Blueprint for Mobility Service Providers

DELIVERABLE 2.2

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University of Antwerp

Summary sheet

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Project partners

Organisation	Abbreviation	Country
Gemeente Amsterdam	AMS	The Netherlands
Promotion of Operation Links with Integrated Services aisbl (POLIS)	POLIS	Belgium
Taxistop asbl	Taxi	Belgium
Autodelen.net	Auton	Belgium
Bayern Innovativ GMbH	BI	Germany
Cargoroo	CA	The Netherlands
URBEE (E-bike network Amsterdam BV)	URBEE	The Netherlands
Gemeente Nijmegen	NIJ	The Netherlands
Transport for the Greater Manchester	TfGM	Great Britain
Stad Leuven	LEU	Belgium
TU Delft	TUD	The Netherlands
University of Newcastle upon Tyne	UN	Great Britain
Ville de Dreux	DR	France
Stadt Kempten (Allgäu)	Kemp	Germany
Universiteit Antwerpen	UAntwerp	Belgium
Mpact vzw	Taxi2	Belgium
Mobipunt vzw	Mobipunt	Belgium
Electricity Supply Board	ESB	Ireland
The Highlands and Islands Transport Partnership	HITRANS	Great Britain
Service Public de Wallonie Mobilité et Infrastructures, Autorité Organisatrice du Transport	SPW MI, AOT	Belgium

Document history

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0.1	August 2021	University of Antwerp	Structure	
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1. Introduction

The implementation of a network of eHUBS requires the provision of services by different (commercial) stakeholders, not exclusively shared mobility providers. Several aspects has to be regarded so that the deliverance of shared e-mobility services contributes to the goals of public and private stakeholders. This document provides information and experiences on how the commercial partners in the eHUBS-project engaged with other commercial stakeholders, how they cooperated with local authorities, how the concept of eHUBS possibly altered its operations and business model, how they could reinforce the existing nudging campaigns of the local authorities and which pitfalls and risks have been encountered during the implementation process. The context (i.e. regulatory environment, culture, transportation system, socio-demographics, geography) of the different pilot cities has a considerable influence on the approach and experiences of the commercial partners with regard to the abovementioned aspects. This has to be kept in mind by mobility service providers when they want to delivering e-mobility services in a certain market. However, the information provided in this document can still support other them to identify the key elements they have to consider when aiming to deliver e-mobility services, specifically in an eHUBS context.

This document complements the blueprint for replication cities, which is available [here](#). The blueprint has ten modules providing a step-by-step approach supporting local authorities with the implementation of eHUBS. Certain modules also fit into this document, detailing the approach that the pilot cities took in their engagement with commercial partners (such as shared mobility providers and charging point operators). This relates to tendering processes, providing charging infrastructure, selecting the mobility service providers, creating the regulatory framework, nudging the end-user, engagement with different stakeholders and the assessment of the eHUBS' services (and its operators). This information can be useful for commercial partners to see the focal points and decision factors of the local governments.

2. The eHUBS concept

e-Mobility hubs, in short eHUBS, are on-street locations that bring together (e-)bikes, (e-)cargo bikes, (e-)scooters and/or (e-)cars, offering users a wide range of transport modalities to experiment and use in various situations. The idea is to give a high-quality and diverse offer of shared electric mobility services that facilitate a modal shift from car-centric to shared and active mobility. This can result in cleaner, more liveable and pleasant cities. The implementation of eHUBs seeks to reduce the overall number of cars on public streets while respecting the citizen's need for individual and flexible mobility options.
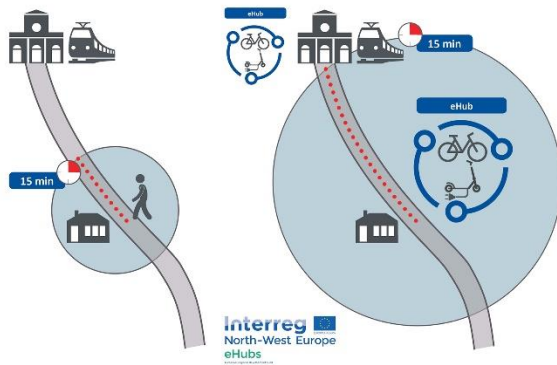
The figure above shows what benefit eHUBS can have for citizens. eHUBs help to cover distances that would not be taken by foot by most people but rather by car. The transport options of the eHUBS give an alternative to that by providing mobility options that widen the mobility-range of a person without the need of a private car that extrudes CO_2 and the need of a parking lot. So the focus group of eHUBS are car-users. If the options offered at the eHUBS can be a real alternative for this societal group, the change in (urban) mobility then comes into action

Best case, the eHUBS can contribute to the following effects:

1. It reduces CO2-emissions as well as the emission of NO2 and fine dust
2. It promotes the uptake of active mobility options, that benefit the physical well-being of citizens and reduce traffic induced noise
3. They facilitate multimodal and intermodal mobility, while increasing the accessability of public transportation
4. They reduce the pressure on public streets due to reduced parking demands

In total, shared mobility options provided by eHubs contribute to a more efficient use of vehicles. Thus, they can help to promote the means of transportation with the lowest impact on the environment and the public domain (see Mobility pyramid).
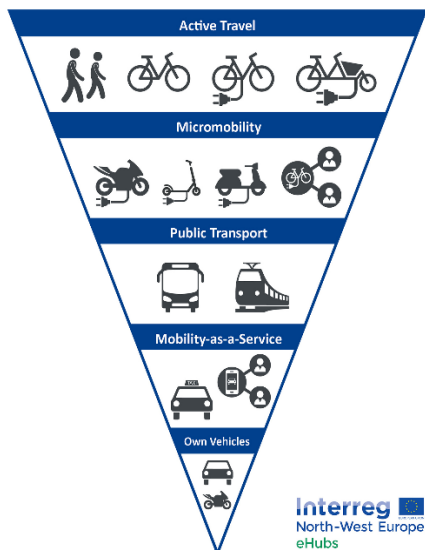
eHUBS can vary in size (minimalistic, light, medium, large), type of location, and type of offer. They can be small and located in residential areas, with just one or two parking spots, or bigger and positioned close major public transport interchanges. They may also offer additional services such as lockers, Wi-Fi hotspots or bike repair stations. But in the end, the key is that they should always be where supply and demand meet.

At the same time, eHubs address the issue of urban cluttering often related to shared mobility by physically clustering the vehicles, preventing them from blocking streets and sidewalks and thus benefit the general acceptance of shared mobility.

eHUBS represent a crucial step towards the adaption of shared and electric mobility services, as they represent a real alternative to the use of private cars, by providing opportunities to increase shared and electric mobility in a truly innovative way.

When local authorities decide to implement the eHUB concept, mobility service providers will have to think about how their services could be integrated in this network and how they can contribute to the eHUBS' objectives, while considering how its own commercial interest could benefit from it.

3. Considerations with regard to the business model when integrating with eHUBS

Shared mobility providers will have to reconsider some aspects of their business model and operations when they want to provide e-mobility services at eHUBS. This relates to their use cases, the investments required and their maintenance and redistribution operational tasks.

3.1. Realign the use case and target groups with the type of eHUB network

Shared mobility consists of different modes, such as shared cars, (cargo-)bikes, scooters and mopeds. Overall, they are operated under two main business models, i.e. the station-based and free floating model. As eHUBS are physical locations where different shared mobility modes are clustered, the station-based model is, in this regard, more suited for integration with shared mobility hubs. Local authorities will give preference to these types of operators. However, free floating models can also be implemented in an eHUB network, using the eHUB locations as so-called virtual drop-off zones. The different modes can serve different use cases. The policy objectives of the local authority will determine what kind of eHUB network they will implement. As an operator, it is important that the use cases foreseen by this network can be served by your model and mode. For example, if the local authority wants to establish a dense network of eHUBS aimed at commuters and visitors, the business model of the operator should allow for a back-to-many system with high redistribution efforts, which can be served by shared micromobility. If the local authority wants to establish eHUBS at neighbourhoods to reduce the car trips for occasional purposes (e.g. shopping, visiting families, bringing children to school or their leisure activity), a roundtrip model with a shared car or cargo bike can better serve this use case.

3.2.   Additional investments in an eHUBS network

The investments that are required are different when integrating with a network of eHUBS. A first aspect is the charging infrastructure. The local government can decide to take all the infrastructure investments of the eHUBS on them, meaning that they will provide charging infrastructure at the eHUBS. However, this also depends on the requirements of the mobility service providers, as they can possibly offer a battery swapping system, so that they do not require charging infrastructure. Nonetheless, carsharing operators should discuss with the local authorities if it is possible to adapt the public space so that charging infrastructure can be installed, which posed a considerable problem for many pilot cities. Second aspect is the transformation of the public space to accommodate the shared vehicles and make them easily accessible. An example is the provision of physical stations for shared (cargo-)bikes at the eHUBS. A third aspect are the investments associated with the determination of suitable locations. If the locations are already decided by the local authority, it is essential to assess the market potential of that location. If it seems that the market potential is too low, agreements with regard to possible compensation for these locations can be discussed. However, if the locations are not fixed, determining the optimal locations will ask considerable efforts and investments. A last element is the provision of electric vehicles. This can increase the upfront capital costs, while also impacting the operational tasks and associated costs. The eHUBS project showed that cities are open to discuss the possibility of having a mix of conventional and electric vehicles, as the availability of service is more important than the electrification itself.

3.3.   Reconsidering operational tasks in an eHUBS network

The operational tasks associated with providing mobility services at eHUBS, again depends on the considered shared mode and model. The eHUBS concept offers an opportunity for integrating the rebalancing, redistribution and maintenance efforts, performed by one centralised actor that can be in charge of the whole eHUBS network. If the number of shared vehicles is low, it is not interesting to hire employees for these operational tasks, as the overhead for the limited amount of vehicles is too high. Then, the possibility to outsource it to an external actor should be explored.

## 3.4.   Complying with data sharing standards and digital integration requirements

Another important aspect to consider are the requirements that cities pose with regard to integrating the mobility services into a digital data infrastructure and setting data sharing standards, so that data-based decisions can be taken and digital cooperation with other mobility providers (such as MaaS or public transport) becomes easier. The eHUBS project has developed two open-source data frameworks, the City Data standard – Mobility (CDS-M) and the Transport Operator Mobility-as-a-Service Application Programming Interface (TOMP-API). These can be found in the blueprint, module 5.2.

Currently, there is a broad variety of data standards for the exchange of data between municipalities and mobility operators. As mentioned above, having a clear idea about the mobility behaviour of citizens is important to design infrastructural changes in accordance with the needs of the citizens. For this cause, good data about travel behaviour is required.
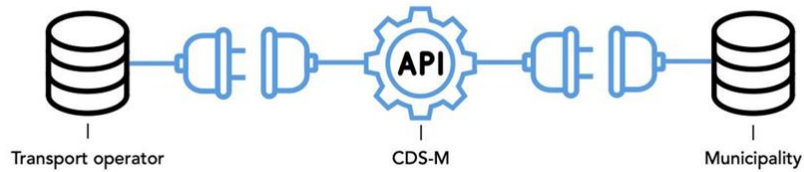
The City Data Standard (CDS-M) was created to fit the requirements of a transport system that includes Mobility-as-a-Service and through that many different use cases in the transport system of a city. The CDS-M is a data exchange standard that was created with a focus on the metrics that municipalities need and sets "must-haves" of data that a transport operator must share. The aim is to create a European data standard for MaaS. The City Data Standards for Mobility will eventually become a menu of data items that cities can request from mobility operators in line with a validated data standard.

The data, structured with the CDS-M consists of two main parts, the metadata and the body containing several measurements, aggregated on time interval and location to protect the privacy of users. The metadata contains general properties about the data provider (transport operator) and the data batch. CDS-M will define mandatory properties but will leave room for optional properties that can be adjusted to the actual use case. The figure below displays the CDS-M Data Structure.
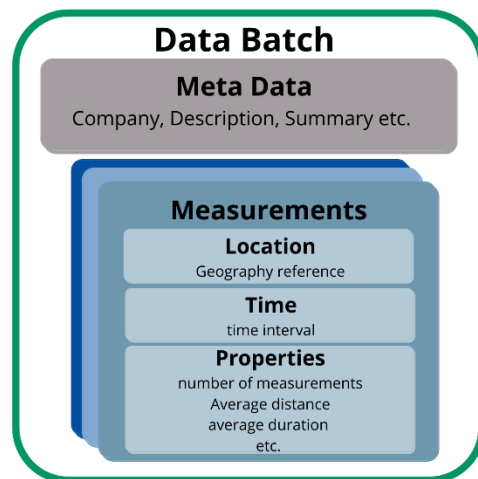

The body consists of any number of measurements, each having a location and time interval. Included is e.g., the data of the individual trips that the users make (the distance covered, trip time, etc.) but also data about the shared vehicle fleet (vehicles in use, vehicles available etc.) and also, there can be metrics added to the data batch, that are required by your municipality.

There is a lot of analysis that can be done with the data. This includes use of parking space, car reduction, demand for public space, modality specific route development, clustering and curb side management,…. More information on the CDS-M can be found [here](#).

As the CDS-M is intended to be a European-wide standard for MaaS-data exchange, it can be very relevant for mobility service providers to consider it, as it can be a competitive advantage to enable future market entries.

The TOMP-API framework is an open-source data-exchange project (work in progress) that aims to cover all the different stages of a trip made by a user and every usable mobility mode. An API consists of a set of rules and standards that enables data to be transferred between different parties in a standardized way. The data exchange is a mandatory link that has to be established between transport operators and mobility-as-a-service (MaaS) providers for an eHUB network. In a multi-modal mobility system, a whole lot of different services should be integrated into a single system. Through that, the use of the different services is easy for potential users as they can book different services via one application. For eHUBS the services of e.g. the e-bike, e-cargo bike and e-car sharing providers had to be integrated into the digital infrastructure of the MaaS-providers.

The TOMP-API consists of six separate modules, that can be combined for the actual use case.
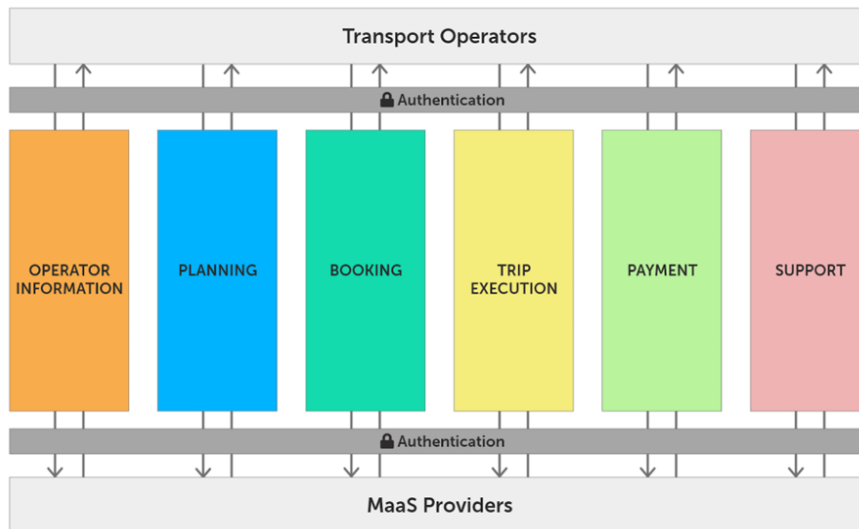
Within the eHUBS Project the TOMP-API was used to create an eHUBS KIOSK, a platform that can be accessed at the HUBS and assists the user with planning a shared mobility ride. For this use case, the

modules Operator Information and Planning are needed, and the referring data must be exchanged.
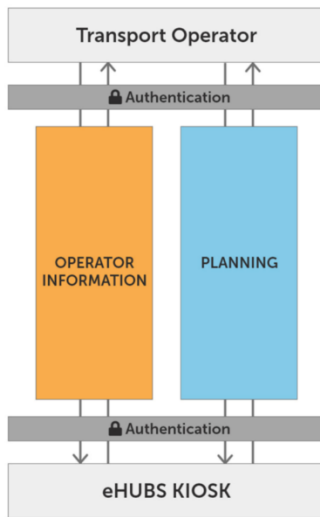
The Kiosk is an application that can be accessed from a digital eHUB pillar that has a touchscreen installed. On the screen, as displayed in the pictures below, the users get information on mobility options near the eHUB and the shared mobility vehicles of the HUB itself. In addition, all kinds of information about sightseeing, weather, POIs or recent events in the municipality and more can be provided.

It is an open-source project which always offer the possibility to join the working group and participate in the development of the framework. This framework is also relevant to consider as a mobility provider, as more cities will put this API as a requirement in their tenders. More information about the TOMP-API can be found here.

3.5. Is the business case still positive?

It should be noted that not every city can be attractive for (several) shared mobility operators. The business case cannot be made for certain cases, as potential demand is too low or the context does not enable shared mobility services (e.g. too favourable environment for private car use or infrastructure not adapted for micromobility services). Therefore, discussions with local authorities can be started to see if a subsidised service can be established. Possible forms of cooperation or partnerships with local authorities will be considered in the next section.

However, eHUBS offer the possibility to gain a competitive advantage and make the business case positive. We saw that typically only one service provider per mode get selected to deliver e-mobility services at the eHUBS, which furthermore offers the right to provide services in public space, high visibility, publicity and (free) public infrastructure for the operator.

4. Cooperation with local authorities

Dialogue between mobility service providers and local authorities is always beneficial to in order to deliver relevant services for citizens, but it is even more necessary when eHUBS are considered. The public resources that are required to set up a dense and qualitative network of eHUBS, are significant, thus authorities are looking for reliable and supporting partners so that their resources are not misplaced. Therefore, governments are opening tender procedures, posing different service levels to be reached, offering possible subsidies and looking for long-term relationships. This section will describe the experiences of the eHUBS' partners in this regard.

4.1. Where to find potential municipalities?

Identifying potential markets is an essential activity for service providers. They can search for request for proposals (RfP), market consultations, public tenders and open procurement procedures. The European Union has a website on which all calls for public tenders in member states of the European Union are published. The website can be found here. Examples of market consultations and call for tenders from the eHUBS' pilot cities can be found in the blueprint, module 4.1.

Furthermore, the eHUBS project has analysed which characteristics of a city could be of relevance as decision factors for mobility service providers. Desk research has led to the following decision tree, which shows potential relevant decision factors for MSPs.
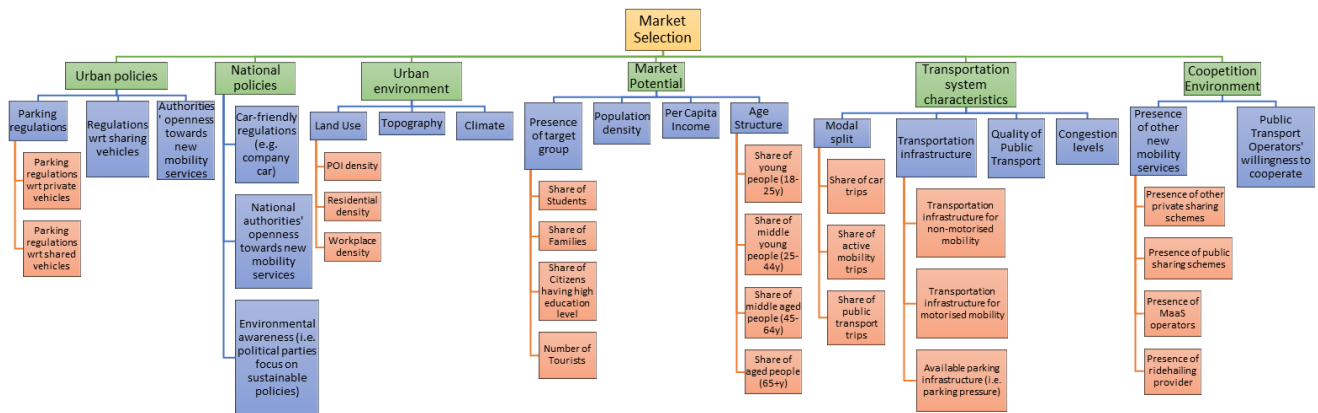
Following the identification of these potential decision factors, the quantification of the importance of every factors has been analysed, using the analytic hierarchy process methodology. First, the partners of the eHUBS project had to make pairwise comparisons between the factors. Afterwards, the relative weights of every factor have been calculated. These have been visualised in the picture below. The results indicate that two upper-level factors, i.e. 'Market Potential' and 'Coopetition Environment', are the most important to consider. Under the factor 'Market Potential', the factors 'Population density' and 'Share of families' are to be taken into account. Below the factor 'Coopetition Environment', the presence of other 'Public and Private Sharing Schemes' plays an important role. The factor 'National Policies' is not really considered as important, while the factor 'Urban Policies', and in particular the 'Authorities' Openness Towards New Mobility Services', is viewed more important. The factor 'Transportation System Characteristics' has a similar weight as 'Urban Policies', further indicating the importance of the 'Share of Active Mobility Trips in a City' and the 'City's Congestion Level'.

Market Decision Factors

These results could be interesting for mobility service providers to proactively identify relevant cities. However, the specific situation of the city, and the elements it included into its procurement or tender procedure, determines the appropriateness as potential market.

4.2. The tendering procedures and the service level requirements

The tendering process will not be uniformly issued across the local governments who want to tender for mobility services at the eHUBS. They will use differing procedures and specify the requirements accordingly to their eHUBS' objectives. Guidance on which kind of tendering procedure can be used given the specific situation has been provided in the MOBIMIX project. The figure below shows their supporting procurement matrix.

The procurement matrix

	Direct launch of RfP without negotiation	Competitive procedure with negotiation	Competitive dialogue	Idea sourcing / design contest	Innovation partnership
High urgency/ speed to market	+ +	+	+/−	−	− −
Many resources and budget available	− −	+/−	+ +	+	+ +
Many suppliers available	− −	−	+	−	+/−
Highly innovative solution	− −	+	+ +	+ +	+ +
High complexity of challenge	− −	+/−	+	+ +	+ +
Need for more than 1 mobility provider	+	+	+ +	+	+/−
High certainty of purchasing a final mobility solution	+ +	+	+/−	− −	+/−

Solution driven →
Challenge driven →

+ + very suitable   + adequate   +/− neutral   − not suitable   − − not suitable at all

Depending on the 'attractiveness' of a city towards shared mobility service providers, the requirements regarding the service levels can differ. Smaller cities have less bargaining power and will eventually have to fully procure a service, establishing a public-private partnership, such as Kempten and Dreux. The larger cities have the possibility to raise the bar and demand high service levels. The aspects they typically consider are:

- Pricing scheme
- Addressing certain target groups (in terms of affordability, availability and accessibility of the scheme)
- Maintenance and operational tasks
- Data sharing
- Digital integration (with MaaS or Public transport)
- Electric assets
- Compliance with regulations
- Covered area of the service
- Availability of vehicles
- Idle time of vehicles
- Customer service level
- Previous experience with shared mobility services

In the eHUBS project, two approaches were taken. The top-down approach led to the requirement for mobility service providers to put their assets at the eHUBS the local authorities identified, while trying to

score best at the aspects described in the tender document. The bottom-up approach led to the possibility of providing mobility services only at certain eHUBS. The citizens surrounding the eHUB were given the possibility to vote for certain mobility service providers who, after meeting the requirements described in the tender document, were included in the choice menu the citizens had. The mobility providers only had to meet the basic requirements described in the tender document to be included, but to actually provide their services they had to be chosen by the citizens.

4.3. How can a long-term relationship be established?

The investment in eHUBS requires a long-term vision from the public authority, as it will transform urban space and will only achieve its objectives if a behavioural change has been accomplished. The availability and reliability of the shared mobility services at the eHUB network are key for creating a successful story. Therefore, the local authorities will aim for a longstanding relationship with a commercial partner they can trust. Before, during and after the implementation of the eHUBS network, a continuous dialogue between public and private actors have to go on.

If the business case is not clear for the providers, the financial risks should be shared between public and private partners. It is recommended to see what the vision and goals of the eHUBS project are, and recommend possible ways how a better financial rentability can be achieved in the longer term. If the economics will not work, it is advised to monitor and showcase the impact the services have on travel behaviour, sustainability, accessibility and health, so that subsidies can be justified.

In order to improve the rentability of a service, three forms of co-financing can be discussed with the local authority: buying a certain amount of vouchers, which can also be handed out to certain target groups or municipal employees; guaranteeing a certain revenue threshold, if this threshold is not reached the local authority will compensate until the threshold; or fully subsiding the exploitation of the fleet. However, to establish a win-win relationship, the main focus should not be the (public) costs of the service, but how and in which degree it is contributing to the policy goals. It is also recommended to put your impact in a broader perspective, so not only focusing on the number of private car trips that has been replaced, but the effects this has on parking pressure, quality and liveability of public space, air quality, safety, accessibility, emission reduction and health. The eHUBS partners indicate that an policy environment where sustainability is put at the forefront and the impact of the shared services is acknowledged, will lead to better efforts to ensure the services and to improve their effectiveness.

5. Nudging the end-user

Citizens in most European cities are already accommodated to shared mobility services, which are becoming more and more available. However, the concept of eHUBS or shared mobility hubs is currently being piloted by a limited, but growing, number of municipalities. This requires adapted communication towards the end-user so that the concept becomes known and the objectives and reasoning behind establishing an eHUBS' network are clear. The eHUBS' pilot cities have each initiated communication campaigns, consisting of different phases and initiatives. There are opportunities to strengthen these communication efforts with providers' communication resources, so that a broader reach can be accomplished.

5.1. How are the municipalities nudging the end-user?

An overview of the eHUBS' partner cities' communication campaigns and the different phases they went through can be found [here](#).

First, they created a branding identity specifically for the eHUBS concept, which providers can relate to, while also maintaining their own branding identity. However, if the eHUB brand is associated by end-users with a qualitative and reliable service, being integrated with this brand can also strengthen the perception of the providers.

Second, they started raising awareness about the eHUBS concept, informing the general public about the concept. Different digital and non-digital (e.g. leaflets) channels were used to distribute the message. A broad target outreach is aimed for, so to identify which target groups are already interested in the concept and which groups seem hesitant to make use of the services.

Third, the communication messages got adapted towards the specific target groups they want to reach, in order to showcase potential use cases of the eHUBS' services. The aim is to actually gain the interest of their target groups, by illustrating which benefits eHUBS could bring for this specific target groups and which inconveniences it can take away.

Lastly, the interventions were aimed to convince the target groups to actually start using the eHUBS' services. They should reduce the barrier to make use of the service for a first time, which can pose a significant step to overcome for certain users. Examples of interventions are:

- Reducing the financial barrier, by offering discounts for the first rides.
- Reducing the suspicion for a new service, by introducing a buddy system, trial events and testimonials
- Influencing the self-image of the target group, by using different sentiment frames for messages (e.g. *'Save money thanks to the eHUBS'*, *'Discover the eHUBS' services like Romée does'* or *'Are you climate conscious? …% of our citizens is concerned with sustainable travel. You also? Choose the eHUB'*)

5.2. Which communication interventions could strengthen the local communication campaign?

Providers have their own communication channels to reach their target groups. There are opportunities to enhance certain stages of the public communication campaigns. When considering developing certain interventions to enable a behavioural change, it is recommended to take a look at the [blueprint](#), module 7.1, which includes a toolkit supporting the realisation of successful behavioural interventions.

Providers could first and foremost, open up their communication channels to raise awareness about the eHUBS concept. Their users are already accommodated with shared mobility services, which could lead to a faster adoption of the services at the eHUB. The experiences the providers have with the kind of messages that work for certain target groups, could be used to strengthen and focus the messages of the public communication campaigns. For example, a shared cargo bike provider is more focused towards families, so their expertise how to reach and make this group use the service, should be used in the eHUB communication interventions. Furthermore, if a shared mobility service is not yet available in the city, the provider should initiate try-outs at certain public events and involve citizens as ambassadors or buddies.

The local authority also has the ability to better connect with local businesses, neighbourhood committees or other government departments. Making use of this network can offer providers the opportunity to establish new use case and an extended customer base. Moreover, the advertising space that public authorities make available for their communication campaigns, can also be used to promote the individual services provided at the eHUB. These spaces could be located at central, high demand areas. This enables providers to increase their advertisement efforts without having to increase their marketing budget. Last, it is important to keep inclusivity in mind, so working together with the local authorities but also with representatives of minority groups, so that the message can also engage them.

The nudging of the end-user is the last step of the communication campaign. If the cost of using the service forms a barrier for end-users, a discount could be applied, for which the costs could be divided across the provider and the local authority. Next, the provider could propose incentives to their users to make use of the eHUB infrastructure (e.g. offering additional credits if a vehicle is brought back to an eHUB station or if the vehicle, having a low battery level, get plugged in at the charging facility of an eHUB). Furthermore, providers should clearly discuss with the local authority which kind of framing will be used for the nudging messages. This should be realigned with the framing and perception of the providers' own communication messages.

Overall, the communication efforts of the providers should complement and being integrated within the communication campaigns of the eHUBS. This enables a broader outreach of the eHUBS concept while also strengthening the individual services provided at the eHUB. Experience from eHUBS partners also indicate that a particular focus should be attributed to the misperception that the eHUBS concept and the shared services are occupying and commercialising the public space. Public communication efforts should be aimed at putting this in the right perspective, so that the general public is not adverse towards and advocating against the eHUBS concept and its services.

6. Pitfalls and recommendations

This last section describes the pitfalls the eHUBS partners had or mentioned, while also giving some recommendations how shared mobility service providers could create synergies together with public authorities in establishing a network of eHUBS that could contribute to the societal, environmental and economic objectives.

6.1. Making the risk assessment for new mobility modes

One aspect that was considered by local authorities and that added credibility for shared mobility providers so that they could offer their service, was making a risk assessment. For example, a shared cargo-bike is a vehicle which a large group of people is not yet familiar with. Therefore, it is beneficial to think about certain hazards and risks that are associated with the introduction of such service. This way, certain solutions could proactively be identified and already implemented if necessary.

An example of a risk assessment for a shared e-cargo bike and e-scooter scheme for the Manchester Region can be found below.

		Hazard / How Harmed	Persons at Risk						Before Control Measures			Existing Control Measures	After Controls	Existing
			Employees	Members of the Public	Contractors	Visitors	Young Persons	Other (state)	Severity Rating 1/2/3/4/5	Likelihood Rating 1/2/3/4/5	Risk Rating before		Likelihood Rating 1/2/3/4/5	Total Risk Rating
1		Users lose control of e-cargo bike and collide with other pedestrians		X		X	X		3	2	6	Safety standards of the e-cargo bike Training via live events Videos to watch via the app	2	6
2		e-Scooter wheels dropping into rail flangeway when approached at a shallow angle or riding along the direction of tracks, leading to loss of steering control or causing injury		X		X	X		3	3	9	Geofenced no-ride zones will be implemened to prevent Lime e-scooter use on or near Metrolink tracks except for at existing road crossing points.

Lime-S Gen 3.0 e-scooters used in the Salford trial use wheels that are wider than the flangeway, and have been deployed extensively in a number of regions with large tram networks including Melbourne, Berlin, and Los Angeles.

Lime-S Gen 3.0 e-scooters used in the Salford trial have passed a number of additional safety requirements set by the Department for Transport, including lateral stability tests, kerb-hopping, travelling through potholes and travelling across sudden changes in surface longitudinal and lateral inclination. | 1 | 3 |
| 3 | | e-Scooters left near/on tracks or in the exclusion zone causing disruption to tram operations or damage to rolling stock | X | X | | | | X | 3 | 3 | 9 | Geofenced no-ride and no-parking zones will be set that prevent e-scooter use within 2m of tracks, on ML platforms and near entrance/exits to tram stops.

KAM/ML to be consulted on proposed parking zones for Phases 2 and 3 of the e-scooter scheme that will see it expand to large parts of the Ordsall and Salford city area, which may include tram tracks between Broadway and MediaCityUK to Exchange Quay.

KAM/ML to be consulted on the scheme as a whole to identify any other possible risks and appropriate action, such as implementing additional no-ride or slow-speed zones, to be taken.

Lime to include additional information about tram tracks within the trial zone to riders via its app, including through push notifications, the Safety Centre, rider sign-up and pre-ride flows, and through warning notifications on the e-scooter screen.

As with all other incidents and collisions, all such incidents involving Metrolink trams or infrastructure/property must be reported immediately to TfGM so that appropriate action can be taken to mitigate any future risk. | 1 | 3 |

4	e-Scooters left on Metrolink platforms or at entrance/exit points causing slips, trips and falls hazard	X	X	X	X	X		3	3	9	Geofenced no-ride and no-parking zones will be set that prevent e-scooter use within 2m of tracks, on ML platforms and near entrance/exits to tram stops. KAM/ML to be consulted on proposed parking zones for Phases 2 and 3 of the e-scooter scheme that will see it expand to large parts of the Ordsall and Salford city area, which may include tram tracks between Broadway and MediaCityUK to Exchange Quay. KAM/ML to be consulted on the scheme as a whole to identify any other possible risks and appropriate action, such as implementing additional no-ride or slow-speed zones, to be taken.	2	6
5	e-Scooter users colliding with trams causing injury or damage to rollling stock	X	X				X	4	2	8	Tram drivers and relevant operational staff to be briefed on the e-scooter scheme, including the extent of its operational zone, possible incident hotspots, and other factors to be aware of such as movement characteristics and parking zones in close proximity. Lime to include additional information about tram tracks within the trial zone to riders via its app, including through push notifications, the Safety Centre, rider sign-up and pre-ride flows, and through warning notifications on the e-scooter screen. As with all other incidents and collisions, all such incidents involving Metrolink trams or infrastructure/property must be reported immediately to TfGM so that appropriate action can be taken to mitigate any future risk.	1	4
6	Additional wear on Metrolink tracks due to e-scooter crossings						X	2	1	2	Lime-S Gen 3.0 e-scooter used in Salford trial use rubber wheels which will have negligible impact on tracks.	1	2

6.2. Specific vehicles and infrastructure considerations for eHUBS

Some providers will already have experience with running a shared mobility scheme (or in free floating or station based form), but integration within an eHUBS network has some specific things with regard to vehicles and infrastructure to consider.

The local authorities will want to install infrastructure that is not specific for the assets of one provider, so that the risk of sunk costs is reduced for them. Therefore, it is important to inspect if the vehicles can be charged with the eHUBS' infrastructure they are planning to install, or if a change of operational model (e.g. from fixed charging to battery swapping) is necessary. Local authorities are thus in favour of generic and flexible infrastructure, that allows for adaptation of certain eHUBS if the uptake for those eHUBS is not favourable.

The locking mechanism is another important element to consider. Vandalism seemed a big issue during the eHUB pilots, which posed also a threat to the financial viability of certain shared mobility services. It is therefore recommended to see how the eHUBS infrastructure could provide possibilities to better lock the vehicles and reduce the threat of vandalism (e.g. providing adequate lightning at the eHUBS).

One last aspect with regard to the physical assets that posed a problem, was the coordination between the deliverance of the different shared vehicles and operationalisation of the eHUBS network. Local authorities aim to have a certain number of vehicles available across the whole network of eHUBS, when the eHUBS are ready (i.e. public space has been readapted and possible infrastructure has been installed). However, to get all shared vehicles available at that certain time is a difficult operation. As an operator, it is important not to have a large stock of vehicles standing idle and waiting to be deployed when the eHUB network is ready. However, the waiting times for the delivery of vehicles can be long, so ordering the vehicles on time is essential. Therefore, it is recommended to keep a constant dialogue with the local authority so that the delivery of the shared vehicles can be realigned with the opening of the eHUBs.

Regarding the digital assets, it is recommended to see if the mobile application and GPS technology allows for changing to a different model (e.g. from round-trip station-based to back-to-many station-based), if the local authority aims for this kind of network. In this regard, accurate geofencing technology is also necessary, so that parking zones at the eHUBS can be well-defined and used.

6.3. Transnational operations – regulations

As more and more European cities are welcoming shared (e-)mobility services and investigating the concept of shared mobility hubs, the internationalisation of an operator's activities is an opportunity to look into. When considering to enter markets outside of the home city or home country, there are of course regulations that have be regarded. They are situated on different levels, from local urban policies to regional to national to the European policy level. Module 9.1 of the blueprint provides an overview of policies which are relevant for shared mobility services. It is based on the work done by the Gecko project, which investigated how shared and new mobility services are regulated and provides recommendations how regulations should be improved. It is recommended to take a look at the blueprint and the Gecko project, so that a notion about relevant regulation can be formed. The case-specific urban regulations can always be discussed with governing bodies, to see if there are possibilities for adaptations that can enhance the (economic, social and environmental) success of shared mobility services.

6.4. Estimating the impact of eHUBS and the related services

A last and one essential aspect is the evaluation of the eHUBS and their related services. Local authorities will want to show results, to justify their investments and the adaptations they did to public space (in particular when they decided to transform parking spaces). It is key for the shared mobility service operator to be transparent and share data with the local authorities, so that an accurate assessment can be performed. As stated above, data sharing standards can support this transparency and allow for a good understanding between public and private actors. This can also allow for a specific case-by-case approach, in which separate eHUB locations are assessed. If it seems that certain locations are not having the usage numbers required to turn break-even, the local authority can consider co-financing options. For other locations, they can require a certain minimum threshold of rides, so that efforts of the mobility providers are not only going towards the highly profitable city centre areas.

When assessing the quality of a shared mobility service, cities will mainly focus on

- **Availability of the vehicles.** In order for eHUBS to be a real alternative to private Cars, they need to be reliable and it is preferred to not have to plan trips ahead. Therefore, the availability of the vehicles must be ensured.
- **Quality of the vehicles.** The vehicles at the eHUBS have to be robust while still offering a pleasant travel experience. If users find their ride to be too tedious, inconvenient or uncomfortable, they are very unlikely to return to an eHUB.
- **Cleanliness of the vehicles.** Especially in times of COVID-19 users have higher expectations towards cleanliness and hygiene.
- **Safety of the vehicles.** Make sure that the vehicles are in a safe condition and that critical parts (brakes, lights, etc.) are regularly checked.
- **Proximity of the eHUBS/vehicles.** eHUBS can only be a real alternative to private cars if the serve specific travel needs, e.g. access to public transport modes. The location of the eHUBS should therefore be continuously monitored.
- **Easy Access.** The booking and payment process should be as transparent and hassle-free as possible to ensure a seamless travel experience. The digital integration of the eHUBS transport modes in terms of Mobility-as-a-Service can play an important role here.

It is also important to consider distributing surveys to end-users which can be of added value to further improve the service and identify and meet their needs.

Certainly, cities will assess the whole network of the eHUBS. As stated earlier, it is important not to put the focus only on usage numbers and CO_2 emission reduction, but take a broader perspective. This means, how the eHUBS and the services have contributed to a more accessible environment, to reduce mobility poverty, to enhance inclusion, to increase the liveability of an area (e.g. reduced the parking pressure, improved the air quality). In this regard, it is recommended to continuously monitor all eHUBS, together with the local authority and other service providers, so that necessary adaptations to the location, design or offer at the eHUB can be made. Furthermore, eHUBS should not be regarded as an end in themselves. Offering eHUBS and shared mobility services alone will not cause the necessary modal shift. Therefore, discussions with the local authorities should mention push-measures for car-use and -ownership, making recommendations how a more sustainable transportation system can be achieved.

The eHUBS Consortium

The consortium of eHUBS consists of 20 partners with multidisciplinary and complementary competencies. This includes European cities, leading universities, networks and electric and shared mobility providers.

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