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Cleaner and better transport in cities
PROSPERITY

Innovation brief

The rapid up-take of micromobility in cities

Following the success of bike-sharing, which emerged due to technological progress and business innovations, new forms of shared mobility using small and often electric vehicles (e.g., e-bikes (electric bikes) and e-scooters (electric scooters) etc.) have started to appear in cities.

They are operated by private companies in a sharing model – collectively referred to as 'micromobility' – and offer new possibilities for cities as travel preferences change. While they offer many opportunities, micromobility also poses regulation and infrastructure challenges. The aim of this PROSPERITY Innovation Brief is to provide a short insight into these issues within the context of Sustainable Urban Mobility Planning (SUMP).

Problem description

Bike-sharing schemes, based on docking stations, have spread across the globe and have become part of the sustainable mobility offer in many cities since the turn of the millennium. With the rapid development of technology in this area, new service providers have emerged providing free-floating services and new business models. (See the PROSPERITY Innovation Brief on Regulating Dockless Bike-Sharing Schemes for details.)

The concept has expanded to include other 'small vehicles' modes (in addition to bikes and e-bikes, scooters, e-scooters etc.) that are designed specifically for shared use (NACTO Policy, 2018). The term micromobility covers the transportation services by these modes. They target individual users, they offer both flexibility of access and route choice and they are generally operated in a shared usage (NLC, 2019) capacity.

The new market is expanding rapidly, for example, start-ups have raised 5.7 billion USD between 2015 and January 2019 of which 85% in China. The customer base is growing more rapidly than car sharing or ride hailing (Heineke et al., 2019) and it has been described as 'the fastest technological adoption in history' (Bliss 2019). In the US, e-scooters have taken over from docking station-based bike share systems in less than 18 months and the number of micromobility trips have more than doubled in 2018 (NACTO, 2019, Intelligent Transport, 2019a).

The micromobility offer is intuitive and simple-to-use, it offers sustainable mobility options for short trips and it can provide a last mile connection solution to public transport. While it offers a range of benefits, the spread of micromobility also has some negative externalities and controversies associated with it. They include, safety concerns, increased pressure on existing bicycle and pedestrian infrastructure and parking conflicts. Therefore, it is important for cities to prepare for micromobility and to provide guidance and market regulation.

How micromobility works

Technological and business innovations have facilitated a new wave of micromobility providers entering the market and they have expanded their operations over a relatively short period.

These new services do not depend on docking stations. Instead, they are based on flexible parking and reallocation of vehicles on public spaces. The vehicles are equipped with low-consumption GPS units and smart locks that allows them to be operated without docking stations. Access is typically offered

via the users' own smartphones (most commonly by apps), which allows the vehicle to be located (i.e., on a live map on the phone) and identified by a registration number, QR code or sound signal for example. Once accessed it is

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unlocking and at the end of the trip it is locked again. The electric drive or assistance increase their distance range that is attractive to new user groups.

Different conceptual and technical solutions exist between station-based and completely free-floating systems. For example, 'virtual docking stations' can be designated so that vehicles have to be locked to bicycle racks or simply at locations designated by road markings. Geofencing1 is usually used to delimitate the service area, and in some cases also the area of virtual docking stations.

Due to the fact that free-floating services do not necessarily require any new fixed infrastructure (docking stations), operators often launch their service without any prior consultation or contact with city authorities (NACTO Policy, 2018). This has forced many city authorities into a reactive position (NLC, 2019).

Who benefits?

Micromobility can offer a range of benefits for users and cities, such as:

- offering intuitive, simple-to-use sustainable mobility options for short trips (often quicker than walking or other transport options);
- provide a last mile solution for public transport connection and it can expand the catchment areas of public transport stops (or even be part of the public transport offer);

Image 1: Bike sharing docking station and parked e-scooter in Brussels (photo: Antal Gertheis, Mobilissimus)

Geofencing is setting virtual boundaries to a real-world geographic area. E.g. if a user crosses this boundary, this can trigger an alert to the user and/or to the operator; or change the permissions (e.g. parking is allowed or not).

- a tech-based and fancy solution, it is attractive to target groups who would otherwise not willing to leave their cars;
- ultimately contributing to a more competitive sustainable mobility offer, and thus reduces car use; and
- providing mobility data to transport planners to support the planning of infrastructure.

They can also be a profitable investment for the operators, with much quicker break-even on investment than investment-heavy car sharing initiatives (Heineke et al., 2019).

Disadvantages, dangers

The spread of micromobility services has led to some negative externalities and controversies, including:

- safety concerns (Bliss, 2019), these currently concern perceived safety concerns rather than evidence-based problems. The concerns are sometimes the result of car-centric infrastructure design (NLC, 2019);
- growing pressure on existing bicycle and pedestrian infrastructure, especially in dense inner-city areas;
- overcrowded public space due to with parking small vehicles, especially in pedestrian zones and at transport nodes; and
- the low market entry barrier often results in a volatile, unstable market (Heineke et al., 2019).

Stakeholder analysis – who are drivers, who are opponents

The expansion of micromobility services is supported by a customer base in cities who are already aware of and using shared mobility solutions (Heineke et al., 2019). This creates an attractive business case for private mobility providers, who are also interested in expanding their market.

However, opposition may be expected from those who experience the drawbacks of these new services, for example: conflicts may arise with pedestrians (and eventually cyclists) due to the use of existing infrastructure and car drivers when increased demand for micromobility leads to the reallocation of road space (NLC, 2019).

Legal framework

The legal framework varies from country to country depending on the level of regulatory autonomy city administrations have over such issues. In many cases, the legal framework has not caught up with the rate of change, and therefore some of the new ‘small vehicles’ fall into regulatory ‘grey zones’ (NACTO Policy, 2018, NLC, 2019). Affected areas include national or local regulations on:

Image 2: Dockless e-bike in Berlin / Different shared e-scooters at a tram stop in Vienna (photo: András Ekés, Mobilissimus)

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- traffic rules; traffic safety regulations;
- use of public space or pedestrian areas;
- on-street parking;
- liability insurance (in the case of such services);
- consumer rights protection;
- data protection (including GDPR);
- integration with traditional public transport services and other public/private shared mobility services;
- financial incentives for public/shared mobility; and
- etc.

Policy options for cities

The current knowledge and experience suggest that it may be necessary to develop regulations and guidelines for cities to integrate micromobility into their local sustainable mobility offer so that their potential can be maximised while minimising any negative externalities.

There have been different policy approaches towards micromobility in cities. These policy options vary to some extent from country to country depending on the regulatory and legislative framework and the degree to which a city administration has regulatory autonomy over such issues. The approaches taken range from a 'hands-off approach' to the complete ban of such services, as follows:

1. Hands-off approach.
2. Providing regulative ground rules.
3. Requiring operational permits.
4. Contracts for Concessions.
5. Pilots/demonstrations.
6. Banning / not allowing operation.

For more detailed description about these regulatory approaches, as well as for a comprehensive list of requirements usually set towards service providers, please consult the PROSPERITY Innovation Brief on Regulating Dockless Bike-Sharing Schemes. The National Association of City Transportation Officials and the National League of Cities have also published detailed recommendations for US cities (NACTO Policy 2018, NLC 2019).

As well as the regulatory side of micromobility, cities can support the development of the shared micromobility market to reduce the negative impacts of excess car use. Possible measures include limiting car use and road traffic speeds in certain areas; increasing costs for car-based mobility; and creating intermodal hubs to foster interchange between public transport and micromobility (Heineke et al., 2019, Intelligent Transport, 2019b). Micromobility can be used as an effective tool to improve public transport offer and image.

In terms of infrastructure, the flourishing variety of small vehicles strengthens the idea of replacing the traditional road/sidewalk dichotomy with a tripartite infrastructure based on typical speeds: 30-40 km/h (cars, public transport); 10-30 km/h (bicycles, e-scooters, skateboards etc.) and 0-10 km/h (pedestrians) (Vitézy 2018). The maintenance of good street conditions is also important. Privately owned small vehicles can also be combined with public transport by taking them on board; the possibility to do so is an important question.

Good/bad practice (short examples)

Germany, Elektrokleinstfahrzeuge-Verordnung

In Germany, the federal regulations were updated in May 2019 to encompass and permit the use of electric kick-scooters. This was necessary because the EU-regulation 168/2013 'on the approval and market surveillance of two- or three-wheel vehicles and quadricycles' does not apply to self-balancing vehicles and vehicles with no seats, and therefore had to be regulated at the national level.

Originally two categories were included, e-scooters able to travel below 12 km/h or over 12 km/h, but this was subsequently simplified. According to the rules adopted, all of these vehicles have to travel in general on cycleways and are not permitted on sidewalks. The only e-scooters permitted are those with a maximum speed of 20 km/h and a maximum power of 500W. In addition, they must be fitted with breaks, be steerable, equipped with lighting and the person operating the vehicle must be at least 14 years of age. Helmets are not compulsory, driving license is not required, but (unlike bicycles) e-scooters are subject to compulsory insurance.

The new regulations set the scene for new micromobility providers, until now they had to wait to start their services in German cities (BMVI, 2019, Bundesregierung, 2019, FAZ.NET, 2019).

France, Paris

The French capital Paris was flooded with over 15,000 scooters owned by several companies (such as Lime, Bird and Uber) within a year of their introduction, and their number is estimated to reach 40,000 by the end of 2019. This shows the rapid pace of the development, which was unregulated.

The national government now plans to introduce new regulations from September 2019, banning the use of e-scooters, monowheels, personal transporters and hover boards on sidewalks with a fine of 135 EUR. These vehicles will be restricted to drive on the road or cycle ways (France24, 2019).

In parallel to the use of infrastructure regulation, the municipality of Paris has decided to regulate shared small vehicle parking by introducing an annual fee paid by the operators (20 EUR for a bicycle, 50 EUR for an e-scooter, 60 EUR for an electric moped and up to 120 EUR for a conventional moped). The authorities plan to finance the creation of 2,500 parking spaces provided every 150 m. Vehicles will be required to park in these dedicated spaces. Free-floating mobility providers have welcomed the move, as it signals their acceptance by the authorities, and a more stable regulatory environment (Bouland, 2019).

Image 3. Source: PROSPERITY / Harry Schiffer

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Time frame

Micromobility services are currently available in many cities worldwide. If the local regulations are favourable and the business case is attractive, private operators can set up their service in a matter of months. However, the adaptation of the regulations and especially the infrastructure by cities may require a longer timeframe.

Costs

In most cases, micromobility is seen as a sector that should not induce direct costs for the public sector. Vehicles, the IT system behind them and their operational costs are covered by the operators on a market basis.

However, costs are likely to arise with the adaptation of the infrastructure, including parking racks and/or designated parking hubs in more densely populated areas. These can be borne fully by the city or partly transferred to the operators, depending on the policy priorities.

Open questions

Marketed as a 'disruptive' mobility solution, many open questions remain unanswered about micromobility. Some questions include: how the market will find a sustainable business model; how regulators will integrate their business models into the transport system; and how insurance cover will adapt to the rise of shared micromobility (Bliss, 2019).

Possible future developments

As micromobility becomes increasingly common in cities, with several competing operators, the demand for integration is increasing. Mobility as a Service (MaaS; see the PROSPERITY Innovation Brief on Mobility as a Service) is therefore initiated not only by the public, but also by the private stakeholders (Vitézy, 2018). This is supported by the market consolidation and led by large transportation companies such as Uber (having acquired JUMP recently) or Lyft (having purchased Motivate) (NLC, 2019).

How and where does 'micromobility' fit into a SUMP

As discussed above, micromobility can play a useful part of the sustainable mobility offer and has many possible benefits, but it can also lead to some negative externalities. Ultimately, it is up to cities to consider how this tool fits to their goals and how it may contribute to the benefit of the public (NACTO Policy, 2018).

Sustainable Urban Mobility Planning (SUMP) is a strategic process that defines the vision of the city and clearly set its goals with the involvement of all relevant stakeholders. The SUMP process and methodology provides a suitable platform and opportunity to consider the place of micromobility in the system of tools that contribute to the ultimate goals of the city, thus enabling the creation of the right framework for such systems.

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