EUROCITIES

Playing by the rules

Report on e-scooter operators and fleets in cities - a survey of city approaches and options to optimise regulations

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1. Introduction

Dockless electric scooters (e-scooters) have grown rapidly in availability and use across European cities in recent years. Proponents of e-scooters highlight their potential to improve air quality and congestion, replacing short distance passenger car journeys and serving as a first and last mile to public transportation networks.

However, e-scooters have brought challenges for cities. Their emergence in European cities was characterised by an initial lack of engagement with city authorities and operational issues that relate to safety, use of public space, traffic management and others.

The purpose of this report is to provide a snapshot of e-scooter regulatory approaches in European cities and share best practices with practical options for their management. This report does not include privately owned e-scooters or mopeds. The first part of the report presents an overview of responses to a survey and the second part details options under the headings of governance, sustainability, safety, and data.

The collection of feedback is based on voluntary responses to a questionnaire launched by the Eurocities 'Smart and Connected Mobility' Working Group to members of the Eurocities Mobility Forum. An initial survey in 2019 was updated in 2020 and due to rapid developments in this field, some details might have since changed.

Twenty European cities were surveyed to understand their approach, challenges, and regulatory gaps to be addressed in the future. This sample does not permit conclusions to be drawn for European cities in their entirety but provides an indication of perceived challenges and chosen approaches. As some responding cities have only just launched shared e-scooter services, their inputs reflect only early numbers and impressions on deployment.

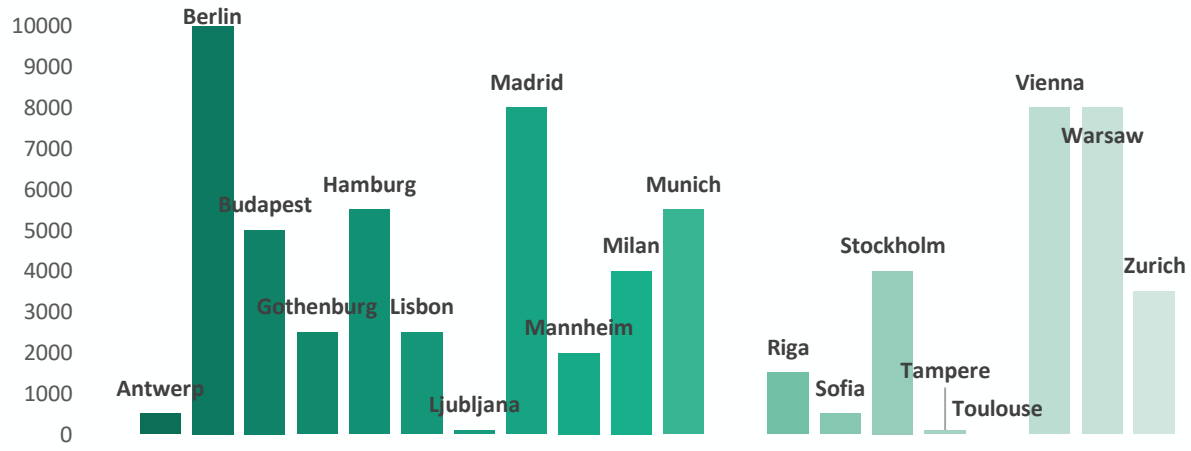
The authors of this report kindly thank the following cities for their input to the report: Antwerp, Berlin, Budapest, Gothenburg, Hamburg, Lisbon, Ljubljana, Madrid, Mannheim, Milan, Munich, Oslo, Riga, Sofia, Stockholm, Tampere, Toulouse, Vienna, Warsaw and Zurich.

2. Survey

2.1 Scooters and operators

The number of e-scooters deployed in cities surveyed in the report vary from a couple hundred to more than ten thousand. Budapest, Hamburg, Munich, and Stockholm have a total number of e-scooters that exceeds 4000 vehicles, while Berlin, Madrid, Vienna, and Warsaw have numbers greater than 8000. The number of e-scooters is generally correlated with the number of providers that operate services.

Some of these figures may change rapidly soon, with the recent introduction of national regulatory regimes.



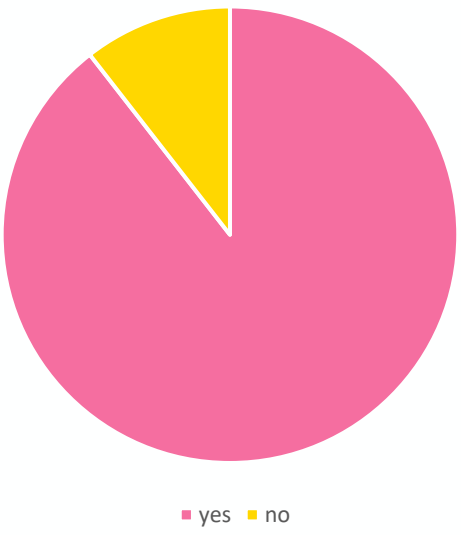
2.2 Active approach of cities and collaboration with operators

Most cities surveyed actively engage with e-scooter operators through one or more methods. This engagement includes information exchange, self-binding agreements, and legal obligations, in order of occurrence. In some cases, softer forms of collaboration (information exchange and self-binding agreements) are supported by legal obligations, such as in Tampere and Vienna. Warsaw is a unique case, as they do not actively collaborate with e-scooter operators but remove improperly parked e-scooters from pavements; it was reported that confiscated vehicles are not collected by operators.

Those cities that reported the use of other approaches, mentioned pilot schemes, regular meetings with operators and permitting schemes with fees levied by number of vehicles. For example, Budapest introduced 200 e-scooters within a limited operational zone for a two-month trial period, to gain experience ahead of introducing regulation.

Most respondents reported the necessity of active engagement to mitigate potential conflicts in public spaces. In addition, engagement with operator was mentioned as part of cities' ambition to gain experience and explore how developments can provide a framework for sustainable mobility.

2.3 Reported challenges



16 of 19 cities with e-scooters in operation reported that there were challenges. Chaotic parking and traffic safety (often in the context of problematic behaviour of scooter users but also since the small quick vehicles are an unaccustomed element on city streets) were named as frequent challenges.

Avoiding the overload of public space and regulating the parking of scooters was a recurrent theme. Some cities highlighted the need to regulate areas such as parks or the vicinity of touristic sights/heritage buildings. Traffic safety concerns in general, especially protecting pedestrians, are also top motivators why city administrations address scooter sharing.

Challenges mentioned in the responses included:

2.4 Legal basis

The legal basis for European cities to implement regulations is diverse, including the extent to which existing competencies are used. Approximately half of surveyed cities have implemented specific legal decrees, which vary in approach.

National legal frameworks are diverse where they exist. For instance, in Germany the regulation of e-scooters is governed by the Elektrokleinstfahrzeuge-Verordnung, (eKFV), which establishes rules for minimum age of use, liability insurance, vehicle safety requirements and limits use to roads. City authorities can only intervene in the case of severe road traffic or parking offences, but otherwise have limited regulatory options. In Sweden, e-scooters are classed as bicycles (as in Germany) yet it is possible to introduce stricter regulations that relate to parking in public spaces. In Italy, following the publication of the national framework, cities were granted the power to introduce fleet size limits (which were enlarged to cope with the demands of the COVID-19 public health crisis).

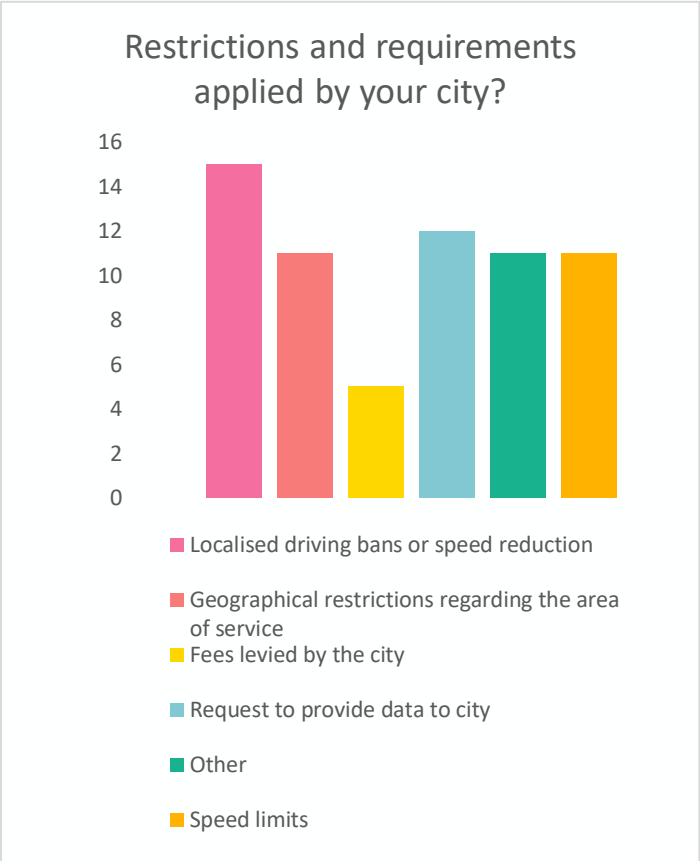
There were several instances in which national legal frameworks have recently evolved or been created, which led to challenges in adaption and improvements in the management of vehicle fleets. In some cases, legal frameworks can be complicated by laws on the regional level that add another dimension for city administrations to operate in. These differences can create challenges in the exchange of best practice examples, as what may be effective in one city will not be legally feasible in another.

Respondents noted that in cases where legal options are non-existent or limited, the establishment of dialogue and cooperation with operators is critical to address challenges. Progress depends on positive engagement of operators and adherence to measures, such geofenced parking zones, data sharing or service standards.

Future work of the Eurocities Smart and Connected Mobility Working Group will focus on understanding under which conditions the most effective approaches worked and what can be learned from that in designing local frameworks.

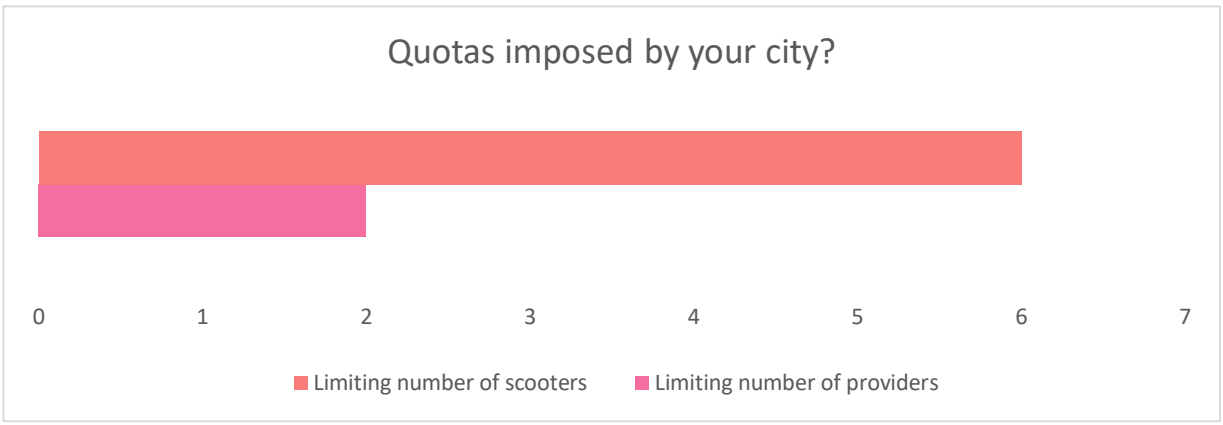
2.5 Instruments and restrictions

Cities surveyed employ a broad range of instruments to manage e-scooter fleets. The stated objectives of introducing regulations varied between cities but commonly included aspects such as traffic safety, minimising impact on vulnerable road users, sustainable modal shift, improving parking of e-scooters and the use of public space, insurance and managing quality of service.



The use of localised or geographical restrictions is common, which include aspects such as bans from pavement and pedestrian zones and parking bans in green spaces and historical monuments; several respondents noted the limitations of geofencing accuracy as a barrier. Requirements to provide data is also common and was applied by 60% of cities. For those cities that requested data, agreements included attributes such as total numbers of trips, total kilometres travelled, number of trips per vehicle per day, average trip length and temporal and spatial distributions to map trend lines. Other reported measures included incentives to park in designated parking hubs, application of fines for non-compliance with local rules, obligations for e-scooter removal on notification by city authorities and frequent report on operator service development and traffic flows. The application of fees levied per operator, vehicle or rental was not frequently reported.

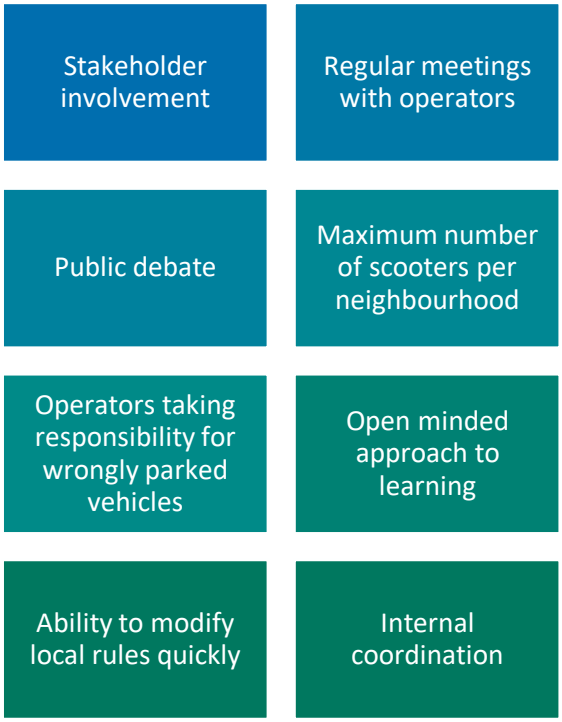
Significantly, more cities address the total number of scooters than limit the number of providers.



2.6 Success factors

The most cited factor for the success of e-scooter management was early and continuous dialogue with operators. This allowed authorities and operators to establish mutual understanding and solve challenges in cooperation. Other cities mentioned the importance of establishing exchange internally, regular dialogue with police authorities and involving the public. These factors imply the continuous dedication of resources.

Regarding specific measures, key success factors included vehicle fleet limits (total and per neighbourhood), police enforcement of sensitive areas, data exchange and ensuring that operators took responsibility for improperly parked vehicles.



2.7 Optimisation needs

Most cities believe that further optimisation is required in the future. A limited number of cities could not currently answer the question, largely due to the need to acquire further evidence on the effectiveness of local regulations.

Those cities that detailed their expected optimisation needs noted the following factors:

- Local regulation needs to be updated quickly as mobility industry develops quickly and dynamically
- Adapt to upscaling of services
- Increasing service quality and performance
- Defining and implmenting speed reductions
- Enforcement (e.g. age of drivers)

3. Regulatory options

The following section details potential regulatory options or approaches for city authorities to require or encourage in the management of e-scooter fleets. The options presented to cities have been developed from the survey responses and relevant literature, pilots, and studies.

The ability to apply specific measures will depend on respective legal frameworks and cooperation with operators. Certain measures detailed in the following sections are therefore not available to all cities but can serve as a toolbox for planning regulatory frameworks and approaches.

3.1 Governance and oversight

To ensure a reliable, convenient, and inclusive service, consideration of fleet size and distribution is valuable. In determining fleet sizes and coverage, cities can reflect on the geographic areas that should be served, the number of vehicles that would be necessary to provide a meaningful transportation service, as well as their internal staffing and oversight capacity.

Options can include defining geographic zones with minimum and maximum numbers of vehicles, requiring vehicles that have not been used within a fixed timeframe to be located elsewhere and ensuring a certain percentage of vehicle fleets are deployed in neighbourhoods with social equity needs.

- **Options:**
  - Limit or establish targets for maximum fleet sizes or total numbers of vehicles (per total area, per neighbourhood/geographic area)
  - License fees with costs per vehicle per time-period
  - Cooperation and dialogue mechanisms with operators
  - Establish procedures for handling complaints
  - Broad stakeholder involvement and internal coordination
  - Charge operators fees that accurately reflect the cost of regulating and monitoring vehicle fleet
  - Assess the use of penalties for non-compliance with contract, license, or permit terms

3.2 Social impact

New solutions often operate in entrepreneurial frameworks with high personal commitment and risk. As services become proven solutions and are rolled out at large scale, it is necessary that social standards and good practices of employment are observed across organisations and including those staff that service vehicles locally.

The strength of public institutions and social security systems depends on an effective taxation regime, which may be obstructed by platforms operating services across Member States within the EU. To ensure a sustainable environment city authorities an explore the establishment of local subsidiaries

In several instances, the virtual nature of the platform economy has allowed businesses to excel in tax avoidance. On the long term, this undermines Options:

- Require or encourage operators to demonstrate/implement employment schemes beyond precarious work based on extensive self-employment of local service staff.
- Require or encourage the establishment of local subsidiaries. This can be one way to facilitate employment schemes with good practices in employment and is a nucleus for paying local taxes.

3.3 Environmental impact

The operation of e-scooters results in both direct and indirect environmental impacts, which can be significant without corrective measures. Analysis undertaken by the International Transport Forum[1] (ITF) demonstrates factors that influence the direct environmental impact relate to average daily distances, vehicle lifetime, operator collection practices, vehicle weight and material choice in manufacturing.

Further studies have highlighted the impact that results from the displacement of other modes of transport[2]. In a survey undertaken by Brussels Capital Region, e-scooters replaced 26.7% of trips by passenger cars, 29.2% of trips by public transportation and 40.3% of trips by walking and cycling. Similarly, the European Environmental Agency notes that 'e-scooter sharing schemes appear to attract users that would have otherwise walked or used public transport'.

To improve the environmental performance of e-scooters, cities can favour or encourage operators to take steps to minimise impact in these areas. Increasing scooter lifetimes, reducing collection and distribution distance, using more efficient collection vehicles, and less frequent charging strategies can reduce adverse environmental impacts significantly. New e-scooter designs increasingly employ swappable batteries, which can benefit environmental impact of collection and distribution practices for charging.

- **Options:**
  - Require or encourage operators to implement sustainable fleet collection and distribution practices
  - Favour operators that demonstrate:
    - low lifecycle impact
    - zero emission electricity in fleet charging,
    - easily repairable vehicles
    - use recycled content in manufacturing processes,
    - minimise energy use of production
    - minimise environmental impact of sourcing materials in batteries
    - provide an environmentally friendly end-of-life pathway for batteries

[1] https://www.itf-oecd.org/good-to-go-environmental-performance-new-mobility
[2] https://iopscience.iop.org/article/10.1088/1748-9326/ab2da8

- Coordinate deployments with operators to avoid vandalism during events
- Favour operators that employ durable and vandalism resistant e-scooter models

3.4 Safety

Emerging data on the risks of e-scooters highlights significant safety risks, with risks of accidents potentially seven times greater than use of bicycles[3]. The widespread use of e-scooters therefore presents cities with new challenges in the management of traffic safety.

Eurocities advocates the Safe System approach to road safety. Guiding principles of the Safe System recognise human fallibility, human vulnerability, road safety is a shared responsibility and that a safe and forgiving road system is necessary. Policy responses to these principles are centred around safe users, safe infrastructure, safe vehicles, and safe speeds, which are discussed in detail below.

3.4.1 Safe users

Several risk factors contribute to the probability of users involved in accidents and severity of incident, including experience, use of alcohol and drugs, awareness of rules and protective equipment.

A study of accidents in Copenhagen noted that riders primarily sustained facial bruising and lacerations and were sometimes under the influence of alcohol or drugs (36.6%)[4]. Around one-third of accidents occurred between 23:00 and 07:00, which may indicate a safety benefit to regulating the operation of scooters during hours in which riders are more likely to be involved in an incident. In another study of patients involved in e-scooter or e-bike accidents, 8.4% of those involved were pedestrians; three-quarters of those pedestrians were vulnerable road users, either between the ages of 0-14 or older than 60 years of age[5].

Options available to authorities can include soft measures to improve user behaviour, through safety trainings and awareness raising on rules, and stronger regulatory measures that target the cause of crash or mitigate impact, such as limits on riders per e-scooter and the use of phones while riding. Insurance provided by operators can be an important element to consider for the safety of users for when accidents happen. This should cover damages that arise from collision, liability for third parties and their property as well as medical costs.

- **Options:**
  - Safety campaigns and awareness raising on rules and regulations (by operator or authority)
  - Minimum age limits for e-scooter users
  - Limits for one rider per e-scooter
  - Limited time of operation for users, minimising late-night driving
  - Require or encourage the use of protective helmets

[3] https://www.trm.dk/nyheder/2020/evalueringen-af-de-smaa-motoriserede-koeretoejer-er-nu-offentliggjort/
[4] https://bmjopen.bmj.com/content/9/12/e033988
[5] https://www.tandfonline.com/doi/full/10.1080/15389588.2016.1246723

- Limits on use of phones while riding
- Maximum blood alcohol concentrations
- Require e-scooter operators to provide liability insurance
- Regulate distances per vehicle
- Calculate rental rates by distance rather than time

3.4.2 Infrastructure

There is potential to ensure the safety of users through the establishment of safe infrastructure. Following the COVID-19 public health crisis, the necessity and popularity of reallocating space away from passenger cars has grown[6]. Many of the measures associated with the protection of vulnerable road users can also apply, such as passenger car speed restrictions, traffic calming measures, separated bicycle lanes or similar.

The physical characteristics of e-scooters have higher demands on road surface quality than other forms of mobility. Smaller wheel diameters and lower stability relative to bicycles results in higher sensitivity of the vehicle to the smoothness of surfaces and quality of roads (i.e. absence of potholes or other obstructions).

The use of e-scooters on pavements was banned or limited to a strict speed limit in most of the cities surveyed. A failure to ensure high quality infrastructure often results in higher occurrences of riders on pavements, which challenges the safety of pedestrians. As modal share for walking is linked to real or perceived safety risks, this can be damaged by dangerous e-scooter driving on pavements.

a) Geofencing

Geofencing is a location-based service in which an action can be triggered when a device enters or exits a virtual boundary, known as a geofence. Most e-scooter geofencing technologies use GPS, which has an accuracy of approximately 2-3+ meters, dependant on nearby infrastructure and other technical factors.

Geofences can be used to outline borders for operational zones, but the technology can offer safety benefits by regulating access to certain streets or areas, reducing speed, or limiting parking to controlled areas. For instance, in Stockholm, Voi have agreed to implement a geofenced speed limit of 6 km/h on pedestrianised streets[7] although this is not permitted by national regulation in some member states. Several cities highlighted the limited accuracy of geofencing, which creates barriers in geofencing pavements and some pedestrian areas.

[6] https://www.transportenvironment.org/sites/te/files/publications/Briefing%20-%20polling%20Covid-19%20%26%20mobility.pdf

[7] http://meltwater.pressify.io/publication/5cf5276c43a56200043a9691/5cc2e92ebc666f1000014954

b) Parking

The management of e-scooter parking emerged as a particularly challenging issue. Those that are visually impaired or have mobility disabilities appear to be the most affected by the presence of e-scooters parked inappropriately[8].

Regulations can be used to restrict parking on in sensitive areas, such as pavements, historic monuments, parks, market squares and bicycle lanes. The establishment of parking zones are another emerging option to tackle the public nuisance of poor parking.

The use of locks (i.e. 'lock-to technology') are being explored by some operators, with the expectation that they encourage e-scooters to be locked to infrastructure and ensure a clearer path for pedestrians. This may limit the likelihood of e-scooters left in the middle of sidewalks and obstructs paths for pedestrians, including wheelchair users and the visually impaired.

- **Options:**
  - Identify and designate unauthorised parking zones that might conflict with public space needs
  - Encourage operators to guide users to safe parking zones
  - Implement fines for operators for unauthorised parking
  - Limit the numbers of e-scooters parked in any one area
  - Require operators to take preventive measures to identify and remove vehicles in unauthorised areas within specific timeframes
  - Establish means for reporting of improperly parked vehicles
  - Assess feasibility of requiring lock-to technology

3.4.3 Vehicles and speed

The design of e-scooters has a significant impact on safety performance, such as acoustic warnings, brakes, visibility, wheel diameter, tyre tread and weight.

Vehicles with limited wheel sizes are more likely to encounter difficulties with uneven road surfaces. E-scooters have wheel diameters of approximately 8-10 inches, which can create challenges in the navigation of obstacles, such as potholes or cobblestones. Increases in wheel diameters have been evident in manufacturer updates but remain small relative to other modes of transport.

The ability for users to signal has also been identified as a challenge, largely due to limited vehicle stability[9]. Most first-time users and a significant portion of regular users always keep both hands on the handlebar of an e-scooter, which adds weight for the need to add indicators to vehicles.

[8] https://smartride.pl/wp-content/uploads/2020/03/E-Scooter_Pilot_Evaluation_2.17.20.pdf
[9] https://www.itf-oecd.org/sites/default/files/docs/safe-micromobility_1.pdf

Analysis of e-scooter data shows that a significant proportion of accidents occur in night-time crashes. Options to address this could include specifications on the minimum amount of light that can be reflected from the e-scooter and increase the use of reflective paint.

Speed is a key determinant of death and serious injury on the road. In many cases, national legislation has established speed limits for e-scooters. Denmark, Germany, and Sweden have imposed a nationwide speed limit of 20 km/h, while France, Portugal and Spain have speed limits of 25 km/h. In areas of additional risk of collisions with pedestrians, establishment of additional limits by geofencing can be an option.

- **Options:**
  - Favour or encourage operators to ensure vehicles have larger wheels, reflectors, lighting, and ability to signal
  - Ensure safe speed limits by geofencing, potentially differentiated by street type

3.5 Data

Access to data provides opportunities for cities to manage e-scooter services, measure their impact on communities and react where necessary. Data can provide insight into specific policy challenges, such as: equitable distribution across neighbourhoods, enforcement of boundaries, total fleet sizes and adequacy of supply, temporal and spatial characteristics of use to guide infrastructure investments, information on road surface quality and whether safety concerns are tackled promptly. Analysis of data necessarily requires adequate tools, training, and infrastructure.

Examples of data types that could be requested can include: number of vehicles, total number of trips, total distance travelled, number of trips per vehicle per day, number of kilometres travelled per vehicle per day, average trip time, average distance per trip, temporal and spatial distributions for mapping demand, start and finish coordinates.

To ensure data provided to city authorities is useful, data should be provided in adequate quality and frequency. To protect privacy of users, location data and relevant information should be provided by GPS and sensory equipment from the e-scooter rather than the user.

- **Options:**
  - Require or encourage data sharing from operators with data types linked to well-defined public policy objectives
  - Ensure operators provide data in adequate quality and frequency to meet needs

3.5.1 Data privacy

Analysis of operator privacy policies reveals risk of data captured from users[10]. To secure privacy for users, robust data privacy policies should be in place to mitigate risks. Operators have access to

[10] https://arxiv.org/pdf/2001.01387.pdf

sensitive information, such as start and end destination of users, history of locations and personal contact and residence information. Unregulated and non-anonymised data can be used to create a user profile that can later compromise user safety, and is often shared with third parties, which can exacerbate privacy risks.

- **Options:**
  - Require operators to demonstrate robust data privacy policies, which do not require users to share personal with commercial third parties
  - Require operators to detail specific data types collected and explanations on the purpose of collecting each data type

4. Conclusion

E-scooter fleets is a new topic for cities, and we are still in an early phase of market deployment, which will likely develop in the coming years.

The feedback received from participating cities indicates that while many challenges are the same, regulatory approaches can differ considerably. Many cities noted that further optimisation is required, and such approaches are likely to evolve over time in response to observed impact and lessons learned from other authorities.

Cities were swift in addressing the sudden challenge of scooter deployment, which has created learning opportunities for others in designing and establishing regulations. Some city authorities have launched and maintained a constructive dialogue with scooter providers, which is a good precondition for the future evolution of local regulation. A comparison between cities with local ordinances in place and those without indicates it is more difficult to have an effective solution-oriented dialogue with the service providers in the latter case.

As we turn towards the future, these results will form the basis of further discussion among Eurocities city authorities and towards the EU institutions.