European Platform on Sustainable Urban Mobility Plans

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Topic guide – Draft for consultation

Safe use of micromobility devices in urban areas

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About

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Title

Topic Guide: Safe use of micromobility devices in urban areas

Author(s)

Vanessa Holve, with contributions from Silvia Maffii, Stefano Borgato and Simone Bosetti (TRT Trasporti e Territorio srl, Italy)

Reviewers

DG MOVE: Sylvester Carruth, Piotr Rapacz, Luana Bidasca.

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- Tanja Hohenstein, ETSC (represented by German Road Safety Council)
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- Koen Kennis, City of Antwerp (chair of the CIVITAS Policy Advisory Committee – PAC)
- Nina Nesterova, Breda University of Applied Sciences (CIVITAS ELEVATE)

Cover picture

TBC

Design and layout

ELTIS/RICARDO

Contacts

TRT Trasporti e Territorio
Via Rutilia 10/8
20141 Milano, Italy
info@trt.it

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Guide to the reader

This document provides guidance on how to integrate micromobility in urban mobility planning, with the goal to achieve a safer use of micromobility devices in urban areas.

It applies the concept of SUMP, as outlined by the European Commission's Urban Mobility Package[1] and described in detail in the European SUMP Guidelines (second edition)[2].

Sustainable Urban Mobility Planning is a strategic and integrated approach to dealing with the complexity of urban transport. Its core goal is to improve accessibility and quality of life by achieving a shift towards sustainable mobility. SUMP advocates fact-based decision making guided by a long-term vision for sustainable mobility. It requires a thorough assessment of the current situation and future trends, a common vision with strategic objectives, and an integrated set of regulatory, promotional, financial, technical and infrastructural measures. Implementing these measures to deliver the objectives should also be accompanied by reliable monitoring and evaluation. In contrast to traditional planning approaches, SUMP particularly emphasises the involvement and cooperation across different levels of government, with citizens, stakeholders, and private stakeholders. Further emphasis should also be placed on the coordination of policies between sectors (transport, land use, environment, economic development, social policy, health, safety, energy, etc.).

This document is part of a compendium of guidance documents, complementing the revised second edition of the SUMP Guidelines. They elaborate on difficult planning aspects in more detail, provide guidance for specific contexts, or focus on important policy fields. Two types of guidance document are available. While 'Topic Guides' provide comprehensive planning recommendations on established topics, 'Practitioner Briefings' are less elaborate documents addressing emerging topics with a higher level of uncertainty.

So far, guidance documents have been published on how to address the following topics in a SUMP process:

- Planning process: Participation; Monitoring and evaluation; Institutional cooperation; Measure selection; Action planning; Funding and financing; Procurement.
- Contexts: Metropolitan regions; Polycentric regions; Smaller cities; National support.
- Policy fields: Safety; Health; Energy (SECAPs); Logistics; Walking; Cycling; Parking; Shared mobility; Mobility as a Service; Intelligent Transport Systems; Electrification; Access regulations; Automation; Resilience; Social impact assessment; Gender and vulnerable groups.

They are part of a growing knowledge database that will be regularly updated with new guidance contexts. The latest documents are always available in the 'Mobility Plans' section of the European Commission's urban mobility observatory Eltis (www.eltis.org).

[1] Annex 1 of COM(2013) 91.
[2] Rupprecht Consult (editor), Guidelines for Developing and Implementing a Sustainable Urban Mobility Plan, Second Edition, 2019.

Executive summary

This Topic Guide proposes best practice and key recommendations on the integration of micromobility in urban mobility planning, with the goal to achieve a safer use of micromobility devices in urban areas. It focuses on electrically assisted cycles and electrically powered personal mobility devices such as e-scooters, whether owned or shared, and electric assisted cycles, in an urban context. While the title can be misleading, it was decided not to focus the Topic Guide exclusively on road safety and technology, since those aspects have already been covered in other micromobility studies at EU level, but to address micromobility from a wider urban mobility planning perspective, with a focus on mobility planning.

In a fast-evolving urban transport environment, micromobility is changing how people move around the city. It brings along new and urgent challenges for local authorities, urban planners and national decision-makers. Despite getting off to a sometimes rocky start, micromobility may encourage both city leaders and micromobility providers to work hand-in-hand to forge a way ahead that serves the public good, meets city goals such as a modal shift towards more sustainable modes of transport, and enables the private sector to create viable business models.

The crux of the micromobility challenge could lie in finding the right equilibrium that serves the interests of cities, citizens, and service providers. Getting there will require planning mobility differently, with relationships built on trust among all parties, including service providers. Like many other emerging mobility issues, there is no single formula that cities and urban planners can apply equally everywhere. But by working through the issues now, learning from new data and adapting urban mobility processes, cities can further learn and be better prepared when next mobility innovations come into the scene, such as autonomous vehicles moving people and goods. One thing is sure: while there is an expanding role of the private sector in mobility service provision, public interest must lead, and cities must be in the driver's seat.

The Topic Guide provides recommendations on integrating micromobility into a Vision Zero: to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all. It highlights the need to urgently integrate micromobility into SUMPs, but also into Vision Zero Safety Plans and other relevant plans. It also provides direction on how to achieve the desired outcomes of Vision Zero in relation to micromobility, including zero fatalities and serious injuries, zero emissions, and zero inequalities, with governance and regulation as the supporting framework. The Topic Guide then proposes a framework to define micromobility which includes all the above-mentioned vehicles and suggests recommendations on how the safe use of micromobility devices relates to the eight SUMP principles. It goes on introducing the main actions and elements essential for implementing a safe use of micromobility, reflecting the phases of the SUMP cycle.

The Topic Guide draws on the results from the research of the first CIVITAS ELEVATE Policy Support Group experts between January and October 2021.

Key recommendations on planning for the safe use of micromobility devices in urban areas

- Assess your transport situation and have a clear modal shift goal.
- See micromobility as an opportunity for deploying a new governance framework and use shifts in travel demand, as experienced in response to the COVID-19 pandemic, to pilot integrative transport services.
- Lead the integration process and develop close working relationships with private operators committed to integrating services.
- Initiate collective dialogue with key stakeholders, especially micromobility operators, in form of a stakeholders committee.
- Consider the most appropriate regulatory model (single or multiple tendered franchise, etc.) and have control over your market: select providers of shared micromobility using carefully designed tender procedures. Ensure you cover all important specifications and that these help you reach your goals, e.g. providers to include safety and parking guidelines for their micromobility users, information on batteries recharging and recycling, etc.
- Use data from micromobility providers to your advantage: it can serve city goals and complement other modes.
- Focus on expanded accessibility and better social inclusion.
- Identify KPIs for effective monitoring and management of new mobility services.
- Establish clear criteria and procedures for enforcement mechanisms.

Key safety-related recommendations

- Create a protected network for micromobility and pedestrians: segregated spaces, calming traffic. Micromobility vehicles should systematically be banned from sidewalks.
- Where vulnerable road users share space with motor vehicles, speed limits should be 25 km/h or less. If micromobility services are sharing cycling lanes in urban areas, the average speed should be defined according to the speed of regular bike speed.
- Develop new expertise and build capacity to collect and use data, e.g. on micro-vehicle trips and crashes.
- Provide micromobility training for micromobility and road users, diverse and disadvantaged groups.
- Apply Vision Zero to micromobility and ensure coherence between SUMPs and Vision Zero Safety Plans.

1. Introduction

1.1 Objectives of this Topic Guide

The main objective of the Topic Guide is to provide planning recommendations and best practice for stakeholders involved in urban planning on the topic of the safe use of micromobility devices in urban areas. This Topic Guide has a policy focus concentrating on road safety and how to address micromobility in the SUMP planning and implementation process. The primary target audience for this Topic Guide are planners and practitioners with a broad variation in their level of expertise in relation to mobility and planning. In this Topic Guide we make the link with the Vision Zero approach and how micromobility can be integrated into it. Also, the document aims to provide general guidance on how to integrate micromobility into all 8 principles of sustainable urban mobility planning and implementation. Good practice examples and key recommendations are also an important component of this guidance material.

This Topic Guide is an annex to the SUMP 2.0. Guidelines[3]. It also supports the European Commission deliver on Action 22 of the Sustainable and Smart Mobility Strategy[4], focusing on the safe use of micromobility devices in urban areas.

1.2 What we mean by micromobility

The term micromobility is associated with a rapidly evolving range of light vehicles that are increasingly deployed on streets across the globe. In most markets today, micromobility means privately-owned or shared scooters and bikes (both human-powered and those with electric motors, docked and dockless). However, a variety of new devices and designs emerging in the near future might stretch the definition of micromobility.

Definitions of micromobility

Despite its success, there is still no international definition of micromobility.

European Union regulation N°168/2013 established the L-category vehicles as a reference for Member States[5]. L-category vehicles are powered two-, three- and four-wheel vehicles. The category uses power, power source, speed, length, width and height as classification criteria. Some types of micro-vehicles can be mapped to the L1e category called “light two-wheel powered vehicle”:

- L1e-A powered cycle: electric bicycle equipped with auxiliary propulsion with a maximum speed of 25 km/h and a net power between 250 watts and 1 000 watts. This category includes low-powered throttle only electric bikes. It also allows for three and four wheeled vehicles.
- L1e-B two-wheel moped: any two-wheel vehicle with a maximum design speed of more than 25 km/h and up to 45 km/h and a net power of up to 4 000 watts. It includes speed-pedelecs, though most speed-pedelecs have a power of 500-750 watts.

[3] https://www.eltis.org/mobility-plans/sump-guidelines
[4] https://ec.europa.eu/transport/themes/mobilitystrategy_en
[5] https://www.itf-oecd.org/safe-micromobility, p.16

Other micro-vehicles are left outside the L1e category, most notably:

- human-powered vehicles, such as bicycles, skates and kick scooters
- pedelecs, defined as bicycles with pedal assistance up to 25 km/h and with an auxiliary electric motor having a maximum continuous rated power of up to 250 watts.
- self-balancing vehicles and vehicles not equipped with a seat (ie. standing scooters).

The United Nations Economic and Social Council published the Consolidated Resolution on the Construction of Vehicles[6], which included a vehicle classification system and safety standards that are now used as international references.

The World Forum for Harmonization of Vehicle Regulations allows open discussions among policy makers. This leads to the construction of a shared reference across countries, even if it still excludes the large part of micro-vehicles cited above (UNECE, 2017).

The ITF/OECD refers to micromobility as "Personal transportation using devices and vehicles weighing up to 350 kg and whose power supply, if any, is gradually reduced and cut off at a given speed limit which is no higher than 45 km/h. Micromobility includes the use of exclusively human-powered vehicles, such as bicycles, skates, skateboards and kick-scooters." "Micro-vehicles" can be for private or shared use."

Figure 1 Types of powered micromobility vehicles

TYPES OF POWERED MICROMOBILITY VEHICLES[1]

	Powered Bicycle	Powered Standing Scooter	Powered Seated Scooter	Powered Self-Balancing Board	Powered Non-Self-Balancing Board	Powered Skates
Center column	Y	Y	Y	Possible	N	N
Seat	Y	N	Y	N	N	N
Operable pedals	Y	N	N	N	N	N
Floorboard / foot pegs	Possible	Y	Y	Y	Y	Y
Self-balancing[2]	N	N	N	Y	N	Possible

[1] All vehicles typically designed for one person, except for those specifically designed to accommodate additional passenger(s)
[2] Self-balancing refers to dynamic stabilization achieved via a combination of sensors and gyroscopes contained in/on the vehicle

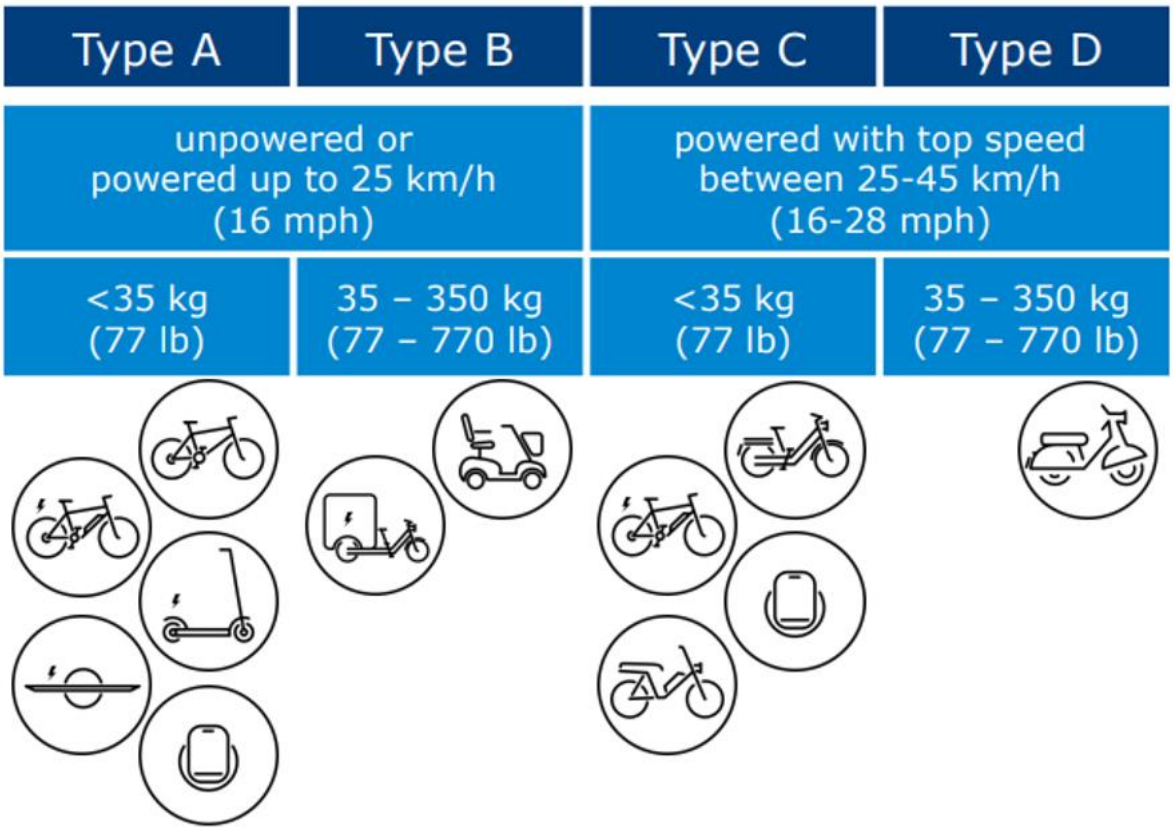
Source: SAE International from SAE J3194™ Standard - Taxonomy & Classification of Powered Micromobility Vehicles. https://www.sae.org/standards/content/j3194_201911/

In this Topic Guide, we suggest practices and recommendations focusing on "Type A" devices as per the ITF/OECD classification. That includes e-bikes, e-scooters and self-balancing vehicles (whatever they are or they will be). The focus is on the specific urban function (last

[6] https://digitallibrary.un.org/record/416897?ln=en

mile connections, intermodality), operating models (mainly shared schemes), and power (electric or e-assisted).

Figure 2 Classification of micromobility vehicles



Source: OECD/ITF 2020, Safe Micromobility, https://www.itf-oecd.org/safe-micromobility.

This Guide applies two additional criteria when analysing micromobility, namely the type of use and type of motorisation:

- Motorisation:
  - Motor micromobility
  - Electrical pedal assisted micromobilty
  - Non-assisted micromobility
- Type of users:
  - Private-own vehicles
  - Shared mobility fleets

Micromobility devices can be privately-owned or available through a shared fleet. Shared micromobility services make micromobility devices available for shared use to individuals on a short term basis for a price or free. Most challenges linked to micromobility in urban areas relate to shared mobility services that are privately-owned, namely private operators providing free-floating e-scooters and e-bikes in cities.

Micromobility is seen as a potential solution to moving people more efficiently around cities, when replacing trips done with individual conventional cars. These services have clearly

resonated with consumers, as demonstrated by their rapid adoption over just the last several years. They have the potential to better connect people with public transport, reduce reliance on private car use, hence supporting a modal shift. Micro-vehicles have supposedly a lower environmental impact than private conventional cars, with little noise and zero tailpipe emissions. Their light weight could also mean a smaller carbon footprint over the vehicle life cycle compared to other types of vehicles - though all this still remains to be proved. A recent study[7] conducted by the ITF found that the CO_2 emissions per km of e-scooters was significantly worse than many other modes, including e-bikes, ICE buses, and rail. Like any new entrants into a long-established system, many of these services have faced resistance and growing pains, including for urban planners, resulting in sometimes tensed relationships between local governments and e-scooter providers. The popularity of micromobility devices was perhaps unforeseen, but is well illustrated by the expansion of shared e-bike and e-scooter companies and seems to be here to stay.

1.3 Discussing micromobility in the context of SUMPs

Today, most urban planners tend to agree that urban transport systems need to be reimagined. Micromobility, which favors small, flexible modes of transport, is turning into a popular new alternative to private cars for shorter distances. Micromobility can also solve several urban problems at once. It acts as a supplement to existing public transport systems, helps with congestion, and can also possibly cut down on greenhouse gas emissions – which still remains to be proved, as mentioned above. Just as importantly, the data obtained from micromobility solutions can help urban planners to improve the city for all.

In this context, cities around Europe are coming up with a wide range of planning strategies to meet their residents' transport needs. Having found themselves inundated with this unanticipated new mobility option, they have experimented with a variety of approaches. Nevertheless, it appears that most cities do not integrate micromobility in their SUMPs yet. This Topic Guide aims to support cities in this new and challenging exercise.

[7] https://www.itf-oecd.org/file/51926/download?token=8MylC6fy

2. Integrating micromobility into Vision Zero

2.1 What we mean by Vision Zero

This chapter suggests to integrate micromobility into the Vision Zero approach[8] and proposes avenues to get there. The EU has set the long-term goal to move close to zero deaths by 2050 – also called "Vision Zero". Through the endorsement of the Valletta Declaration on road safety of March 2017 in Council conclusions[9], EU transport ministers set a target for reducing serious injuries, namely to halve the number of serious injuries in the EU by 2030 from a 2019 baseline. To move towards these goals, a new approach is set out in the ”Europe on the Move” Communication[10]: first of all, the mindset of “Vision Zero” needs to take hold more than it has so far, both among policy makers, urban planners and in society at large. Secondly, the “Safe System”[11] approach, supporting Vision Zero, needs to be implemented at EU level. The core elements of the Safe System approach are: ensuring safe vehicles, safe infrastructure, safe road use (speed, sober driving, wearing safety belts and helmets) and better post-crash care. Thirdly, we have to be ready to confront new trends, such as connectivity and automation, but also micromobility.

When properly addressed, micromobility can play a significant role in delivering on Vision Zero, with the goals of zero pollution and emissions, zero fatalities and serious injuries, zero emissions - at EU, national and local level. This suggests a wider scope of Vision Zero, in which micromobility has a key role to play.

Several urban and mobility plans and schemes already provide tools to help achieve better mobility planning and Vision Zero. Many of these tools have regulatory power, or at least hold a strong influence over decision-making. SUMPs, as explained in detail in the previous chapters, are the most obvious ones, but many others exist, e.g. schemes to restrict urban vehicle access or to create Low Emission Zones, strategic development plans for public transport, parking or cycling, public space improvement programmes, etc. As a rule, micromobility should be systematically integrated into these plans, as a priority into SUMPs.

With governance and regulation as the enabling framework, this chapter suggests how Vision Zero for micromobility can achieve the following sustainability outcomes, which lie at the core of any robust SUMP:

- Zero fatalities and serious injuries
- Zero emissions
- Zero inequalities

[8] European Commission (2011), White Paper “Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system”, COM(2011) 144 final
[9] https://data.consilium.europa.eu/doc/document/ST-9994-2017-INIT/en/pdf
[10] https://ec.europa.eu/transport/modes/road/news/2017-05-31-europe-on-the-move_en
[11] https://2018.itf-oecd.org/road-safety.html

2.2 Zero fatalities and serious injuries

The premise of the Zero Vision strategy is that road deaths and serious injuries are unacceptable and preventable. The target is to reduce road deaths to almost zero by 2050. To achieve this target, the use of micromobility devices needs to be made safer in cities, thanks to better planning and governance.

Planning instruments

When planning for micromobility, urban planners need to envisage how e-scooter and e-bike safety are being considered under their SUMP and, when available, under their Vision Zero Safety Plan in their city. Vision Zero Safety plans are efficient tools to prepare for the safe deployment and operation of e-scooters in cities, and have already been adopted by many cities around the globe[12].

In doing so, the reference should be the Safe System approach, which argues that better vehicle construction, improved road infrastructure, lower speeds for example all have the capacity to reduce the impact of crashes. Taken together, these elements should form layers of protection that ensure that, if one element fails, another one will compensate to prevent injuries and fatalities. This approach requires multi-sectoral action and management by objectives, including timed targets, clear responsibilities of all actors involved and performance tracking.

Safety impacts of e-scooters and e-bikes in cities should be carefully analysed, especially when considering plans and permits for shared micromobility devices like e-bikes and e-scooters. Cities and providers should partner to ensure safe riding of e-scooters and re-design streets to provide safe places to ride e-scooters. Cities should also agree on safety standards for the micromobility vehicles themselves. The type of e-bike or e-scooter chosen for a scheme may have a significant effect on the safety of that scheme.

Rapid increase in Vulnerable Road Users

Micromobility brings along a new challenge: how can authorities ensure that micromobility users and pedestrians will not become crash victims? Many cities note a rapid increase in people who are becoming “vulnerable road users”, as little or no improvements are made to the road network and to street safety in general. However, the full street network has to be made safe for micromobility to work. In doing so, it is recommended to focus on the first mile (e.g., suburban areas), not only the last mile. For example, moving around main transport hubs can be considered as unsafe. Between January 2018 and August 2020, at least 11 deaths have been linked to e-scooters in cities across Europe, while Paris is experiencing between 150 and 200 e-scooter-related injuries every month[13]. Limited helmet use, poor road surface conditions, speed, inexperienced users and unclear road rules are largely blamed. However, analysing the relatively limited data available, ITF found that a road fatality is not significantly more probable with a shared standing e-scooter compared to a bicycle, although they noted that it does need further investigation[14].

[12] London Vision Zero Safety Plan: http://content.tfl.gov.uk/vision-zero-action-plan.pdf
[13] https://www.eltis.org/resources/case-studies/rise-micromobility

The safe use of micromobility devices is often at the top of the transport agenda in cities. The challenge is the reporting of injury rates based on actual numbers of trips or miles travelled, which even objective data fails to provide. A surge in micromobility-related injuries has been expected, due to the vehicles' rapid adoption in recent months. Still, it remains unclear how dangerous micromobility devices are in relation to other modes of transport, how different user behaviours (helmet use, speed, etc.) affect injury rates, and whether micromobility use creates a net gain for public health.

Infrastructure, urban space and parking management

As the experiences of European cities during the Covid-19 pandemic have shown, more cyclists require better and safer infrastructure – ideally separated from motorised vehicles such as cars and trucks – and broad enough to allow overtaking manoeuvres among cyclists and users of micromobility devices. This is also one of the recommendations from the International Transport Forum's (ITF/OECD) report[15] on micromobility safety, which offers ten recommendations for policy makers, city planners, operators and manufacturers:

1. Allocate protected space for micromobility
2. To make micromobility safe, focus on motor vehicles
3. Regulate low-speed micro-vehicles as bicycles
4. Collect data on micro-vehicle trips and crashes
5. Proactively manage the safety performance of street networks
6. Include micromobility in training for road users
7. Tackle drunk driving and speeding across all vehicle types
8. Eliminate incentives for micromobility riders to speed
9. Improve micro-vehicle design
10. Reduce wider risks associated with shared micromobility operations

At the top of its list, the ITF recommends to create a protected and connected network for micromobility. This can be done by creating dedicated spaces and by calming traffic. It is important that micromobility vehicles are banned from sidewalks. When people do not feel safe enough while cycling or using e-scooters on the road without cycle paths, they tend to use sidewalks instead – which should actually remain a safe space for the most vulnerable i.e. pedestrians. One of the most effective measures a city can implement to improve safety of micromobility and encourage a positive modal shift towards e-bikes and e-scooters is creating segregated infrastructure. Protected bike lanes would make riders feel safer and more welcome. Thus, infrastructure must be adapted to the needs of both the users of bikes and micromobility.. In many cities, cycling lanes were already crowded, too narrow and in poor condition before new micromobility vehicles arrived and aggravated the problem even further. Since planning, applying for subsidies and approval procedures can take a lot of time, faster solutions should be implemented – at least transitionally. During the pandemic, several cities transformed traffic or parking lanes into bicycle infrastructure to provide more space for the

[15] ITF/OECD Safe Micromobility report (February 2020): https://www.itf-oecd.org/safe-micromobility

increasing number of cyclists, for example. Where this is not an option and separate cycle paths cannot be set up, lowering speed limits is inevitable.

If micromobility services are sharing cycling lanes in urban areas, the average speed of micromobility vehicles should be defined according to the speed of regular bikes. Speed on bike lanes should be taking consideration for all users. Otherwise, special speed cycling lanes should be planned for, especially during commuting hours. It is to be noted that pedal cycles are capable of much higher speeds than rental e-scooters. We also need to bear in mind that a speed limit is only as good as its enforcement mechanism.

Intermodal mobility stations next to public transport stations and parking spots dedicated to e-scooters and bikes, like e-hubs, including charging facilities, should be introduced to organise parking safely without endangering pedestrians who might stumble over micromobility devices. Special traffic signs can mark such parking spots and stands can prevent chaos resulting from e-scooters which fell over.

If a city wants to change mobility habits, it must change the distribution of space accordingly. This means e.g. to dedicate more space to cleaner and active mobility options by reducing parking spots for cars in city centres. The space from former parking spots can then be used for a separate lane for micromobility devices and bikes but also for parking and mobility stations for these vehicles.

National (even international) rules for micromobility, as previously mentioned, should define general conditions (where to ride, where to park) in order to make public space a safe place for all users (elderly users, people with reduced mobility, children). The main basis should be shared worldwide.

Speeding, drink driving and drug use

Speed limits play an important role for safety and survival in case of accidents. Especially in situations without separate cycle paths, a speed limit of 25 km/h should be introduced – at least until separate cycle paths are built.

Another option to make urban traffic safer is to enlarge the 30 kilometres per hour zones, and have bicycle streets where the bikes and other micromobility devices are the privileged modes. Where vulnerable road users share space with motor vehicles, speed limits should be a minimum 30 km/h or less.

For any vehicle riding faster than 15km/h in urban areas users should previously obtain a permit or authorisation (after having attended a course) or provide a driving licence. Cities could implement a kind of “good behaviour card (license)” for bike and micromobility users. Nowadays, less young people in urban areas hold a driving licence. This means that no rules of the road or security education is provided for many cyclists and new mobility users. It seems important to teach citizens to behave properly, take precautions regarding fragile people and avoid risk situations.

Segregated lanes according to authorised speed could be implanted instead of making the difference among different devices or vehicles. For example: low speed lanes: up to 15-20km/h, fast lanes: from 20 to 30 km/h max.

An important point raised by the International Transport Forum is one of incentives for micromobility users to speed, such as by-the-minute rental. Operators of shared micromobility fleets should ensure their pricing mechanisms do not encourage riders to take risks.

Local authorities should also define and enforce limits on speed, alcohol and drug use for all motor vehicle drivers, including micromobility users. Riding when having taking alcohol should be regulated the same as when driving a car. This is the case in Germany.

Safety data

Data on accidents helps to make city streets safer for the users of micromobility and the other users of the public space. Police statistics on accidents also include information on the location of accidents and become part of accident maps of a city – however, only if the police is involved.

There are ongoing studies on behaviour of e-scooters drivers. In certain countries like Germany, e-scooters have become a new dedicated category in transport accidents statistics.[16]

Specific indicators should be included for road safety of micromobility in the planning process. Data specifications should include the format and the content of the data, i.e., as a binding condition for operation, or be negotiated with the operator. It would be really helpful to have an international standard for this, so that data are comparable from one place to another. Allowing each city to set its own data standard runs the risk that data are misinterpreted or misused. Due to the high amount of data to be dealt with, automated data processing is recommended. Solutions already exist regarding specifications on the format (MDS – Mobility Data Specifications). As for content specifications, these will depend on the data collected by the operator and will be subject to privacy legislation.

Collecting data on micromobility trips and crashes could help improve the safety performance of these new services. Police and hospitals should collect accurate crash data. It is to be noted that the police only collect data about incidents that they attend – many micromobility incidents are not reported, so it is difficult for the police to collect a comprehensive data set. Hospital data is often inaccurate because the people making the report have to rely on information from the casualty, which understandably is often not available or not accurate, especially in the most serious cases. The operators themselves may be best placed to collect incident data, perhaps using on-board data recorders. So trip data from operators, but also travel surveys and on-street observation can help improve the safe use of micromobility vehicles.

Regarding the road network, cities and operators should cooperate on monitoring and maintenance, using the data provided by the sensors and GPS located on micromobility vehicles (data on falls, crashes, etc.).

GDPR, consumer rights and services safety are other key aspects to take into consideration when planning for the collection of micromobility data. The operator should ensure that users

[16] Statistisches Bundesamt, Press release: https://www.destatis.de/DE/Presse/Pressemitteilungen/2021/03/PD21_N021_462.html ; special evaluation: https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Verkehrsunfaelle/Tabellen/sonderauswertung-unfaelle-e-scooter.xlsx?__blob=publicationFile

agree with anonimised data being shared. The city should ensure also that this sharing clause is included in the contractual agreement with the operator.

Communicating and educating

Communication about safe use of micromobility should be considered as important as communicating about the safe use of cars or mopeds. Cooperating with sharing providers is key. Usually, shared micromobility vehicles can be activated via apps. These apps should include information on local rules and safety instructions which should be shown before users can activate the vehicle. Moreover, users of shared vehicles must register after downloading the app. This constitutes another chance to increase the users' awareness of the specific local rules and risks of the micromobility device they are about to use. Since enforcing an obligation to wear a helmet while using micromobility devices would be very difficult, wearing a helmet and appropriate shoes should at least be part of recommendations and be included in any visuals in order to set a good example for users.

These apps also include shared micromobility options and give users the choice of which mobility type they want to use. In Antwerp for instance, users can choose between the smartest way, the fastest way, the cheapest way, the most sportive way, the way with least changes, etc. There is also a price indicator for the whole ride and the cast for every used transport in the route planner.

Cities have also pressed micromobility providers to provide safety equipment. That includes increasing helmet availability and usage. They also encourage them to modify vehicle designs with, for example, more robust chassis and larger wheels better able to manage uneven pavement. Vehicles were also equipped with indicators in order to avoid taking one hand from the handlebar before making a turn.

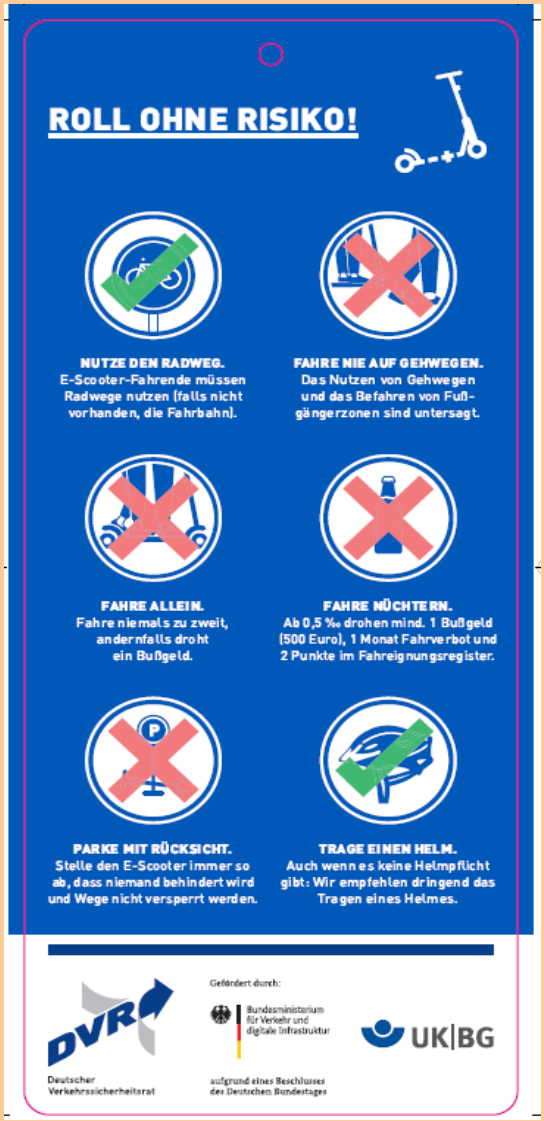
One of the key safety recommendations from the International Transport Forum[17] is to include micromobility in training for road users: training for car, bus and truck drivers to avoid crashes with micromobility vehicles riders should be mandatory. Training for cycling and micromobility should be part of the school curriculum. Training programmes should be updated accordingly and regularly revised.

Examples of campaign on e-scooters in Germany

In 2020, the German Road Safety Council (DVR) launched a nationwide campaign on the safe use of e-scooters. The campaign is financed by the Federal Ministry of Transport and the statutory accident insurance. According to a German regulation which entered into force in the middle of June 2019, e-scooters are defined as vehicles usually without a seat but with a handlebar, lights, brakes, a bell and a maximum speed of 20 kilometres per hour. Other vehicles which might be categorized as micro mobility devices such as hoverboards or electric skateboards must not be used in public traffic.

[17] https://www.itf-oecd.org/sites/default/files/docs/safe-micromobility_1.pdf

To determine the main knowledge gaps concerning the use of e-scooters among the users of these vehicles, DVR conducted a representative survey. The results showed that 51% did not know that the blood-alcohol limit for the use of e-scooters is the same as for the use of other motor vehicles. Moreover, more than one in four were unaware of the fact that e-scooters mustn't be used on sidewalks.



Source: German Road Safety Council

So information on these and other rules which are often broken were visualized and then printed on stickers and tags which were attached to e-scooters by providers of e-scooter sharing. The messages on the tags are printed both in German and English to make them accessible to international users as well. In addition to this, visuals and video clips were posted on social media.
Further topics covered by the campaign include two people riding one e-scooter and chaotic parking. Cooperating with providers of shared e-scooters has proven very helpful since the information can hardly be overlooked when it is attached to the vehicle itself. A humorous approach was chosen to convey the messages.

When educating about the use of micromobility services, it would be useful to have a clear set of rules in mind. Users should be educated and prove their knowledge regarding the highway code. In particular, younger users who do not have a driver's licence should learn traffic rules

before they use electric micromobility devices. In Germany, some schools already offer a cycling test and moped classes including a theoretical and a practical driving component. Something similar should be offered for micromobility devices like e-scooters or integrate these devices in existing programmes.

Several studies show that the first rides on standing e-scooters are the most dangerous ones, e.g. one third of e-scooter accidents with injuries happen during the first ride on these vehicles. It might for example be sensible to require riders to make their first rides in parks or other areas with minimal traffic and open spaces where they can master the control of the machine before attempting to ride in mixed traffic.

There are obviously some significant barriers to mandating such a scheme, although rental companies may be in a position to require something of this nature, even though this would still cause issues for experienced riders who wanted to swap from one rental operator to another. Training users in a safe space before they participate in normal street traffic, ideally with the help of professional trainers, might also help new users to familiarise themselves with the vehicles. However, in most cases this will not happen, so sharing apps can come in handy and make suggestions concerning the question how to make your first “steps” safely before you hit a busy street.

Some cities require the operators of shared micromobility services to develop campaigns that can be aimed at users (safe and civil behaviours, e.g., where and how to ride, speed, helmet use, proper parking, etc.), and at prospective users (specially to make sure lower-income citizens feel welcome and supported in using micromobility services). Campaigns can include advertising (on many supports, including social media), printed materials (that can be tagged to the vehicle, and distributed, e.g. at events and public information desks), dedicated or other public events, community sessions, meetings with local stakeholders.

Another issue to bear in mind is linked to the fact that the rules on the use of these vehicles vary from country to country, sometimes between regions or even cities within one country. So these differences must be communicated to many recipients including tourists who take their own micro mobility vehicle on a city trip.

2.3 Zero emissions

New mobility concepts such as e-bikes and e-scooters may have the potential to reduce congestion and improve air quality in cities, for instance by replacing car trips. Better planning for micromobility can help achieve a Vision Zero emissions.

Environment and congestion: modal shift

Local authorities need a clear vision and modal shift goals, and use micromobility to serve these goals. Micromobility can be a tool at the service of cities to achieve a shift away from a car-centric transport system. Strategic planning can then envisage how to ensure micromobility operators of micromobility services serve city goals, with active travel and public transport as the backbone of the transport system.

Modal shift Brussels Mobility Survey Summer 2019

- among 1,259 scooter users
- scooter use is occasional
- 1/5 several times a week, most 1-3/month or less
- average journey between 5-10'
- 64% men, 50% between 25 and 34
- +50% higher education
- 25% of users substituted car or motorbike trips
- 75% replaced public transport or walking

It is important to consider the added value of micromobility and how it fits in to the long-term sustainable goals that cities set. Environmental concerns around climate change have provided another powerful driving force for change, with European cities are declaring climate emergencies and setting ambitious net zero carbon emission targets. Micromobility can contribute positively to the solution of some of the problems faced by cities, such as air quality and congestion.

Batteries

There are key elements linked to micromobility that should not be neglected, including the recharging and recycling of batteries. Micromobility products deployed initially did not include information on the lifespan of their vehicles. For example, cities have reported that for shared e-scooters, this is only 3-6 months.

The batteries and their recharging is another key issue, as shared micromobility vehicles have to be collected for their batteries to be recharged. These vehicles are spread around the city, leading to additional journeys for the collection of these vehicles for the purposes of recharging but also the redistribution around cities, so as to ensure that there is appropriate coverage of the vehicles at key locations.

Cities should require clarity from operators on these aspects when procuring micromobility services, taking into consideration the whole 'life cycle' emissions associated with the batteries, as well as wider circular economy principles. Awareness-raising campaigns should also target owners of privately-owned micromobility devices.

Environmental performance of micromobility modes in Paris: preliminary results using Life Cycle Assessment[18]

As part of the ORNISIM project, researchers studied simulations and assessments of micromobility solutions (electric scooters, hoverboards, solowheels, segways). They considered environmental profiles, safety, user behaviors and traffic patterns. The study explains that the market for personal acquisitions has skyrocketed in France, while Paris has today one of the leading free-floating e-scooter fleets, counting over 20,000 vehicles. If the social aspects of these new mobilities are vigorously questioned, their environmental impacts are often cut short as positive without a proper appraisal. But to these researchers'' knowledge, no reviewed multicriteria environmental assessment has been performed yet to feed the debate of micromobility environmental opportunity in a rational quantitative way.
To fill the gap, the researchers provided first environmental performance estimates of micromobility using the following four micro-vehicles in Paris: a personal electric scooter, a commercial two-wheeled self-balancing personal transporter, a personal solo-wheel, and a personal hoverboard.
This assessment is based on an attributional process-based Life Cycle Assessment, and a large input data collection collected through a web and field surveys, as well as from the industry. They selected a set of 13 indicators, classically affected by transportation, and calculated using the CML (environmental impact assessment method)[19], EDIP tool (Environmental Design of Industrial Products)[20] and Cumulative Energy Demand characterization methods.
The results focused on climate change show that the solo-wheel would be the best environmentally friendly mode, releasing about 7 $gCO_2eq/p.km$, followed by the self-balancing personal transporter emitting 8 $gCO_2eq/p.km$, then by the e-scooter generating 12 $gCO_2eq/p.km$, and finally by the hoverboard producing 23 $gCO_2eq/p.km$.
The researchers then compared micromobility performance to conventional urban transportation modes in European contexts and found that they would be 8 to 25 times more efficient than a small diesel car, and 5 to 14 times more efficient than a streetcar.

2.4 Zero inequalities

While e-scooters and e-bikes have potential to serve areas with less accessibility to mobility, the experience of many cities has shown that this has not always been realised. The privately operated e-scooter business model is centred around serving areas with higher pedestrian density and usually more disposable income. E-scooters pose a risk to people with disabilities due to their faster speeds and lack of noise. Parked e-scooters, especially when part of a dockless sharing system, can pose trip hazards and obstacles. Seniors, people with disabilities, and those with socio-economic challenges could face negative outcomes if injured in a collision or fall. Therefore, solutions for parking micromobility devices in designated spots apart from sidewalks is crucial. The same applies for keeping users off sidewalks while riding e-scooters.

[18] https://www.researchgate.net/publication/334710768_Environmental_performance_of_micromobility_modes_in_Paris_preliminary_results_using_Life_Cycle_Assessment
[19] https://www.universiteitleiden.nl/en/research/research-output/science/cml-ia-characterisation-factors
[20] https://www2.mst.dk/udgiv/publications/2004/87-7614-201-9/html/a_7_eng.htm

Accessibility

Generally, the low-cost characteristics of micromobility vehicles mean that they can also support improved accessibility and enhanced social mobility. However, these are not built into the system: in some cities it is much more expensive to make a journey by e-scooter than by bus or even taxi.

Cities have the right to expect and to ensure that operators of shared micromobility services are trustworthy and reliable, and do not discriminate negatively against any group. Consideration must be given to the way in which micromobility can be used to serve the needs of those who have different needs from the conventional core demographic for micromobility devices, e.g. parents with young children, those with physical mobility challenges, etc. Cities can for instance require or incentivise operators to include adapted vehicles in their fleets, e.g. machines that are specifically designed for the use of those with physical disabilities, tricycles, hand-pedalled or recumbent bikes, child seats, etc.. Special procedures for reserving and accessing these vehicles can also be put in place, e.g. specific user limitations require specific adaptations, and these procedures should be focused on matching users with vehicles that respond to their needs, and facilitating access.

It is also important to reach out to organisations representing people with all types of disabilities, to plan for a more inclusive and accessible transport offer, including micromobility in their Persons with Reduced Mobility (PRMs) strategy for instance.

Affordability

The vehicles themselves are relatively affordable and incur minimal additional costs, compared to the costs that are typically associated with car ownership, such as insurance, tax, maintenance, congestion charges and parking. If not privately-owned, micromobility is typically a shared service with travellers accessing and paying for trips via a smartphone. This usage model eliminates many of the costs associated with the private ownership of vehicles. Rental costs can be as little as a few euros a day or €100 for an annual membership.

There is a risk that the creation of shared micromobility schemes just makes another mode available to young, affluent, able-bodied people who are already well catered for in the transport market with a possible detriment to those groups who are not catered for. Urban planners should make the best use of micromobility to help alleviate the social exclusion that the transport system has created in the recent years. How can micromobility serve lower income areas and customers? How can it also benefit the elderly by helping them to move around the city better? These are all questions that urban planners should address when integrating micromobility into their SUMPs.

2.5 Governance and regulation

Lack of appropriate regulation and weak governance are mainly to blame for the chaotic start of shared micromobility free-floating services in 2018. The Safe System approach seeks to recognise the responsibility shared by all contributors to the elements of the system. There is a responsibility to collectively manage all inputs so that the likelihood of a crash is minimised. As planners and managers of public space, cities can influence micromobility developments and try to set them on a course that serves the public interest. Cities could also use of micromobility as a test case for deploying a new governance model that can bring together the private and public sectors, and all modes of travel.

To set a course, cities need to know where they want to get to, and how these innovations can help them to get there. Here is a key role for political vision. Micromobility indeed offers a real opportunity to reinvent mobility planning and governance structures.

Cooperation

Cooperation that brings all stakeholders into the conversation, e.g. in form of a consultative committee appears to be the best way ahead, and should be the foundation of planning for micromobility, especially in the context of Vision Zero. With regards shared micromobility services, the lines of responsibility between micromobility providers, users, and governments are nascent, and it is only through collective dialogue that the right balance can be struck.

While micromobility service providers should respect the real concerns of cities, it is also important for cities to appreciate the constraints service providers are facing. Per-trip fees and fines, if not carefully managed, can significantly impact their bottom line.

Cooperation in building more micromobility-friendly infrastructure is another key avenue to consider. While costs per km can vary wildly, academic research suggests constructing bike lanes is extremely cost-effective once the knock-on benefits of lower injury risk and more use of active modes of transportation are taken into account. Some shared micromobility providers could be encouraged to co-fund those efforts.

Varying types and degrees of regulation

Since the explosion of privately-operated shared bicycles and e-scooters on city streets, many cities have approached shared micromobility offerings with concern. Some cities designed and implemented strict regulations to counter negative externalities, like misuse of public space and unsafe riding.

Differences in regulations across countries are definitely a challenge. But cities also learned from each other, and best practice for shared micromobility governance emerged. In most cases, regulation of shared bicycles and e-scooters alone does not enable cities to use these services to their full potential to fill transport network gaps and achieve a modal shift goal. While regulation is an obvious and important tool to manage operations, integrating shared micromobility into urban mobility planning represents an opportunity to offer people quick and affordable mobility options.

City authorities will still need to decide, based on their overall planning and procurement context, how to enable the deployment of shared micromobility services. A number of models or combinations of models are available:

- Hands-off approach
- Providing regulatory ground-rules
- Requiring operational permits/licences
- Contracts for concessions
- Pilots / demonstrations
- Banning / not allowing operations

The extremes of the list could stifle innovation, user choice and lead to higher user costs. An exception may be in small cities with less than 50’000 inhabitants for instance, where a single

operator may be most appropriate. When it comes to a fully open market in a commercially attractive city, the consequence could be on-street chaos, as seen in certain cities a few years ago and still today. The fully open model could also lead to market instability, as operators might find it challenging to defend their investment. This could potentially lead to user dissatisfaction.

Micromobility strategy of Toulouse (FR)

- Deployment strategy & charter for free-floating bike and scooter shares
- Protect public interest: quality of service; management of public space
- Fixing desired volume of vehicles in circulation, fee to be paid to use public space
- Compliance with rules as prerequisite for deployment

It is to be noted that service providers are not against regulation, on the contrary.

When considering road use rules for micromobility devices, it is important to keep the various regulatory schemes between different categories of device (including conventional bicycles) as similar as possible, i.e. there should not be wildly different sets of rules for different categories, e.g. e-scooters and e-bikes. The logic here is that keeping the diversity of rules between categories to a minimum helps users who might swap from one category to another on a regular basis. It also helps those who may be tasked with enforcing rules as they only have one set of rules to remember.

While a coherent framework for technical characteristics of shared micromobility should be in place throughout Europe, this framework should carefully take into consideration the potential unintended consequences of certain - characteristics of micromobility devices. For example, the consequence of a rule to prevent e-scooters being used by more than one rider at a time means that parents with young children are excluded entirely from accessing this mode. However, to take into account the possibility of e-scooters being ridden by a parent with a young child as a passenger, requires an appropriate philosophy to be applied in the way these machines are technically regulated and designed. The market of shared e-cargo-bikes for families is also increasing rapidly. Cities should try to organise such an offer. It is still necessary to exclude certain user/age groups from using certain vehicles.

In developing technical regulations it should be kept in mind that the regulation of motor power should be balanced and vary among vehicle types. For example, e-bikes have a considerable power contribution from their human riders, while e-scooters and other micromobility types do not. Thus a power limit that may be appropriate for an e-bike will be significantly too low for an e-scooter.

Micromobility strategy of Bologna (IT)

- Tender through competitive dialogue
- Incentives structure
- Service obligations
- Mutual data sharing
- Revenues known and shared beyond certain threshold
- One operator selected of 3 bidders
- Positive results

Control over access to the market

Cities should select providers of shared micromobility using tender procedures. In doing so, they can set their own priorities concerning e.g. traffic safety, sustainability, intermodality, etc. Moreover, this can fuel competition among the providers which in turn constitutes a driver for change and technological progress. It is to be noted that it also has the potential to stifle progress by reducing the profitability for operators who thus cut investment in 'better' technologies.

In the next step, city officials and the providers who won the tender should define the concrete area for their services – both in the centre and at the outskirts – including no parking zones (e.g. in the historic centre, next to tourist attractions, in parks, etc.) and places where their availability is particularly welcome (e.g. around stations of public transport).

These aspects should be integrated into the local SUMP.

Some ways of controlling access to the market are for instance the rights of local authorities to:

- Terminate permits at any time, for due cause, including causes not specified in the regulatory agreement, and require the operator to remove their entire fleet of vehicles from city streets. Contracts written in this way would tend to favour operators with a short term mindset. Operators would be much less willing to make investments with long payback periods if they ran the risk that their contract could be terminated at any moment for reasons that may not even be specified in their contract
- Limit the number of companies operating (e.g. cap the number of permits or licenses issued, and/or issue exclusive contracts, permits, or licenses).
- Limit the number of vehicles that any individual company can deploy, on a per-permit basis.
- Prohibit specific companies from operating in the public right-of-way based on conduct or prior conduct (e.g. if a company deploys equipment prior to applying for a permit, license, or contract, or fails to comply with permit, contract, or license terms).
- Limit the duration of licenses and permits to a fixed time period (e.g. 6-12 months) and require all companies to re-apply for each renewal. This might also have the effect of favouring companies with a short term business model, rather than those prepared to

make long term investments. If a city wants companies to make long term investments by, for example, building docking areas or providing rider training, then it needs to give them the opportunity to recoup that investment over an extended period. Contracts developed as the result of competitive bidding processes may have a longer duration. Companies should be aware that cities may update permit terms over time.

- Require operators to provide written notice, at least 14 days before ceasing operations, if they are no longer willing or able to provide service in the city.

These are a set of recommendations for cities, which can be adapted to the local needs.

The Paris experience: A Charter of Good Conduct (FR) while waiting for a new national legal framework

In 2018, the Parisian context was favourable for free-floating scooters: the presence of a consolidated, reliable and dense public transport offer, the increase in cycling infrastructure, the absence of a national legal framework before the end of 2019, a political will to welcome and to support new forms of shared soft mobility, a population ready to opt for shared modes and able to pay the fare (3-4 €).

More than 15,000 electric scooters flourished early 2019 and offered a travel alternative for short trips. The time lapse between the appearance of these new services and the evolution of the regulatory framework has led the city of Paris to address the issue by focusing first of all on dialogue with operators.

The city decided to act and put in place specific measures to supervise these new practices – mainly to ease relations between the different users and to protect the most vulnerable people in the absence of a legal framework. There was indeed a major legal vacuum regarding the treatment of electric scooters for nearly 18 months, since they were not subject to the highway code, and the national Mobility Orientation Law (LOM) was still to be discussed for several months until its approval by the French government.

A working group was set up in June 2018 between the city of Paris and the first operator of free-floating electric scooters to arrive in the capital. Gradually, the new e-scooter providers arriving to the city were integrated into this group to develop a Charter of Good Conduct relating to the rental of these devices in the public space and concerning the sharing of data. All operators deployed in Paris signed this Charter in May 2019. These trips represented in 2019 between 0.8% and 1.9% of internal trips in Paris.

Early 2019 and following the delay in the adoption of a new Law on Mobility ("LOM,") the city implemented the following actions:

- In April 2019, the Paris Council deliberated on the establishment of a fee for all free-floating operators including scooters (from 50 to 65 euros per scooter depending on the size of the fleet deployed).
- In June, the Mayor of Paris asked the operators of electric scooters:
  - To limit their speed to 20km / h and 8km / h in pedestrian areas and meeting areas;
  - Freeze the number of electric scooters available in Paris, and if possible reduce this number, until the government clarifies the legal framework.
- A municipal bylaw relating to the parking of scooters was also published on 30 July 2019 to prohibit parking on sidewalks and pedestrian areas, under penalty of fines for users by municipal police officers. Scooters were authorised to park in paid parking spaces used by cars and spaces dedicated to motorised two-wheelers on

the road. The city enforced the decree by removing and towing away badly parked scooters which would hamper the circulation of pedestrians in particular.

Regulate operations

Shared micromobility operators deploy fleet, digital applications and payment methods, that impact public space, users and non-users, and should therefore be regulated. In Europe, it is generally the national legal framework that determines who can set these rules. Many countries have defined such rules and cities can only regulate the activities of operators within the city area.

More generally speaking, and as detailed in a study from TRL[21], the rules for the use of micromobility should be similar to those which are already in force for bicycles. This means e.g. that micromobility vehicles should be used on cycle paths or streets but not on sidewalks. Violations should be prosecuted. Their speed should be similar to the speed of cyclists and so should their equipment: handlebar for stability and control, brakes, bell, lights, reflecting elements. This approach seeks to reduce the confusion that can arise when dealing with apparently similar vehicles which belong to different categories and are thus subject to different regulations. This approach is favoured over the development of a bespoke set of user regulations specifically to deal with micromobility devices because it reduces the educational challenge for both users and law enforcement officers who would otherwise be required to learn a whole new set of rules and their criteria for application. Introducing new rules inevitably requires either a substantial and expensive public information campaign, or else runs the risk of criminalising micromobility device users who unwittingly break laws of which they were not aware, as has been seen in the U.K. where private e-scooters remain legal to buy, but illegal to use in public places.

The biggest challenge to this approach lies in ensuring that any new risks arising from the operation of micromobility devices, that were not previously considered when regulations for pedal cycles were devised, are adequately managed; for example, if a device requires a significantly different skillset to operate safely. This approach is also predicated on the principle that micromobility devices share their important safety characteristics – primarily speed and mass, with pedal cycles and thus care must be taken to ensure that micromobility devices that are regulated in this way do not deviate significantly from these norms; it would not for example be acceptable to increase the speed limit for micromobility devices to 100km/h without significantly tightening user regulations.

The other significant challenge to this approach arises from the possibility that users of micromobility devices may not have any experience or knowledge of road regulations and, given the nature of the micromobility market, may have their very first experiences of riding an unfamiliar vehicle on a busy urban street. While the possibility of this scenario is equally valid for a pedal cycle user, given the long history of pedal cycles, it is much more likely that they would have built up experience of riding bicycles from an early age and, while they may not have had any formal training, would at least have had the opportunity to develop their vehicle

[21] Study on market development and related road safety risks for L-category vehicles and new personal mobility devices, p. 30

control skills and 'road sense' over a prolonged period under progressively more challenging traffic conditions. It is thus the sudden appearance of new micromobility devices in large numbers, in urban areas, that carries an additional safety challenge, which needs to be considered when user regulations are devised. Consideration must be given to the effect of regulations that prevent micromobility users from practicing in safer spaces like parks or pedestrianised streets.

Care must also be taken to ensure that external societal factors do not disproportionately increase the risk of micromobility device use; for example, it is important to ensure that people who are impaired due to alcohol or drugs are discouraged from using micromobility devices rather than walking or using public transport. However, consideration should be given to the potential unintended consequences that may arise from the strict enforcement of drink or drug driving regulations for micromobility users – while drink or drug driving should be absolutely discouraged, it may be preferable to shift impaired drivers from cars to micromobility devices where the consequences of their behaviour may at least be reduced. Any campaign to prevent drink or drug riding of micromobility devices must therefore be, as a minimum, balanced by campaigns to prevent drink or drug driving of larger more dangerous vehicles.

Consideration should also be given to the potential interaction between the use of micromobility devices and other forms of criminality, for example the use of e-scooters in street robberies and drug dealing. These challenges are not unique to micromobility devices, but do create an additional dimension for law enforcement authorities who may lack the skills and tactics necessary to deal with these new forms of transport.

Recommendations for regulating operations include:

- Limit the number of operators

The number of operators should be based on the size of the city and the user needs. A proper assessment of the local situation is key. In case of many operators, the monitoring and management of their operations, as well as the enforcement process, can be challenging for cities.

- Limit the size of the fleet

The total number of each type of vehicle allowed on the streets should be capped. Limits can be set for each operator and for specific areas of the city. These limits can set a minimum and/or a maximum number of vehicles, based on certain factors linked to the city, such as its available space, demographics, etc., and ensuring that Persons with Reduced Mobility are also taken into account. Dynamic fleet capping based on the actual usage of micromobility vehicles is ideal, but it requires data.

Madrid e-scooter rules (ES)

- Prohibited on sidewalks, bus lanes, streets with more than 1 lane in each direction, main ring roads
- Allowed on cycle lanes, streets with 30km/h speed limit
- Parking: areas reserved to motorcycles and bicycles, if not available then general parking area of the road and, in the last case, on the sidewalks
- Minimum age: 15 (under 16 helmet mandatory)

- Minimum equipment: bell, brakes, lights and reflective elements

- Rebalancing and fleet redistribution

City authorities should also determine pre-set requirements for fleet deployment that operators should follow. Operators should carefully monitor their operations in order to comply with maximum or minimum fleet sizes in different sectors of the city. This will also avoid cluttering of public space with micromobility vehicles.

- Geofencing for service limitations

Limits should also be set by the city regarding parking, speed limits and areas where access is prohibited like pedestrian zones. These limits are included into digital maps (geofencing) with which the apps communicate. The apps can help enforce these limits: to prevent parking, they can disable locking and unlocking or act on the electric engine. However, this can be dangerous if it happens during the ride, e.g. on an intersection. This is why it is not allowed in Germany for instance. Throttling must start at the beginning of the ride but must not be activated later during the ride. Geofencing is still work in progress, and technology is rapidly improving.

Example of geofencing pilot in Helsinki (FI)

In 2021 in Helsinki, there are three operators offering rentable e-scooters for use of customers. The scooters work with smartphone apps and their parking is allowed on pavements in the same way as bicycles, according to Finnish law. Also, when it comes to driving scooters, the same laws are followed as on bicycles. On scooters, you have to drive along a bike path or a bike lane. If neither is on the street, you have to drive on the roadway.

Geofencing areas are in use by all three operators. Firstly, the service area of scooters is not the whole of Helsinki. The area is mainly limited to the inner city and the areas nearby the city centre. The journey cannot be ended and the scooter cannot be parked outside the service area which is specified by geofencing. Some of the areas outside the service area are such that it is not possible to drive there at all on a scooter. For example the island of Seurasaari is that kind of area. It is forbidden to ride a bicycle on the island as well, so the same rule has been applied to the scooters.

The main geofencing functions visible to the customers are parking ban zones and speed limit zones. The vast majority of city parks and the platforms of the railway stations have parking ban zones, as do lots of areas adjacent to the sea (lest scooters end up in the sea). Lower speed limits set by geofencing areas are in use in the most important pedestrian streets and areas, for example on the pedestrian street Keskuskatu, on the railway station area and on the market squares of Kasarmitori and Kamppi. Also in the areas where are lots of construction works or road works lower speed limits can be used temporarily.

The newest geofencing pilot was set in July 2021. There have been problems in Helsinki, particularly on weekends at night, when there have been many injuries to scooter drivers. Drivers have often driven under the influence of alcohol. To solve the problem the e-scooter operators set geofencing areas in the city centre and areas nearby with lower speed limit (15 km/h) at weekend nights between midnight and 6 am. The speed limit is lowered only at night time in weekends and the area covers over 700 hectares.

In August 2021, the City of Helsinki and the companies renting out e-scooters have agreed on changes to the rental policies, with the goal to traffic safety: all companies renting out e-scooters in Helsinki will start restricting the maximum speed of their e-scooters. The maximum speed will be lowered from 25 km/h to 20 km/h in the daytime and to 15 km/h at

night (from midnight to 5 am). These changes have entered into force on 3 September 2021 and remain in force until further notice.

In addition to this, a trial has started during which rental e-scooters will be completely unavailable during weekend nights (nights of Fri–Sat and Sat–Sun) from midnight to 5 am. The trial will continue until the end of 2021, at which point its potential continuation will be agreed on. At the same time, data will be gathered on how the time restrictions affect the number of accidents, with season-specific changes in the utilisation rates also taken into account.

The new restrictions on the maximum speed and operating times of rental e-scooters will apply everywhere in Helsinki. Prior to this change coming into force, speed restrictions have been tested in the city centre during weekend nights.

- Parking

Whether for privately-owned of shared micromobility, regulating parking is an essential part of the micromobility equation in cities. Parking rules should be clearly defined and communicated. For all micromobility devices, parking should be prohibited on pedestrian paths and be made mandatory in “mobility corrals” or “bike hot spots”.

For a successful micromobility parking strategy, the city, alone or together with the operator(s), must provide enough parking facilities. This is a basic rule of course, but one that should not be forgotten. Parking rules are challenging to monitor and enforce though, especially in big cities where users’ numbers are high. Parking guidelines, communication and education can help. These should address accessibility issues, like tactile markings for visually-impaired people.

Operators of shared micromobility services should be required to remove vehicles that are improperly parked or damaged, or were left in areas difficult to access. The city, together with the operator(s), but also citizens in general, can propose easy-to-use alert procedures. A requirement for operators should be to deal with removal requests within a set timeframe, to be monitored and enforced by the city.

- Dockless-to-Docked (and vice versa)

ities should require docking in specific areas, especially in denser areas or in places where higher pedestrian flows may be badly impacted by dockless vehicles, such as public transport hubs. The city should favour solutions for fixed docking that include electric charging of docked vehicles to help operations.

- Speed Limitation

Operators should be required to adjust their apps and vehicles to ensure users comply with pre-capped speed limits. These limits can vary depending on the area of the city.

- Insurance

In procurement rules, the city should check that shared micromobility operators hold an insurance that covers damages by their users and vehicles to the city’s public space, but also damages to other users of the street. Information on compensation for damages and who to contact should be made clearly available.

- Vehicle specifications and maintenance

The city should define maintenance and inspection schedules of shared micromobility services, as well as requirements on vehicle characteristics that are relevant for their safety

and functionality. This concerns also the recycling and disposal of batteries, which is an important point to take into account.

- Fees and subsidised fares

For shared micromobility services, the city can decide to set a more dynamic fee system, with higher fees in the city centre, or lower fees if the journey ends by a transport hub. If users are well informed and understand its implications, a more precise fee system might influence users' behaviour and services' deployment. It is a tool to serve a city's goals, like modal shift.

As part of its financial planning, the city can also decide to subsidise certain types of trips that directly serve strategic urban mobility interests, e.g., trips to and from public transport hubs and schools. This can be a mobility management strategy to boost a modal shift.

- End of operations

As part of the procurement for shared micromobility services, the city should include clear rules on actions to be fulfilled by the operator at the end of its contract. This includes for instance a safety deposit and rules on the removal of all the vehicles and their batteries.

- Micromobility for e-delivery operations

Food deliveries by micromobility devices have been booming over the recent years, leading to chaos and frustration in many cities. Many private players already use micromobility, such as "Deliveroo", "Uber Eat" and other, who already use the bike or e-bike as a way to deliver their supplies to the costumer. Items other than food are also increasingly being delivered by bike or e-bike by DHL and others. In that context, cities should recognise benefits of micromobility for urban logistics, but also start regulating this sector to avoid congestion and street cluttering, applying above-mentioned rules to these services, too.

While freight micromobility is limited in the size of loads that can be carried (up to 150kg in average), it offers an opportunity for transformation of the way urban logistics work. Modal shift of freight from larger diesel vans onto electric cargo bikes and other e-micromobility includes many benefits, including decarbonisation and reducing pollution and making streets safer – since fewer large vehicles would mean fewer serious crashes. Freight micromobility implementation is often combined with last mile consolidation centres (locations where larger vehicles can drop off goods for local delivery, so efficiency is increased). In 2017, TfL[22] found that "up to 14% of vans could be replaced by cycle freight by 2025." There is already a trend for the merging of micromobility rental and food delivery business models, so the delivery company rents a fleet of micromobility devices exclusively to their own employees, thus passing the costs of the vehicle onto the worker. Deliveroo has started doing this in London, by renting out e-mopeds to their own workers. Workers' rights and fair pay should be ensured, avoiding that the cost of equipment 'rented' to workers effectively consumes the majority of their wages. This should be monitored, to ensure that workers involved in such schemes are still being paid more than minimum

[22]https://www.london.gov.uk/about-us/londonassembly/meetings/documents/s82223/Appendix%202%20-%20Micromobility%20and%20Active%20Travel%20in%20the%20UK.pdf

wage.Itis feasible that Deliveroo could switch their current fleet of hardware from electric motorbikes to lighter e-scooters, potentially with racks or seats.

The factors that make micromobility appealing to private users can also be applied to businesses providing urban deliveries and freight. Electric cargo bikes could represent a viable option to replace vans, which can be the cause of over 30% of oxides of nitrogen (Nox) and particulate emissions in cities. Trials conducted by DHL have estimated that CO2 emissions could be reduced by 16 tonnes per year by replacing two vans with four e-cargo bikes. These bikes are able to take faster routes by using cycle lanes. They are easy to park and enable quick deliveries. There is even the potential for private rental of e-cargo bikes for large shopping trips[23],E.g. cites can tender projects on the use of micromobility for e-delivery in line with their goals for modal shift.

Antwerp's city logistics example (BE)

The city of Antwerp uses the "market place for mobility" to promote initiatives and to call on private players to come with solutions for urban logistics. The city has had different providers who proposed their solutions and the city selected six of them. In the selection process, the city focused on green mobility. One of the selected projects provided electric cargo bikes for companies. Antwerp also proposes a bicycle courier service that is not focused on the fastest delivery, but collects the packages and delivers them on fixed time slots. If well regulated, these smart and sustainable micromobility solutions for urban logistics can help cities to achieve their modal shift goal.

Monitoring

Monitoring is a key aspect of Vision Zero. Before the deployment of shared micromobility services, a city authority should establish systems to monitor operations across all of the local micromobility operators. Key indicators should be agreed with the operators, and monitoring systems should be put in place. This could be via a third-party software service. These types of management systems are already in use for the management of public transport, urban parking, etc. This is for shared micromobility to become an effective part of the overall mobility system. Such mechanisms will support mobility policies and effective regulation development and enforcement. This will also enable effective street level management of these new mobility services, and help to improve the public image of the services, their operators and the city authorities.

With the goal to put its Strategic Action Plan on Road Safety into practice, the European Commission published a list of key safety performance indicators (KPI), elaborated in close cooperation with Member States, that will be monitored across the EU to underpin the target of 50% reduction in fatalities and serious injuries by 2030. The list (including indicators like vehicle safety, sober driving, infrastructure, speed compliance and post-crash care) is a living document that will be updated regularly[24], and could be applied to monitor micromobility in the context of Vision Zero.

[23] https://www.eltis.org/sk/node/49712
[24] https://ec.europa.eu/transport/themes/strategies/news/2019-06-19-vision-zero_en

Enforcement

Cities should also have regulations to reduce negative effects of micromobility. For shared micromobility services, these regulations should allow a city to suspend or terminate permits or licenses previously issued to the operator. It is important to establish clear criteria and procedures to enable this sort of regulations and avoid legal disputes. Continued failure by operators to comply with one or more legal or contractual requirements should lead to formal warnings, and eventually sanctions. Some cities work with penalty points when operators fail to follow them. When they reach a certain amount of points, operators lose their permit.

A soft approach could consist in establishing an open consultative committee with regular meetings involving citizens and key stakeholders in shared micromobility, including all operators and relevant city services (e.g. traffic and public space departments), public mobility authorities and or companies, but also police forces, which have enforcing power for traffic code violations. Operators should be expected to participate, either on a voluntary or a mandatory basis (the latter only works if sanctions are applicable to those not participating). Meetings should focus on operational matters that go beyond a bilateral relation and need to be addressed by a wider and more diverse group. It can also serve to encourage cooperation between different stakeholders, e.g., in outreach and education campaigns.

Regulations should also apply to individual riders violating the national and local rules on the use of micromobility vehicles.

Example of enforcement of shared micromobility in Antwerp (BE)

Over the last 4 years, Antwerp municipality has seen a growing interest from the private sector in deploying shared mobility. A range of shared e-bikes and e-scooters, mopeds are being introduced on Antwerp's streets and squares. In this context, the city has introduced a regulation in March 2021, which suggests a penalty system based on points. There are different types of offences that will give a predetermined amount of penalty points to the provider. Every point remains on the provider's record for 1 year. These penalties relate to the following requirements:

- Shared data: providers of shared mobility are obliged to share their data with the municipality in order to control use, availability, and distribution of vehicles. The latter is important to make sure vehicles are available in all parts of the city
- Drop zones for shared vehicles, to prevent blocking passage
- Reporting and follow up on wrongly parked vehicles
- Speed limits for shared vehicles are enforced
- Providers need to run a Dutch spoken helpdesk
- No parking zones by use of geofencing technology in crowded areas
- No go zones (geofencing)

The penalty points system works as follows:

- 30 points: loss of 10% of licensed fleet size for 1 quarter of a year
- 60 points: loss of 50% of licensed fleet size for 1 quarter of a year
- 90 points: loss of 100% of licensed fleet size for 1 quarter of a year
- 120 points: withdrawal of license

Data

The root of many cities' main challenge with micromobility, and at the same time a possible solution to finding a sustainable and mutually beneficial way ahead, could lie in the standardisation and sharing of data. Data is fundamental for urban planners in order to understand and determine where to deploy shared micromobility systems. Knowing how to treat data and how new technology can help is a key challenge. Local authorities need to develop new expertise in order to be able to make use of the collected data.

Shared e-bikes and scooters mushroomed on city streets and pavements, with policy makers having little insights into how, when and where these micromobility devices are being deployed and used. This lack of information and transparency from providers led to mistrust on both sides. Now that micromobility services are continuing to flourish in cities' landscapes, it is urgent to have accurate and up-to-date information. This seems to be a precondition to ensure that new mobility options effectively serve city goals, complement other modes and help to achieve Vision Zero. The collection of accurate and detailed accident data is key to this.

Many cities have understood this and are becoming increasingly sophisticated in understanding and specifying what data they need from micromobility providers. They even make it a precondition for micromobility operators to serve their markets. On the other hand, micromobility operators appear increasingly willing to share data with cities, including information on vehicle locations and trips.

Cities should also give themselves the means to understand and implement standards and application programming interface (API) frameworks that enable them to collect and analyse mobility providers' data. Third-party data aggregators can support cities in combining mobility data across a variety of modes, providing a holistic view of their transport systems. Data will provide cities with a powerful tool, helping them to oversee new services and offering them new possibilities, such as adopting dynamic caps on scooter fleets based on location. The IOT (Internet Of Things) boxes on shared e-scooters collect data which can potentially be used to track traffic flows, information on the condition of infrastructure, intermodality, etc. Therefore, agreements between providers of shared micromobility devices should include a modus operandi on the use of data collected during the rides.

If cities lack capacity for data analysis, it is recommended to seek the support from third party experts. As already experienced in some cities, students can also help to analyse sets of data and collect useful insights, that will feed into the planning strategy.

Data at the service of Antwerp's mobility planning (BE)

In Antwerp, the city works with licenses for every provider of mobility in the city. The city's plan is to work with a modular size of the fleets in correlation to the needs of the users (inhabitants, commuters, tourists, students, etc.). Adjustments to the services provided will be made based on the data the city receives from the providers of micromobility.

Antwerp passed regulations ensuring that every provider needs to deliver his anonymised data on a regular basis. Based on this data, the city makes informed decisions in function of the needs of its users. The means of transport that require more capacity are allowed to expand their fleet, while other means of transport that are not used enough will have to reduce their fleet. With this data at the city's disposal, Antwerp can make these decisions for every part of the city.

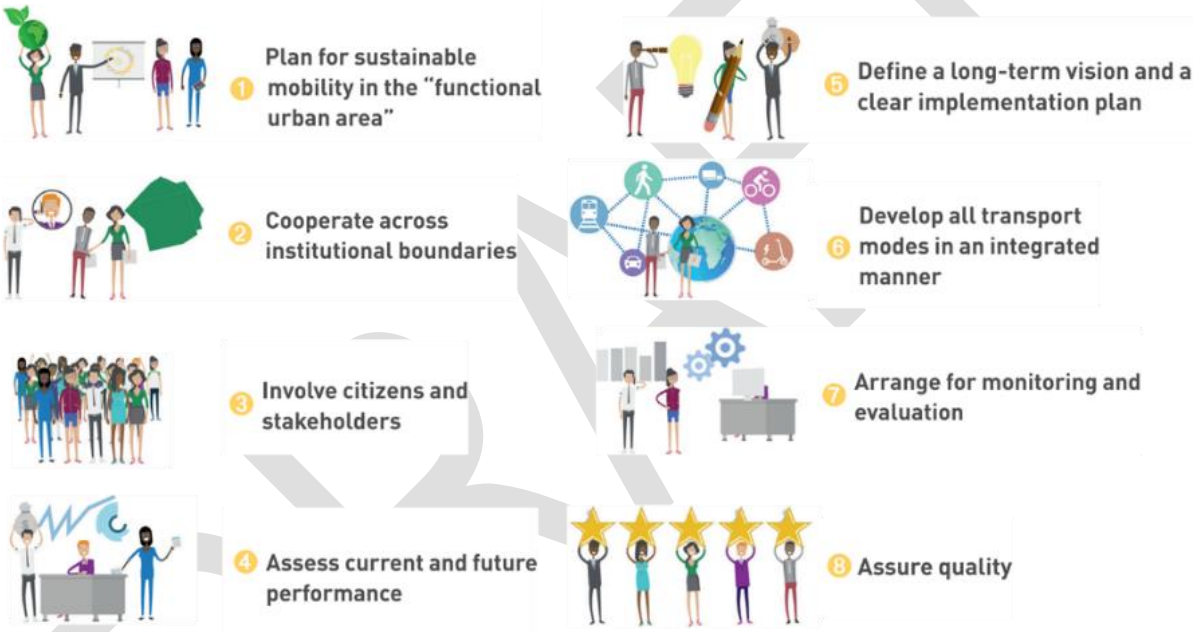
3. The 8 SUMP principles in the context of micromobility

In this chapter we clarify how the safe use of micromobility devices relates to the eight SUMP principles. These 8 SUMP principles are:

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

In the following paragraphs, you can find the crucial elements in each SUMP principle in relation with the policy focus of this Topic Guide: the safe use of micromobility devices in urban areas.

Figure 3 The 8 SUMP principles



Source: Guidelines for developing and implementing a Sustainable Urban Mobility Plan, Second Edition, 2019

3.1 Plan for sustainable mobility in the 'functional urban area'

The starting point of the SUMP process is committing to the overall sustainable mobility principles, going beyond the simple municipal boundaries. Taking measures to improve the use of micromobility can improve sustainability in related areas e.g. air pollution, public health and could become an important contributor to the city's mobility landscape.

Such services were often introduced without consultation and with minimal direction from urban planners and leaders. Nevertheless, micromobility can further pursue a city's sustainability goals by improving congestion, complementing public transport, and reducing

individuals' carbon footprint. As an electric form of transport, micromobility has the potential to reduce urban transport emissions if it replaces motorised transport modes25.

Micromobility devices are also convenient for short trips and represent a solution to first and last-mile journeys. In the context of EU's climate neutrality goal by 2050, and with mobility accounting for 40% of CO2 emissions in Europe, the potential environmental benefits of micromobility should not be understated. However, it is important to plan carefully and focus on replacing private car trips with journeys made using micromobility vehicles. Sustainable mobility benefits of micromobility depend on the type of trip that is displaced.

3.2 Cooperate across institutional boundaries

Cooperation and consultation across different sectors of government and relevant authorities is crucial. Lack of cooperation and coordination between different stakeholders makes the implementation of a good regional and local urban mobility strategy very difficult. This is also valid for micromobility.

Shared mcromobility requires a strong integrated approach, combining public strategies and private sector interests. Therefore, a close cooperation with private partners, such as micromobility operators, will be needed, from the start to the end of the planning process. Integration with the public transport authorities and operators is also relevant.

When it comes to controlling free-floating operators, it is important to define and adapt the most appropriate level of authority to organise it, whether at regional or local level for instance.

3.3 Involve citizens and stakeholders

Citizens and relevant stakeholders are crucial partners in building a strong approach for micromobility. As users of the transport system, citizens' behaviour needs to be assessed and guided, e.g. getting users to comply with traffic law and respect public space. Any effective approach should clearly focus on the road users.

For shared micromobility, stakeholders from both the public and the private transport sector are important to push a safe organisation and to inform and convince citizens to participate in the transport system in a safe way. In cities where licences that allow operators to offer their shared micromobility devices are not required, cities will find it difficult to manage the operation of these services. In such situations, good negotiation and cooperation with micromobility operators is key.

Before involving and discussing with relevant stakeholders and citizens, urban planners should regularly update and carefully tailor their scenarios to the constantly evolving landscape of micromobility. They should have defined a clear city vision supporting the city's goals, that they then submit to all stakeholders for consultation. As part of this process, coordination between different transport modes and their relevant stakeholders is also crucial.

[25] A recent study (https://www.intelligenttransport.com/transport-news/97295/voi-and-ey-release-life-cycle-assessment-of-e-scooters/) on the Life Cycle Assessment (LCA) of an e-scooter in use in a major city in Europe finds that e-scooters with swappable batteries generate 34.7g CO2 equivalent emissions per person per kilometre across the full lifecycle. On the other hand, a new petrol car will generate between 200-350g CO2e/km per person per kilometre.

3.4 Assess current and future performance

To successfully drive the micromobility strategy of a city, urban planners need to understand what is the state of play in their city, what are the numbers, statistics, what is the business model, etc.

It is also essential to define ambitious and measurable targets derived from agreed future objectives aligned with a vision of mobility. In doing so, urban planners should define clear indicators and analyse the modal shift strategy on a regular basis.

The city's environmental footprint should be measured yearly, and cities should try to be more ambitious, making the best use of micromobility with the goal of moving towards more sustainability in the transport system.

Understanding the role and place of micromobility in the whole multimodal transport network is crucial to assess the current performance of micromobility devices and determine future actions and targets. This is valid for instance in terms of road safety: understanding where and how collisions happen and which user groups are involved will help to define effective and specific road safety interventions in the urban area covered by the SUMP. This can be done by launching urban road safety audits, e.g. by using safety performance indicators that can be correlated with a SUMP.

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

At the start of the urban mobility planning process, it is important to define long-term modal shift targets for micromobility for trips in a specific area. The mobility offer can then be developed according to the targeted modal shift, taking into consideration the needs for commuting, carbon footprint, accidentology, inclusive offers (gender, disabled users, seniors, etc.). When offering alternatives for trips, distance, climate (seasonality very hot/cold weather), temporality, risk/advantage of modal shift, alternatives for making the same trip, should all be analysed.

Regarding shared micromobility, before authorising operators to deploy shared fleets, cities should analyse their mobility goals carefully and select the most appropriate duration for permits, in order to match innovation with sustainability. It is also recommended to involve micromobility operators in the earlier phase of the SUMP process.

3.6 Develop all transport modes in an integrated manner

How to accommodate new modes in the transport system? This is a well-known dilemma of urban planners, especially when it comes to micromobility. The whole road network should be made safe in order for micromobility to work. Dedicated bike lanes are just part of the solution, considering the full extent of the network. Moreover, existing bike lanes might have been crowded even before the arrival of micromobility devices.

For micromobility, the first focus should be to define which authority should be in charge of dealing with micromobility and operators and ofdeploying these services as a useful alternative in the whole transport system. Micromobility has a strong interaction with the other modes both along the network and in the nodes of the multimodal network. Planning for the safe use of micromobility devices implies at the same time discussing the functioning of other modes: urban planners cannot make it safe for one mode without considering the whole system,

especially not when it comes to micromobility: Users of micromobility can potentially endanger pedestrians but at the same time, they are potentially endangered by motorised vehicles such as cars and trucks, for example.

3.7 Arrange for monitoring and evaluation

A city needs a well-structured and transparent monitoring and evaluation strategy, with indicators measuring progress and identifying the successes and areas for improvement. Like for other modes of transport, the definition and adoption of a clear set of specific indicators, accompanied by a feasible data collection strategy, is a prerequisite for monitoring and evaluating the safe use of micromobility devices in urban areas.

Shared micromobility provided by private operators requires new forms of control. Information systems have been planned according to traditional modes of travel, allowing new forms of travel to be compartmentalised into the wrong category, such as e-scooters as bicycles. The problem can occur, for example, in accident statistics and in hospital patient systems. For example, when accident data is not available for use by local authorities, it is difficult to apply improvement measures to problem spots.

When new modes of movement are coming into use like micromobility services, different authorities should cooperate at an early stage to bring monitoring into place as quickly as possible. Cities should also set up dedicated expert teams to regularly monitor the compliance of operators with the rules and guarantee the quality and safety of service provided to users and to non-users also affected by micromobility vehicles on the sidewalks.

3.8 Assure quality

The involvement of operators, citizens (users and non-users of micromobility) and stakeholders - including associations for blind and disabled people-, to create awareness and determine the governance framework for micromobility is clearly key for the quality of the process. Another crucial element for quality is the evaluation framework of the impacts of micromobility. Exchanging lessons learnt with other cities can also avoid repeating mistakes and increase the quality of the process, while supporting the creation of a common understanding and vision across geographical and administrative boundaries.

Urban planners should think carefully about how to involve key partners in feedback procedures and how to measure the impacts of micromobility. They should look for advice and best practices. While preparing a SUMP, it is essential to involve micromobility experts, including operators.

4. Considering micromobility in the SUMP steps

In the following, the main actions and elements essential for implementing a safe use of micromobility are introduced, reflecting the phases of the SUMP cycle. We identify crucial aspects and recommend concrete actions to the general guideline cycle in order to encourage urban planners to better integrate micromobility in their SUMPs.

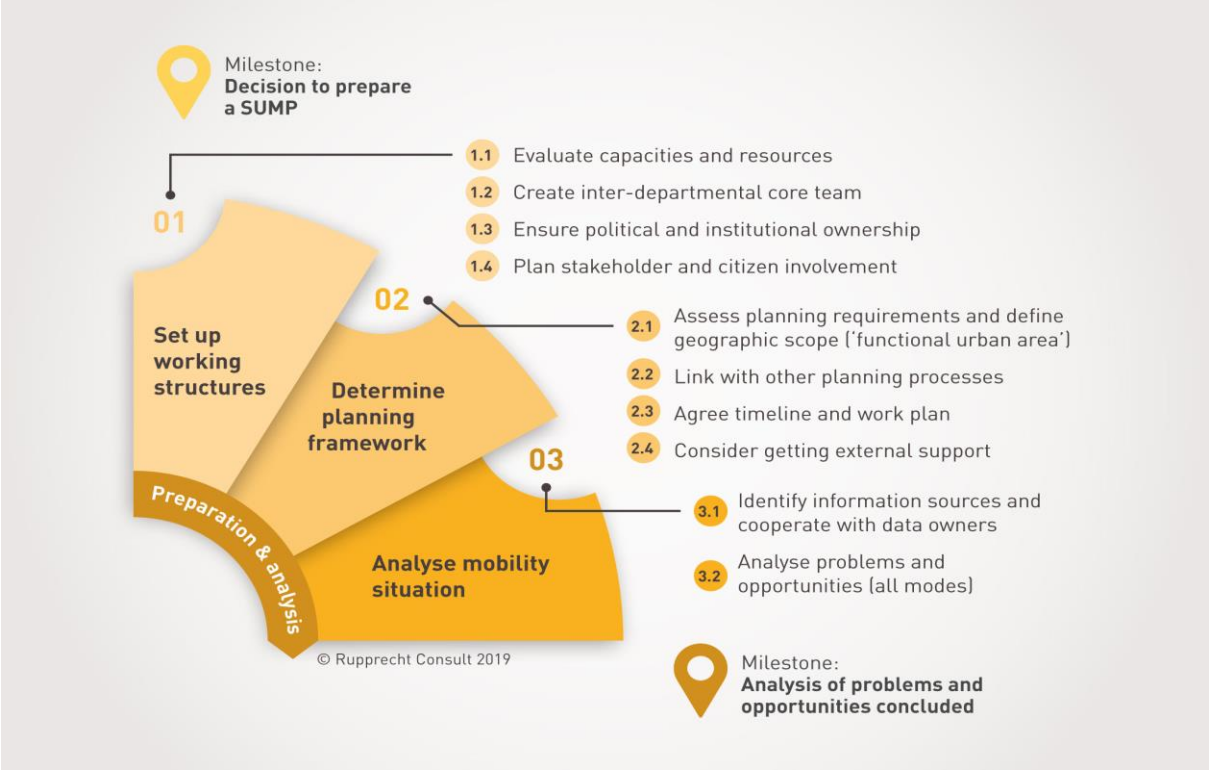
This Topic Guide gives an advice to policy makers and involved stakeholders on how to integrate micromobility in almost every step of the planning cycle of the SUMP. Its objective is to put micromobility high on the agenda while developing and implementing a SUMP and to ensure urban planners are fully aware of the importance to integrate it in the whole transport system, for the overall success of the SUMP.

Figure 4 The SUMP planning cycle

Source: Guidelines for developing and implementing a Sustainable Urban Mobility Plan, Second Edition, 2019

4.1 Phase 1: Preparation and analysis

Figure 5 Phase 1: "Preparation and analysis"



In the first phase of a SUMP, a few actions are recommended to prepare the process, in relation to the set-up of the working structures and the planning framework, as well as the analysis of the mobility situation. Internally, the city should first set up an interdepartmental core team, which will analyse problems and opportunities and define a vision for the city.

When analysing the mobility situation, it is important to assess the availability of micromobility services and their level of integration, but also the market situation and national policies, technological readiness and, more generally, the maturity of the urban area which is about to implement micromobility devices.

The core team should define a comprehensive plan for stakeholder and citizen involvement. With this plan, the city should aim at bringing together the various stakeholders. Since micromobility integrates public and private-led services, there is a need to set up a structure enabling cooperation and dialogue with all stakeholders from the micromobility sector, including newcomers. Shared micromobility operators are part of a new mobility culture that requires an adequate and dedicated discussion platform. A continuous and open public-private dialogue is recommended within and beyond the SUMP process.

After a wider consultation and analysis of problems and opportunities, the city and stakeholders should build a common vision, including incentives, risk and profit sharing, ensuring that every stakeholder can benefit. It is important to develop a culture of trust and to identify the potential benefits for each stakeholder.

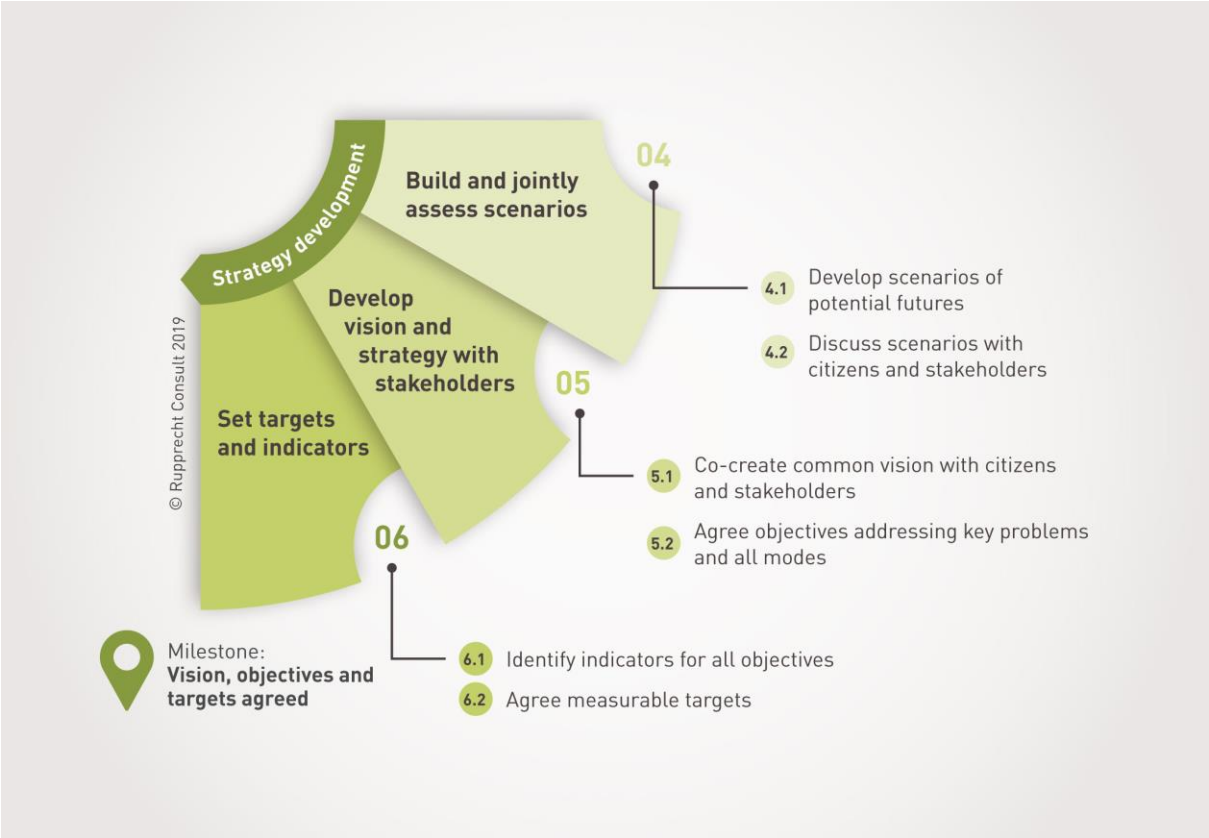
Availability and sharing of the data is crucial for well-informed planning and decision-making procedures. Identifying information sources and cooperating with data owners like

micromobility operators is key. To that end, working with open data and architectures as well as standard interfaces are valid options. Data reciprocity can be imposed as a principle, from one side to improve the service level and usage of micromobility services, and from the other side to have access to up-to-date information for urban planners.

The use of customer data should always be treated in compliance with the relevant legal requirements such as the General Data Protection Regulation (GDPR).

4.2 Phase 2: Strategy development

Figure 6 Phase 2: "Strategy development"



In the second phase of a SUMP, several actions are recommended to prepare the process, particularly in relation of building and jointly assessing future scenarios, developing a common vision and objectives with stakeholders as well as setting targets and indicators. The stakeholders and citizens involvement plan agreed in Phase 1 is the basis for the active involvement of those categories and decision-makers to create a common vision leading to a strategy.

The local planning framework for implementing micromobility should be discussed according to the possible and desired governance and operational models as described in chapter 2, based on a participatory approach. This process could result for example in an agreed code of conduct or charter.

Cooperation frameworks in European cities

- London code of practice
- Paris code of conduct (see more details in dedicated box below)
- UK accreditation scheme for operators
- Dublin byelaws for dockless bikeshare
- Madrid sustainable mobility ordinance
- Flemish/Dutch framework for free-floating bikeshare, etc.

The challenge for the city is to get all stakeholders to work together towards a common goal, which should be a modal shift towards sustainable mobility without endangering vulnerable groups. Public authorities need to ensure that links with public transport, cycling and walking are at the core of any micromobility strategy, in order to avoid the risk of an adverse modal shift. This new type of mobility, usually "door to door", should not discourage people to walk or do active mobility, too. Moreover, the safety of the most vulnerable groups like the elderly or disabled people must be taken into account. This means for example that sidewalks must remain safe walking spaces where motorized vehicles are not allowed to be used.

Regardless of the role the city and/or region and its administrative bodies in micromobility implementation, defining the overall strategy for micromobility is and should remain the responsibility of the public authorities, in an open dialogue with all stakeholders.

Key objectives might be, for instance to increase the modal share of more environmentally friendly and efficient mobility options; to reduce private car use/ownership; to reduce kilometres by car (whether own car, taxi or shared vehicle); to improve mobility and access; to influence users' travel behaviour; to engage the users in socially responsible behaviour within the community; to improve air quality and health of citizens, etc.

It is paramount to create an evaluation framework with key performance indicators (KPIs) and measurable targets to be able to measure the impact of micromobility on travel behaviour against local transport policy goals. A micromobility-friendly policy in SUMP could be evaluated taking into account the modal shift and other related indicators (reduction in private car use/ownership, increase in public transport efficiency, etc.).

Indicators used in Berlin

The report on urban mobility in Berlin in 2017[26] illustrates traffic related developments in Berlin, including strengths as well as the need for action. It constitutes the basis for decision-making and developing further the transport system.

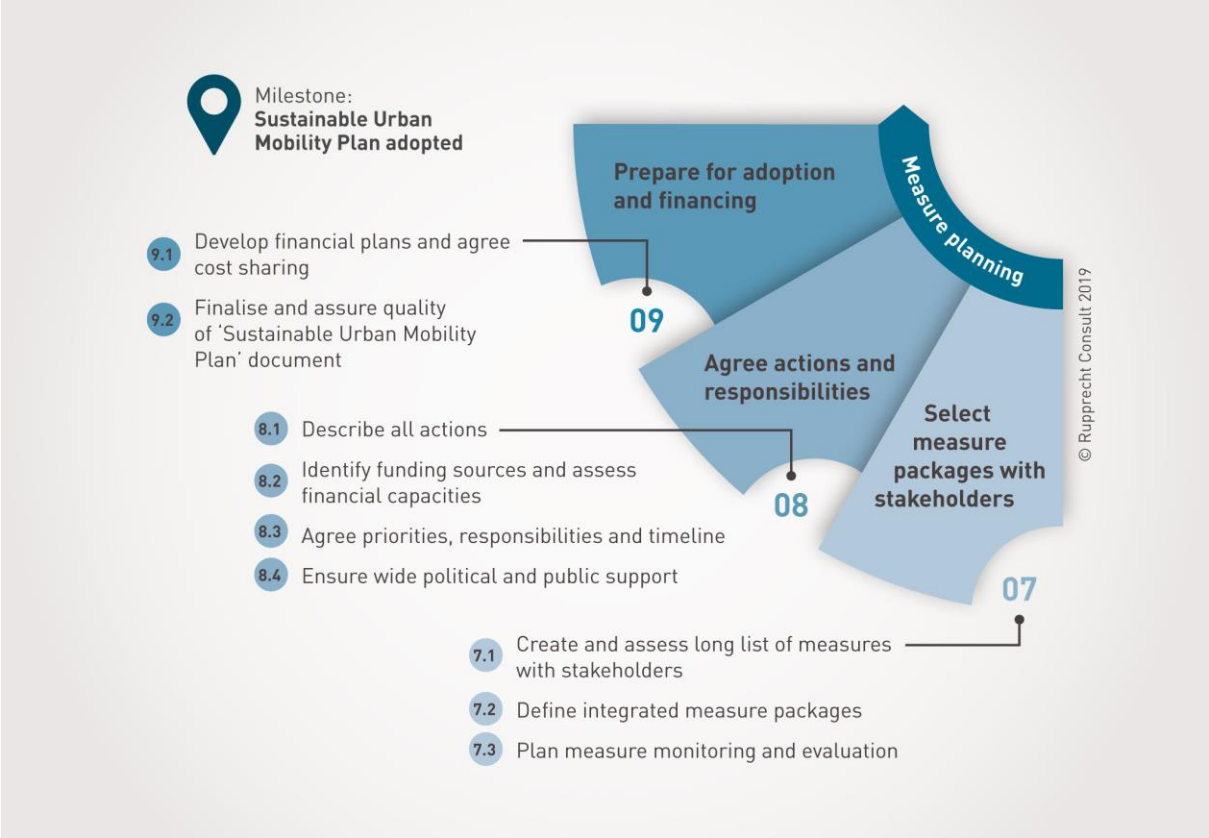
The report proposes the following urban mobility indicators, used also for measuring micromobility:

[26] https://www.berlin.de/sen/uvk/_assets/verkehr/verkehrsdaten/zahlen-und-fakten/mobility_en_komplett.pdf

- Structural data: e.g. inhabitants and working population per district, population development, people moving from and to Berlin from the surrounding area, monthly household income, population density
- Mobility profile: more recent survey with data from February 2018 – January 2019 (the brochure from 2017 includes mobility data from 2013; for this part of the survey, new mobility data is collected every 5 years): e.g.
    - average number of journeys of the residential population (per person and day)
    - average journey time and distance (respectively per journey and day)
    - level of motorization of households
    - rate of occupation (motor vehicles)
    - number of bikes per 1.000 inhabitants
    - modal split (walking, cycling, public transport, motorized private transport) for internal traffic and overall traffic
    - modal split separated according to reasons for journeys (workplace, education, home, leisure, shopping/care, others)
    - modal split separated according to inner and outer city
    - occupational commuters per working day from and to Brandenburg (federal state surrounding Berlin)
    - number of motor vehicles registered in Berlin
    - share of motor vehicles
    - further indicators for biking/cycling (building projects like crossings for pedestrians and infrastructure for cyclists, development of traffic census for bicycles), public transport (development of network of public transport, passenger numbers, vehicle fleet), motor vehicles (including development of carsharing – free floating and with stations and freight transport
- effects and framework of traffic: road safety (accidents according to accident consequences, types of road users involved, age of people involved), air quality, noise, costs and financing (including ticket prices for
- sustainability: referring back to earlier chapters**,** goals:
    - strengthening sustainable modes: walking, cycling, biking
    - at least maintain comparatively low level of private motorisation
    - increase share of freight transport by train and inland vessel
    - keep costs for maintaining and extending the transport system financeable

4.3 Phase 3: Measure planning

Figure 7 Phase 3: "Measure planning"



In the third phase of a SUMP, the following actions are recommended to prepare the process: select measures packages with stakeholders, agree actions and responsibilities and particularly public funding. The result of this phase should be a clear list of actions with well-defined outputs indicating the timing and which stakeholders are responsible for each action. Actions and responsibilities in the micromobility implementation depend greatly on the role taken by key stakeholders, i.e. micromobility operators. The budget for each action should also be clear. As part of the SUMP development, financial plans should be agreed with key stakeholders, including key aspects such as cost sharing of shared micromobility service provision. Public funding could be made available by public authorities for trials and pilots to create awareness or to tackle technological obstacles. In addition, public funding could help to ensure the preconditions to the operation of micromobility services, such as supporting the interoperability of services or by developing multimodal hubs. In this regard, the option of shared micromobility services should also be included in journey planners.

Public authorities should adopt and harmonise quality standards for all new shared micromobility providers. They should try to safeguard a level playing field amongst transport operators and prevent undesirable effects such as a shift from collective modes to individualised modes and creating new risks for the most vulnerable groups, e.g. blind people tripping over toppled vehicles.

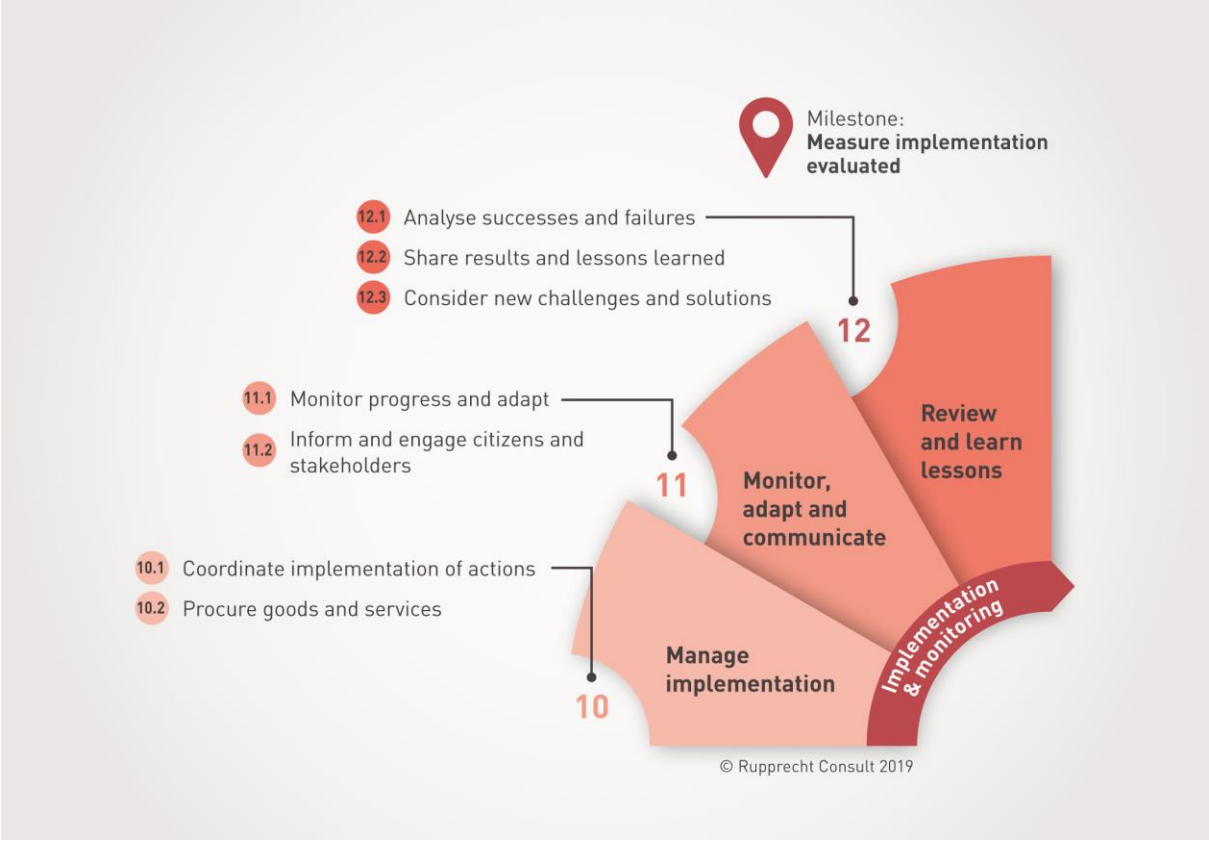
The safe use of micromobility devices in urban areas is a priority for the citizens, but also for local politicians. This is particularly relevant in light of road safety aspects: accidents involving

micromobility users but also people with disabilities who might be endangered by these new types of vehicles are tragic and sensitive topics. Political action is often required to steer the process towards safety improvements. Ensuring wide political support is therefore important. Public support and acceptance is also crucial: while the public has met e-scooters with both enthusiasm and scepticism, unforeseen outcomes such as forms of irresponsible riding, cluttering, or vandalism have tarnished the image of micromobility. It is worth bearing in mind that there is still a novelty effect associated with micromobility. Fatalities involving e-scooters still appear in national news, but those involving cars hardly ever do.

In that phase it is key to ensure that micromobility is part of integrated measure packages. It is an opportunity for public authorities to move away from traditional traffic management towards multimodal mobility management, and to ensure that a more integrated and systemic management approach is put in place.

4.4 Phase 4: Implementation and monitoring

Figure 8 Phase 4: "Implementation and monitoring"



In the fourth phase of a SUMP, several actions are recommended to prepare the process, particularly in relation to the procurement step, to set up relevant organisational structures to manage the measure implementation to communicate, monitor and adapt, and to allow review and lessons learnt.

Taking into account the high public sensitivity linked to micromobility, this phase seems very important to steer continuously the implementation of effective measures, including road safety ones. Communicating, but also educating users on the safe use of micromobility devices, are

other aspects to develop in this phase. In this regard, it would be useful to have a clear set of minimal rules or guidelines for educating users. This could be developed at national or European level, similarly to sharing lessons learnt and extracting good practice.

Public procurement can play a role in encouraging (or discouraging) the development of shared micromobility services. Innovative procurement could be used to ensure that the chosen solutions favour the user and do not create monopolies or bottlenecks. Public procurement can also be used to set requirements for road safety, interoperability, data sharing or the use of open APIs. Each offer should be analysed according to the city's strategy: is a bike sharing system or e-scooter offer, etc. in compliance with the city's mobility objectives? Is the city wanting to increase the number of trips with theses offers, or mostly to reduce them? Objectives might be to increase active mobility with shared mobility (e-bikes for instance), to give alternative options for trips done by public transport during peak hours (e-bikes, moped, scooters), or to use free-floating offers as a solution for areas not served by public transportation.

Cities should also analyse how attractive they are for private operators of shared micromobility. While some cities would need to restrict the number of vehicles and operators, some other cities in suburban areas would find it difficult to actually attract private operators, as a high number of trips per engine would not be guaranteed. Defining fees for public space use and defining restrictions for riding and parking might be alternatives to limit shared micromobility. Not charging operators with fees or even giving some subsidies might be useful then. Thus according to the objectives and attractiveness of each territory, some cities would decide to subsidise micromobility while others would just look for to regulate and limit their deployment.

Paris and cities taking part in the Syndicat Autolib' Velib' Métropole (SAVM) have decided to finance Velib' docked shared bicycle offer in order to increase trips made by bike, to promote active mobility and provide affordable offers for all citizens and special rates for students. They will also guarantee a high density of stations (more than 1000 stations exist in Paris). In total, more than 18 000 bikes are available in the zone served by Vélib' Métropole. 35% of them are e-bikes.

Shared micromobility offers develop extremely fast, that is why innovation should be privileged when signing contracts with selected operators.

Some criteria when selecting operators by a competitive procedure need to define clear performance indicators that could easily be measured. Operators should engage themselves with objective indicators easy to be checked by the city. Whenever possible, certified reports provided by third parties should be requested, e.g.:

- Percentage of covered area of the city with the offer (or indicators like "the operators guarantees an engine ready to be rented in less than "5, 10 minutes for 100% of the total cities population")
- % of the deployed fleet ready to be used 24/24 in relation to the total authorised number
- Environmental criteria: Carbon footprint of the whole activity, Life Cycle Assessment (LCA); % of green and renewable energy used.
- Measured objectives regarding provided technology and educating users
- Actions taken regarding integrating offers for users with reduced mobility and covering gender issues (most shared modes are used by male users) can take into consideration

a balanced deployment in all areas, fleet management to avoid and reduce saturated parking spots.

Example of e-scooter procurement in Paris

When selecting e-scooter operators in Paris in 2019, criteria were based on three main aspects:

- the operating system
- user safety
- environmental responsibility

Private offers need to ensure proper integration of the deployed fleets into the public space. These are some examples of criteria that could be used in the future when delivering "permits" after a competitive procedure:

1. User safety
   - Reliability and quality of fleet, such as approvals, standards, certifications. To be noted: there is a problem for micromobility devices in that there are no certification systems available that take account of the fact that e-scooters are road vehicles. So it might be possible to be certified for the recyclability of the machines used, but not for how safe they are as vehicles
   - Road safety (compliance with the highway code and accident prevention)
   - Data protection
   - Insurances provided to users
2. Territorial balance and availability of supply
   - Territorial deployment and rebalancing (deployment perimeter, territorial indicator)
   - Availability of offers (% of equipment available for rental, management of out-of-service equipment, customer support service)
   - Parking
   - Adaptability to specific events
   - Accessibility PMR and gender
3. Environmental responsibility
   - Carbon footprint of the operations to be planned (fleet and operation of the service)
   - Ecological footprint of the operator's activity
   - CSR strategy
   - Life cycle analysis
   - % of renewable energy used

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