multimodal transport through hubs, behavioural change does not follow automatically from the availability of such a platform. In the case of MaaS, it is often seen as a digital solution that facilitates access to various transport modes. The concept of MaaS and mobility hubs are complementary, facilitating digital and physical access.

- **Use hubs within your spatial management strategy**

Dynamic geofencing policies can support spatial management by concentrating micromobility modes within designated zones. These zones should remain flexible to respond to evolving demand, helping reduce clutter and improve usability.

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The ShareDiMobiHub Consortium

The consortium of ShareDiMobiHub consists of 13 partners and 4 subpartners with multidisciplinary and complementary competencies. This includes European cities and regions, universities, network partners and transport operators.

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