KPMG

Unleashing the dockless micro mobility revolution

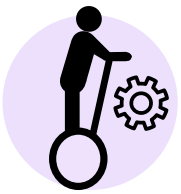
Dockless shared micro mobility promises radical improvements in accessibility, congestion, and air pollution in urban environments, by offering a cleaner and more efficient alternative to the car. However, in order to flourish in cities, micro mobility will need to overcome a range of objections around safety, and will need support from innovative infrastructure, regulation and policy. This paper examines the levers stakeholders have to promote dockless shared micro mobility so as to realise its benefits in the safest and quickest way possible.

Types of micro mobility

Micro mobility
Light-weight transportation designed for individual use.

Shared micro mobility
Refers to a micro mobility vehicle that is being used as a shared resource between multiple users.

Dockless shared micro mobility
The micro mobility vehicle is picked up and returned to any location within a defined area.



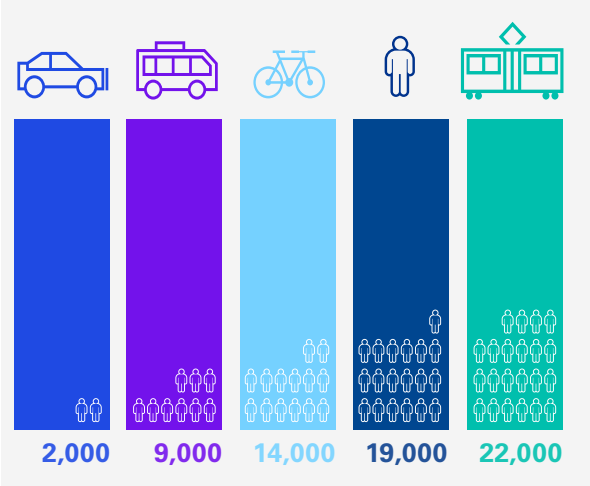
Powered dockless micro mobility
As with dockless, when the vehicles are electric (e.g. e-bikes, e-scooters).

Powered personal transporters (PPT)
A new definition in the Irish law for means of personal transport including e-scooters, Segways, electric skateboards ('hoverboards'), electric unicycles and electric bicycles. (The legal definition for powered micro-mobility).

A change worth making?
The benefits of dockless shared micro mobility

Number of people that can cross a 3.5m-wide space in an urban environment during a 1-hour period

Private cars are far less efficient than the other modes of transport, without taking into account the space they take up for parking.



Source: Botma & Papendrecht, Traffic Operation of bicycle traffic, TU-Delft, 1991

We believe that dockless shared micro mobility can yield a range of positives in most urban environments:

- **Accessibility:** micro mobility can reduce dependency on public transport and time lost to road vehicle congestion, broadening the areas of cities that are accessible to individuals.
- **Commerce:** city businesses benefit from the fact that micro mobility users may stop far more easily at a far greater range of retail and leisure premises, reducing barriers to physical shopping on beleaguered high streets.
- **Pollution:** the transport sector was responsible for 20.3% of Ireland's greenhouse gas (GHG) emissions in 2019, making it the second largest contributing sector. Of these sector emissions, private cars are the largest source, accounting for over 50%.[1] Research has shown that shared electric scooters emit roughly half the amount of carbon per mile travelled of a private car, suggesting that they can significantly lower both emissions and air pollution.[2]
- **Congestion:** micro-mobility solutions can reduce private car usage and take pressure off stressed urban traffic systems and parking real estate.
- **Infrastructure:** one road of average width is sufficient to enable the passage of 2,000 passengers in cars per hour, or 14,000 individual micro-mobility vehicles, implying that they harbour significant potential to increase passenger traffic volume without increasing congestion. Studies from Australia and the US have shown minimal impact on private car travel time from converting road lanes to cycle lanes.[3]
- **Tourism:** micro mobility represents an attractive and convenient option for tourists to move around a city above ground and thereby retain easy access to its attractions, sites and businesses.
- **Economy:** government research assesses the annual cost of congestion to the Irish economy to be over €358 million, forecast to rise to over €2 billion per year in 2033.[4] A transition to dockless shared micro mobility, together with other car alternatives such as public transport and walking, can reduce these costs and reduce constraints on productivity and growth, as well as generate financial savings for city residents when compared to car ownership.

1 https://igees.gov.ie/wp-content/uploads/2021/03/Transport-Trends-2020.pdf
2 https://iopscience.iop.org/article/10.1088/1748-9326/ab2da8#artAbst
3 https://www.pps.org/article/prospect-park-west-overcoming-controversy-to-create-safety-and-mobility-benefits-in-brooklyn https://www.mdpi.com/1660-4601/19/7/3818/html
4 https://assets.gov.ie/19169/7c2814f5572d4ec7874a034fb0e72bea.pdf

Bumps in the road:
the obstacles to dockless shared micro mobility

Whilst the benefits of dockless shared micro mobility are numerous, widespread adoption will not be achieved unless the following difficulties are addressed:

- **Infrastructure:** micro mobility is being hampered by the current lack of suitable lanes and parking spaces, which would lower the risk of collision with both pedestrians and motorised vehicles. According to research conducted in New York City, paving designated cycle lanes and adding traffic islands in 8th and 9th avenues in Manhattan reduced injuries by 38-58%.[5]
- **Safety:** a number of objections to dockless shared micro mobility are made on safety grounds, including careless or dangerous driving, driving under the influence of an intoxicant, and driving an unroadworthy vehicle. These risks can all be mitigated by a suitable framework of rules for micro mobility, including maximum speeds, age requirements and others, to be enforced by local authorities.
- **User inexperience:** many e-scooter riders currently lack experience of using them, elevating their risk of accident. US research has found that 33% of injured riders were injured during their first scooter ride, making first-time users a particular priority for assistance.[6]

Current situation in Ireland

Currently in Ireland, powered personal transporters (PPT) are classed as mechanically-propelled vehicles, the use of which requires a valid licence, tax and appropriate insurance. But as PPTs are not currently taxable or insurable, they are effectively unusable on public roads. However, their use is permitted on private land with the permission of the landowner.

After consultation, a government report from June 2019 made the following recommendations for updating the relevant governing framework:[7]

01. Agree clear terms for vehicle classification, able to accommodate different powered transporter types in order to future-proof against further technology innovation.
02. Promote the use of helmets and other protective equipment.
03. Consider issuing advisory guidelines for both individual users and users of sharing schemes.
04. Promote the need for safe use of powered transporters amongst the public and, if possible, encourage opportunities for training or familiarisation prior to use in public.
05. Consider methods of implementing minimum safety standards for PPTs themselves. One option would be to use the draft European Standard as the basis for a voluntary certification scheme.
06. Carry out further research into the safety features that should be mandatory, how PPT riders are likely to interact with other road users, and what operational guidelines should be produced to minimise risk.

Recognising the need for a framework, the Government has introduced a new category of Powered Personal Transporters, dispensing with the need for a driving license, tax, or insurance for e-scooters, and introducing a range of new measures including age, weight, power and speed restrictions, as well as compulsory helmets for those aged between 16 and 18, and a ban on the use of footpaths - currently widely used by e-scooter riders.

5 NYC DOT. "Measuring the Street: New Metrics for 21st Century Streets" 2012.
6 https://www.pedbikeinfo.org/cms/downloads/InfoBrief_PBIC_Networks.pdf

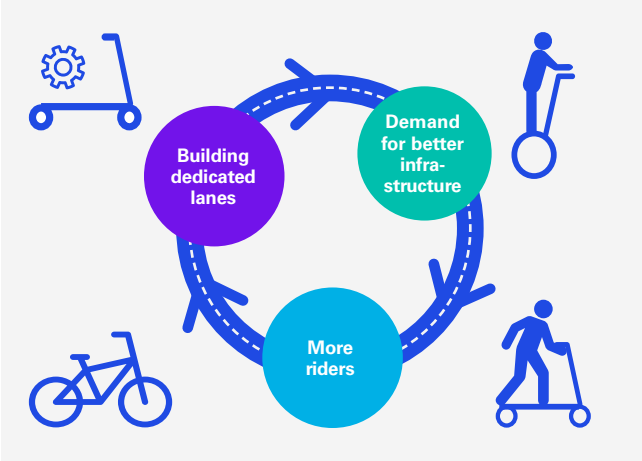
Global leaders: micro mobility around the world

	Paris	London	New York
Regulation	'15 minutes' scheme aims to decentralise services. Diesel vehicles to be banned from 2024, and fossil-fuel vehicles from 2030.	Strategic goal of becoming the world's best big city for cycling. Still illegal to use privately-owned e-scooters or other powered transporters on public roads. Pilot schemes are underway. However, e-scooters are regularly used on footpaths and roads, illegally.	Strategic direction set by 'Green Wave' and 'Vision Zero'. Enacted reforms in urban planning and draft rules regarding cargo (freight bicycle) use.
Infrastructure	One million bike journeys daily. Shared bike scheme active since 2007. 50% of parking spots will be transformed into bike lanes. More than 60,000 parking spaces for micro-mobility vehicles. More than 1,000 km of bike paths and routes. Additional 180 kilometres of permanent segregated bike lanes by 2026.	More than 450km of new Cycleway routes will be built during 2018-2024. Cycle hire scheme has over 12,000 bikes and 785 docking stations. More than 100km of cycle routes have been delivered since the start of the pandemic, generating citizen objection in some areas.[8]	1,243 miles of cycle lanes, including 83 miles of protected lanes. Bike boulevards to prioritise cyclists and limit vehicles on appropriate streets. Green skip bars across key intersections and green bike boxes where cyclists have a safe place to wait.
Private investment	Over 15 e-scooter companies and over 20,000 micro-mobility vehicles, including mechanical bikes, e-bikes and e-scooters. However, dockless unpowered bikes that were very popular during 2017-2019 became less popular. Close to 250,000 residents use dockless e-scooters, out of 2.1 million residents, according to a 2019 survey by Lime and Odoxa.	Community groups can apply for up to £10,000 in funding for local projects that support walking and cycling. Currently 3 shared micro-mobility companies operating: Dott, Lime and Tier. More than 3,400 e-scooters across ten city boroughs.	1,243 miles of bicycle lanes, including 83 miles of protected lanes. Lyft's Citi Bike network includes more than 1,000 dock stations throughout the city.
Innovation	Pilot scheme installing 150 dock, lock and charge stations for electric micro-mobility vehicles.	Free cycle skills programme for riders.	Bird, Lime, and Veo pilot in eastern Bronx recorded more than 480,000 trips in a year, without any deaths or serious injuries.

7 https://assets.gov.ie/26565/104b462a29fe421284339210e86ebc73.pdf3
8 https://www.london.gov.uk/press-releases/mayoral/mayor-and-tfl-announce-work-on-four-new-routes

The role of the local authority

Whilst private providers offer essential capacity and capability, local authorities will also play an indispensable role in paving the way for dockless shared micro mobility adoption, through the provision of infrastructure and supporting regulation. Whatever the approach, the strategic imperative should be the connected network. A connected network provides a safe and comfortable transportation experience, enabling people of all ages and abilities to get where they want to go. Thus, the local authority shouldn't be tempted to take the low-hanging fruit of micro mobility infrastructure – streets with excess auto capacity or unused parking – but rather to be focused on the most important roads for connectivity, even if they require difficult tradeoffs. These changes may be more politically difficult, but if chosen well they promise bigger payoffs in ridership and safety.[9]



Other areas of focus for local authorities include:

Lanes: designated lane infrastructure is essential for dockless shared micro mobility to succeed as a viable transportation option. To see rapid adoption, cities need a road user hierarchy that prioritizes pedestrians and then cyclists over all other traffic, including bike lane networks that encourage and protect riders. The local authority should promote its micro-mobility infrastructure in at least one of the following ways:

A Turning a car lane into a designated lane for micro mobility. In roads with at least two lanes, one could be designated for micro mobility vehicles.

B Building new designated lanes and expanding the roads to fit additional lanes for micro mobility - cycle infrastructure should take the place of carriageway space and parking wherever possible.

C Cancelling parking spaces and building a designated lane for micro mobility instead.

The local authority could build permanent lanes or implement temporary so-called 'tactical' lanes (essentially pop-up bike lanes) as part of an action-based approach using short-term, low-cost, and scalable interventions to promote rideshare. The tactical approach is recommended to begin with, not only because it is faster and cheaper, but also because changes can be made after a period of time, based on real data and experience. In addition, tactic lanes can be transformed more easily into permanent lanes.

Parking: cities must decide where it is appropriate for companies and customers to leave their vehicles. It is recommended to establish dynamic 'corrals' (designated micro mobility parking zones) whose size and location can be changed easily according to local authority needs. The right policy will encourage leaving the pavements available for pedestrians only. In addition, it is recommended to install micro mobility racks in the entrance to central places and throughout the city in order to prevent riders locking their own vehicles to poles and other pavement fixtures.

Enforcement: enforcement can be done through manual/technological tools such as street cameras and automatic analysis in case of accidents or rule infringements. It is important that enforcement ensures public order and the safety of riders and pedestrians. It is recommended to provide periodic tutorials to the local authority inspectors to instruct them as to the current emphasis.

Traffic calming: traffic calming measures, such as modal filters, road narrowings, or chicanes, provide micro mobility users with a greater sense of security and improved safety, as has been demonstrated extensively in London in recent years. These are especially important on roads where there is not enough space to have a bike lane. Where micro-mobility and motor vehicles share the same road, the lower the speed is, the safer it is for all users.

Education and outreach: lack of experience in riding a powered micro mobility vehicle, young riders, not obeying the traffic rules and riding without a helmet are all significant risk factors for road accidents. Local authorities can work in partnerships with dockless shared micro mobility companies through:

01. Training as part of the school curriculum for 16-18 year olds, focused on safe rides, knowing the rules, helmet use, and practical individual experience.

02. Safe riding events that will be open for the public and will exclude motorised vehicular traffic.

9 See footnote 6

Unleashing dockless micro mobility – a public/private partnership

We believe a micro mobility revolution can be a major win for cities, but successful mainstreaming will require careful management if it is not to be derailed by safety incidents. Local authorities have an important responsibility here to plan for and mitigate foreseeable risks, and are likely to benefit from contracting with shared micro-mobility companies, which have the experience and technology to promote safe riding.

As Ireland formally embraces PPT and the use of powered personal transporters is allowed on public roads, people will begin riding their own e-bikes and e-scooters. However, dockless shared micro-mobility vehicles are much safer than vehicles in self ownership, for the following reasons:

- **A** Shared vehicles' speed limits can be enforced by the provider.
- **B** Shared vehicles' rides are monitored, allowing easy enforcement of safety protocols.
- **C** Shared vehicles allow providers to enforce age limitations and other restrictions.
- **D** Shared services offer the opportunity to promote safety to users by various means. It is possible to require the companies to provide helmets to the riders and to do guiding events for safe rides.

In most cases, municipalities should consider contracting with dockless shared micro-mobility companies to provide the service. The municipality lets the companies use the public space, but also sets the requirements from the companies.

In looking to contract with dockless shared micro mobility providers, local authorities should be mindful of the following best practises:

01. **Number of companies:** manage the number of companies operating in the city to ensure competition and maintain capacity.
02. **Duration of license:** limit the duration of licenses and permits to a fixed time period (12-24 months in the initial phase).
03. **Fleet size:** determine the minimum and maximum number of vehicles.
04. **Operating:** require operators to ensure the entire fleet is properly maintained, and to remove inoperable, damaged, or unsafe vehicles from the public right of way - reserving the right to remove such vehicles at the operator's expense.
05. **Special events:** elaborate parking plans for special events (e.g. marathons, events, parades) and routine street maintenance (e.g. snow and rubbish removal).
06. **Operating:** rebalance vehicles within the permitted service area, to ensure access to vehicles and limit overcrowding on pavements.
07. **Restricted areas:** identify and define areas where shared micro mobility services should be non-electric only, or otherwise restricted in operation. Operators must employ speed reductions in high-pedestrian, high-utilization and prohibited spaces upon request from the city.
08. **Customer service:** establish a customer service centre to troubleshoot technical issues, respond to complaints and requests, and provide information about the service.
09. **Pricing**: a common model of a price per minute encourages a fast and unsafe ride. Request the operators to implement a different pricing model (e.g. price per distance travelled with longer multi-hour price increases).
10. **Age verification:** make operators responsible for age verification to ensure no riders under the permitted age use their vehicles.
11. **Vandalism prevention:** Providers and/or councils should install active deterrence measures such as CCTV at hire points, GPS tracking of bikes, etc.

Conclusion

Dockless shared micro mobility represents a major opportunity for today's cities to tackle some of their biggest problems: congestion and pollution. For micro mobility to become mainstream, however, will require careful cooperation between public and private players. To conclude, we highlight the main implications by player type.

City and town councils

- **Contracting:** seek to contract with micro mobility partners who can bring their experience and domain expertise to bear, rather than allowing a 'free for all' of micro mobility.
- **Communicate:** emphasise benefits to citizens in terms of reduced congestion and air pollution as well as costs versus car ownership.
- **Infrastructure:** urgently evaluate infrastructure plans for suitability for dockless shared micro mobility adoption and ensure provision of lanes and parking; consider dynamic 'tactic' lanes and 'corrals' in early phase of rollout. Prioritise road alterations in alignment with a strategic vision for connectivity, rather than political expediency.
- **Traffic management:** consider bike boulevards, dedicated lanes, pedestrian islands and other examples of traffic management best practices.
- **Number of companies and fleet size:** limit the number of companies operating in the city, in order to balance competition and appropriate capacity. Also set min and max numbers of vehicles per company.
- **Duration of license:** limit the duration of licenses and permits to a fixed time period – it's recommended to limit the period for 12-24 months in the initial phase.
- **Operating:** require operators to remove inoperable, damaged, or unsafe vehicles from the public right of way, and reserve the right to move or permanently dispose of vehicles at the operator's expense.
- **Linkage to city's goals:** consider how dockless shared micro mobility can help achieve city-identified goals, such as first/last-mile connectivity and equitable access to vehicles in designated areas.

Central government

- **Use benchmarks:** learn from best practise as demonstrated by global micro mobility leaders such as New York and London.
- **Sustainability:** make the environmental case for dockless shared micro mobility in terms of both reduced emissions and air pollution, with its attendant health benefits.
- **Safety:** consider introduction of minimum safety standards at the national level, on speed, age, and helmets.
- **Regulation:** ensure sufficient regulation is in place to mitigate safety concerns and that vehicle-related regulation is fit for purpose regarding new micro mobility technology.
- **Combined tickets:** consider offering combined tickets for public transport and shared micro mobility to solve the first/last mile problem.
- **Interoperability:** consider integrating shared micro mobility in TFI journey planner app for the convenience of users.

Private mobility providers

- **Technology:** employ technology to embed local regulations (on speed, designated areas, helmets) wherever possible.
- **Fleet size:** employ vehicle rebalancing to ensure access to vehicles and limit overcrowding on pavements.
- **Customer service:** establish a customer service centre to respond to customer concerns. Providers should troubleshoot technical and operational issues, responding to complaints and requests, outreach, and providing information about the service and price.
- **Pricing models:** consider alternative pricing models that do not directly incentivise fast and unsafe riding.
- **Payment functionality:** explore potential for layering digital wallet and payment functionality onto the micro mobility operating system.

Employers

- **Storage facilities:** consider implementing / investing in parking or storage facilities for micro mobility users, to facilitate commuting to the premises.
- **Incentives:** consider incentives to encourage employees to commute with micro mobility.
- **Collaborations with dockless shared micro mobility companies:** increase awareness of shared micro mobility benefits and the importance of safety by collaborating with shared micro mobility companies for education outreach (e.g. safety riding sessions, sustainable commuting campaigns, etc.).

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