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Department for Transport: Future of Transport regulatory review - micromobility

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Summary of submission

This submission is based on preliminary thinking in relation to a forthcoming research project in this area (EPSRC grant EP/S030700/1: 'Innovative Light ELEctric Vehicles for Active and Digital TravEl (ELEVATE): reducing mobility-related energy demand and carbon emissions'). This project is due to start later in the year, and will include both literature review work and primary research which are relevant to the questions asked in this review.

In relation to the questions asked, initial thoughts relate to questions:

2.2 Benefits of micromobility use.

2.4-2.6 Where micromobility vehicles should be permitted, and how this should relate to vehicle definitions and standards

2.7 Other micromobility vehicle design issues

2.8 User requirements

This response is not intended to be comprehensive or definitive, but hopefully to provide some useful references and thinking.

UK Research and Innovation
EPSRC Engineering and Physical Sciences Research Council
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Q2.2a Benefits of micromobility vehicle use

There is a growing body of evidence about the benefits of e-bikes, and e-cargo bikes. Whilst the evidence for newer forms of micromobility is more limited, it is plausible that many of these benefits could also apply, and thereby enable them to contribute to achieving a number of wider social goals. Potential benefits include:

- **Reductions in congestion and vehicle-related pollution**, not least given the small size and relatively low energy requirements of the vehicles. Notably, recent CREDS work on e-bikes has shown that they could cut carbon emissions from cars by up to 50%[1]. Work for the Bicycle Association has shown that e-cargo bikes could potentially reduce traffic mileage by 1.5-7.5% in urban areas[2] if substituting for vans and other delivery vehicles where suitable.

- **Increases in physical activity.** There have been various studies on e-bikes[3]. For other forms of micromobility, the contribution to physical activity may be lower than conventional walking or cycling, but they may still increase the attraction of spending time outside for particular groups or for trips not currently undertaken by active modes. For example, hoverboards or unicycles may provide an attractive alternative to screen time for teenagers.

- **Affordability**. Many new micromobility modes are cheaper than owning and running a car.

- **Benefits for the wider economy**. Work on cycling suggests that it generates around 64,000 FTE jobs in the UK[4]. Many of the newer micromobility options represent relatively innovative industries which may be expected to grow in the future.

Qualitative evidence relating to e-scooters and hoverboards suggests that they may **appeal to new demographic segments**, that are not necessarily attracted to conventional walking and cycling options – including teenagers; those who like new technology; and those who wish to

[1] Philips, I., Anable, J. and Chatterton, T. (2020). e-bike carbon savings – how much and where?. CREDS Policy brief 011. Centre for Research into Energy Demand Solutions: Oxford
[2] Cairns S and Sloman L (2019) Potential for e-cargo bikes to reduce congestion and pollution from vans in cities. Report for the Bicycle Association.
[3] Langford et al (2017) Comparing physical activity of pedal-assist electric bikes with walking and conventional bicycles. Journal of Transport and Health (6) pp463-473
Hochsmann et al (2018) Effect of E-Bike Versus Bike Commuting on Cardiorespiratory Fitness in Overweight Adults. Clinical Journal of Sports Medicine 28 (3) pp255-265.
Sundfor HB and Fyhri A (2017) A push for public health: the effect of e-bikes on physical activity levels. BMC Public Health (809)
[4] Newson C and Sloman L (2018) The Value of the Cycling Sector to the British Economy: A Scoping Study. Report for the Bicycle Association.

'look cool' or be seen as being 'cutting edge'. They can also be relatively **easily shared** (e.g. amongst family members) without much adjusting (whereas bicycles need more bespoke sizing/adjusting).

Q2.2b Risks of micromobility vehicle use

Like all new technologies, these options suffer from challenges, such as lack of standardisation, rapid obsolescence and safety issues. These issues are not dealt with adequately here, but are clearly of critical importance.

Q2.4-6 Where should micromobility vehicles be permitted and what standards should be required?

Key points made in this section are:

- Limiting the maximum speed at which electrical assistance is received makes sense for all types of micromobility vehicles on safety grounds.
- If a few speed bands are used, this also enables these speed limits to be used as a way of regulating where vehicles can travel.
- Vehicle weight, stability and wheel size all affect the safety of vehicles, and should be used as part of the rationale for deciding on maximum allowed speeds, and where vehicles can travel.
- Speed limits need to be agreed with vehicle manufacturers and built into vehicles, since users or the police may have difficulties with judging speeds and enforcing restrictions.
- If vehicles were to include a 'slow mode', similar to pedestrian speeds, use on the pavement might be possible for the lighter, more vulnerable modes.
- Off-road space and wide shared pedestrian/cycle paths are somewhat different in character to either pavements or on-road cycle lanes, and potentially provide initial locations for allowing some of the micromobility modes where users are more vulnerable.
- Given that this is a time when major roadspace reallocation may take place for active travel, very wide pavements with a 'fast' lane, or two-lane cycle tracks should be considered.
- It is also important to establish best practice for the parking and storage of micromobility vehicles.

Micromobility vehicles have very different safety characteristics, depending on their weight, stability and wheel size. Notably, a smaller-wheeled vehicle (such as a scooter) is much more vulnerable to imperfections in the road surface than a larger wheeled vehicle[5] – a pothole

[5] The importance of road surface is discussed in F. Ognissanto, J. Hopkin, A. Stevens, Millard K., M. Jones (2018) Innovative active travel solutions and their evaluation. TRL PPR887, Berkshire.

which a bike could go over would potentially represent a major hazard to a scooter rider. Consequently, it may make sense to assign them to at least two speed bands, and possibly three.

The maximum speed for electrical assistance of 15.5mph for e-bike, e-trike and e-cargo bike users seems to be relatively unproblematic. For vehicles allowed to travel *at these speeds*, they are likely to represent a hazard to pedestrians, and therefore need to use cycle tracks and lanes, or roads in line with conventional bikes. (Presumably quadricycles with large wheels logically fall into this category?)

However, a lighter, less stable vehicle and/or a vehicle with much smaller wheels such as a scooter or hoverboard, potentially requires a lower maximum speed given the increased vulnerability of the rider.

Meanwhile, invalid carriages have speed limits of 4mph (for the pavement) and 8mph (for the road).

There is arguably a case for introducing new harmonized speed limits (perhaps within the ranges of 4-6mph and/or 8-12.5mph), where speed of use partly determines where vehicles can be used. Vehicle manufacturers would need to build speed limits into the vehicles, as expecting people to know exactly how fast they are going is not realistic. It also generates problems for police enforcement. Speed limits would also need to be harmonised with other countries, since manufacturers will not design and/or build vehicles for only one country.

It could be worth investigating the feasibility of building vehicles with two different speed settings (as some invalid carriages are), or a slow speed indicator, to determine where they can be used. There might then be a case for allowing vehicles only travelling at the lower speed to use pavements – thereby enabling them to be used for end-to-end journeys (or in otherwise dangerous locations). For example, hoverboards are heavy to pick up, so difficult to transport between locations unless ridden (and coloured lights or sounds on some models can already indicate when a certain speed is being exceeded).

In terms of where vehicles are permitted, it is important to note that the environment is more complex than simply roads, cycle lanes and pavements. For example, in Europe, scooter use is often common in areas with wide shared pedestrian/cycle routes – often in parallel with people travelling via means such as roller blades, which are not powered, but do enable the rider to travel at significant speeds. Across the UK, there are also large amounts of 'off-road' space – e.g. the grass alongside footpaths or near playgrounds, and various open or public spaces - where use of vehicles might be permissible (for example, for people who want to 'play' on the smaller, more difficult-to-balance vehicles.) If vehicles were defined by speed limits, permission to use different forms of space could then be linked with maximum speeds.

New efforts to allocate space for active travel may also open up new opportunities. For example, it may be worth experimenting with: two-lane cycle paths – with one for faster/overtaking vehicles; or a much wider pavement with a 'fast' lane for the more vulnerable micromobility vehicles, with a proper cycle lane alongside.

Segways are difficult to place in a typology, given their relatively large weight, but potential rider vulnerability. However, the recent failure of the company may make this a redundant issue.

In brief, then, one proposition is that micromobility vehicles could be divided into two or three types, namely:

- Relatively fast and/or heavy vehicles (with reasonable size wheels) should only be allowed on cycle lanes/roads, with a top speed for electrical assistance of 15.5mph or less.
- Lighter vehicles (with smaller wheels) should be capped at a lower speed and permitted to use cycle lanes, pavements above a certain width, and off-road public space (unless street signage indicates otherwise, as it might in town centres).
- Lighter vehicles, which have a speed limiter restricting them to the lowest speed band, could be used on pavements if the speed limiter is on.

Trials potentially have a key role to play in addressing these issues – such as developing a consensus as to the maximum speeds at which particular types of micromobility vehicle should be capped, and defining particular types of road environment that are problematic.

It will also be important to establish best practice in relation to on-street parking and storage of micromobility vehicles. For example, issues include the practicalities and compliance generated by designating a very dense network of small parking locations, compared to the more common practice of designating a few larger locations; and the relative importance, for compliance, of on-street signage, map-based apps and penalties for use of inappropriate locations.

The rental e-scooter trials will presumably address some of these issues, as will some of the planned ELEVATE project work.

2.7 Other design issues for micromobility vehicles

There are potentially various other issues that need consideration:

- As recognized in the consultation document, adequate **brakes/stopping processes** and **lights** should be a requirement for all micromobility vehicles. Use of vehicles in the dark, without lights, travelling above a certain speed, could be prohibited, given the difficulties faced by other road users to perceive and react to their movement. It may be appropriate to consider whether the rider wearing lights makes more or less sense than the lights being fitted to the vehicle.

- Lots of micromobility vehicles have already been sold and/or are likely to be available for sale on international websites, which do not/will not necessarily comply with any new standards that are bought in. Any new rules will need to work out how **older / non-compliant vehicles** will be dealt with.
- **Vehicle durability, battery longevity** and/or **battery standardization** (in terms of size, specification, charging protocol and/or interoperability) will help to determine whether micromobility vehicles can contribute towards a 'green revolution' or generate large amounts of redundant equipment. Those running on-street scooter schemes already talk about how much longer their vehicles now last compared to previously. Specifications should include potential expectations of longevity (and/or manufacturer guarantee periods). **Battery recycling** also needs consideration – for example, are all micromobility manufacturers expected to take responsibility for ensuring spent batteries are recycled in the way that is required of car manufacturers?
- **Stunt skateboarding** is a different type of activity to simply travelling on a hoverboard or other light mobility vehicle. Safety issues are likely to need particular scrutiny, and expert input, in relation to the increased risks to the rider; the risks from the electrics/battery if the skateboard crashes to the ground from a height; and the appropriateness of allowing e-skateboards to use conventional skateboard parks.

2.8 User requirements

Age restrictions

The problem with limiting the use of micromobility vehicles to those aged 14+ or 16+ is that it precludes family use, and fails to engage teenagers in active travel at a key time when they could gain health benefits and independence (for example, for travel to secondary school or to part-time jobs). Arguably, perhaps, use by secondary school students could be permitted, if underwritten by an adult aged 16+, who could be required to 'give permission' and to take legal responsibility for unsafe behaviour.

Training

Although use of many micromobility vehicles is not that difficult, it may still be appropriate to develop specific training, that could be delivered and rolled out by existing initiatives such as Bikeability and Scootability. There are advantages to improving the road awareness skills of all road users, regardless of the vehicle they are using. Work on a previous e-bikes project[6] found that e-bike cycle training was generally greatly valued, even though almost all participants already knew how to cycle.

[6] www.smart-ebikes.co.uk