

E-SCOOTER MICROMOBILITY

Are e-scooters here to stay?



dg:cities

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FINDINGS FROM THE DG CITIES RESEARCH COMMUNITY

Introduction

THE CHANGING NATURE OF URBAN MOBILITY

The way we travel is constantly evolving and, to a great extent, this has accelerated during the COVID-19 pandemic – it has forced us all to adapt. With many people feeling reluctant to travel on crowded public transport, there has been an increase in demand for more independent solutions.

The adoption of single passenger modes is referred to as ‘micromobility’. It’s a term used to group together established small vehicles, like traditional bikes, with an increasingly varied set of lightweight, battery-powered (electric or ‘e’) and pedal-assisted vehicles, like e-scooters, e-bikes and cargo bikes.

One such micro-mobility solution now on the market is the e-scooter. Although e-scooters have a high profile at the moment and tend to elicit a Marmite response over their use, they aren't a new idea – in fact, the first motorised scooter was manufactured by Autoped back in 1915. However, with greener, lighter and more robust energy sources now available, they have become more popular. The Department for Transport (DfT) currently defines an e-scooter as vehicle which:

- is fitted with no motor other than an electric motor
- is designed to carry one person in a standing position with no provision for seating
- has a maximum speed of 12.5 mph
- has 2 wheels, one front and one rear, aligned along the direction of travel
- has a mass, excluding the rider, not exceeding 35 kilograms
- has means of directional control via the use of handlebars
- has means of controlling the speed via hand controls and its power control defaults to the ‘off’ position.



The only e-scooters that can be used legally on public roads in the UK are those rented as part of government-backed trials. While it is legal to buy and own an e-scooter, you can only use a personally owned one on private land and not on public roads, cycle lanes or pavements. The Transport Committee of MPs has called for e-scooters to be legalised on roads, but not on footways, and the Dept for Transport is undertaking trials and gathering evidence from public surveys on their use. Currently, the Met Police say they will issue fines of £50 for riding on the footway, however the capacity to enforce such a measure is limited.

For Councils and transport planners, the primary concern with any new mode, especially an innovative or disruptive one, is how it can work within the context of existing streetscapes and transport offers. This can include questioning what kind of infrastructure might be needed to aid safe operation. There will also be a need to evaluate the potential impact of any new mobility solution on carbon emissions and active travel targets, whether it is legal to use under current legislation, and understanding the consequences for safety of both users and non-users alike. A further consideration is how the new 'offer' fits within equitable access, and if it would have a disproportionately negative impact on more vulnerable road users, including pedestrians.

DESIGNING E-SCOOTERS AROUND PUBLIC NEED: WHAT DO THE PUBLIC THINK OF E-SCOOTERS?

Products and services work best when designed around the needs of their users. E-scooters have already gained much interest from the public, but the extent to which they could become a long-term mobility solution remains unclear. E-scooters draw considerable attention from both advocates and detractors, and as such, are a contentious innovation.

We therefore undertook this survey to explore public perceptions of e-scooters and to draw out recommendations and insights for policy makers, local authorities, and technology developers to inform the ongoing development of this new and disruptive form of personal mobility.

LEARNING FROM TRIALS: LONDON TRIALS BY TRANSPORT FOR LONDON

The Department for Transport is currently undertaking e-scooter trials across several London boroughs as part of a programme of testing and evaluation with London councils. Three operators are running trials, which are bookable via smartphone app. They are available to riders over the age of 18, who can present a valid driving licence.

Interim findings from the trials offer some useful insights. Between 7th June and 26th September 2021:

- Around 255,000 trips have been taken on trial e-scooters
- Average trip distance is 2.8 kilometres
- Average trip duration is 22 minutes
- 6 serious injuries have been reported by operators.

As these trials progress, they will provide valuable information for the design of future services and the potential development of legislation.



Methodology

A survey was distributed online to UK residents during September and October 2021.

The survey was free and accessible via any digital device, and was promoted across social media and to the DG Research Community, a community of UK citizens who are interested in shaping research and insights on issues related to sustainability and the use of technology in towns and cities. The DG Research Community is open to anyone in the UK to sign-up to and receives regular updates about research and opportunities to take part.

The e-scooter section of the survey was split into four sections:

- Perceptions of e-scooters, including safety and accessibility
- Intention to use e-scooters
- General mobility usage
- General demographic questions.

In total, 1572 complete and high-quality responses were analysed. A weighting variable was calculated to ensure the survey was representative of the UK by age and gender.¹

Findings

SAFETY IS A KEY ISSUE

Only a fifth (20.7%) of people think that e-scooters are safe for other road users. Just over a quarter (26.3%) think e-scooters are safe for their riders.

USERSHIP DIFFERS BY AGE

One fifth (20.3%) of people have used an e-scooter. Younger people are far more likely than older people to have used an e-scooter (42.2% of 18–24-year-olds vs 3.3% of those aged 75+). Age appears to be inversely related to usership – as individuals age, they become less likely to use e-scooters.

VIEWS DIFFER ON WHETHER E-SCOOTERS SHOULD BE LEGAL ON UK ROADS

Whilst half (50.1%) of people aged 18-24 believe they should be legal, only 11.4% of people aged 75+ agree.

THE PUBLIC RECOGNISES THE ENVIRONMENTAL BENEFITS OF E-SCOOTERS

Our survey data shows that almost half (45.6%) see the environmental benefits of e-scooters.

ANALYSIS

In the next section we will explore research findings in the following themes:

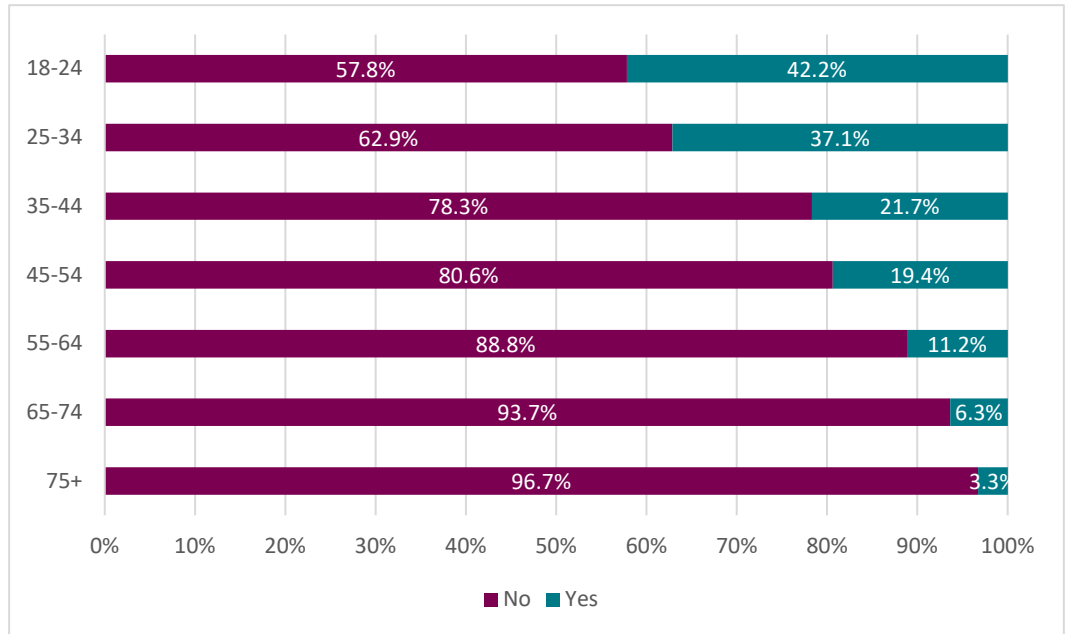
- Usership of e-scooters
- Safety
- Suitability to towns and cities
- Environmental impacts
- Legal considerations.

¹ A weighting variable was calculated through a process of raking (or proportional fitting) using the American National Election Study weighting algorithm ANESRAKE. More information can be found here: <https://web.stanford.edu/group/iriss/cgi-bin/anesrake/resources/RakingDescription.pdf>

USERSHIP OF E-SCOOTERS

Our data shows that one in five (20.3%) have used an e-scooter, whilst the remaining majority haven't. Younger people are far more likely than older people to have used an e-scooter (42.2% of 18-24-year-olds vs 3.3% of those aged 75+).

Figure 1: E-scooter use by age



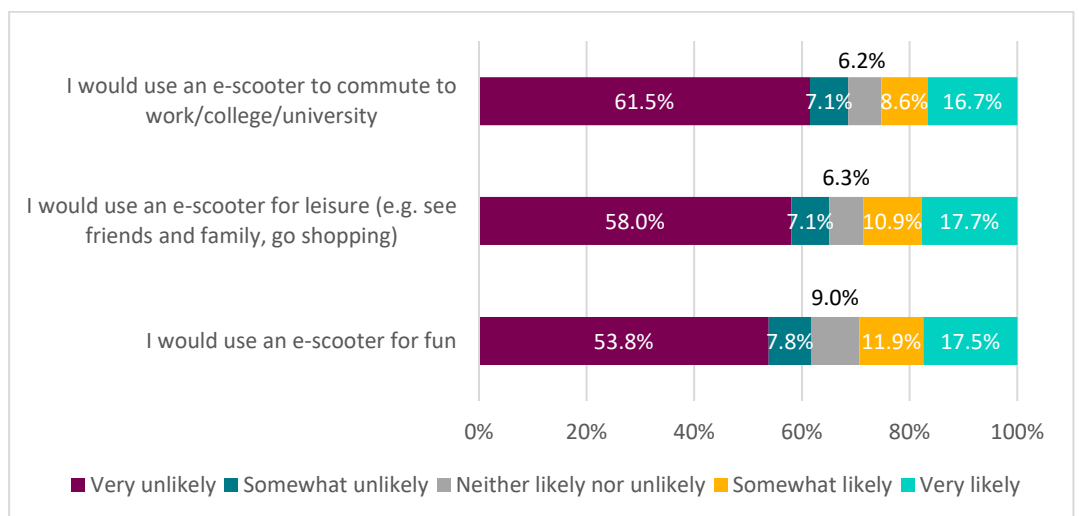
Base: n = 1572 (weighted)

We also compared usership across other groups:

- Over half of regular drivers (51.7%) have used an e-scooter, whilst a third (35.4%) of regular cyclists have
- There was no difference when comparing males and females.

We also looked at whether or not the public would like to use e-scooters in the future and the likelihood of them using them for different purposes.

Figure 2: Likelihood of using an e-scooter in the near future



Base (weighted) = 1567.2

One member of the public could see the value of using an e-scooter for short journeys, although they described observing an illegal use of an e-scooter by another member of the public:

“I think they are brilliant! In my previous job, one of the parents who didn’t own a car used to pick her child up on one of them. They lived at the distance where it would be a lazy waste of money to get a bus/taxi but too far to walk. And he loved it! I see them driving around now and again and nobody is using them antisocially, they’re just getting around like the rest of us. I cannot understand the hate they receive.”

Female respondent, 25-34

Finally, an elderly member of the public noted several issues for older people using e-scooters:

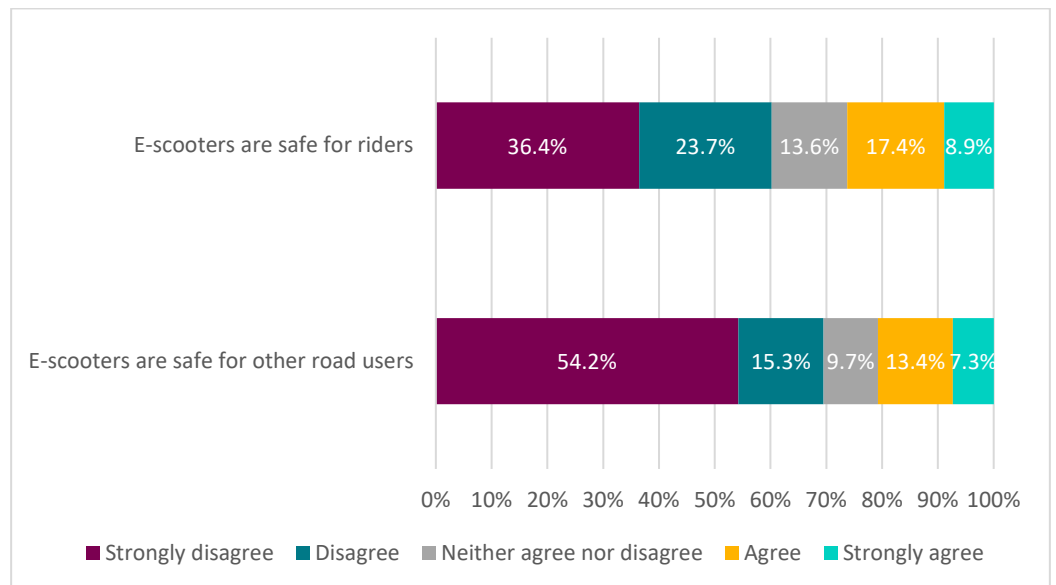
“Useless for the elderly or infirm. If it’s cold you freeze. If it’s wet you get soaked. If it’s dark no one will see you. You can’t carry anything bigger than a small shoulder bag. They are just a trendy novelty.”

Male respondent, 65-74.

SAFETY

Safety is commonly cited as a major issue with e-scooter services. Our data shows that a significant majority of respondents believed that e-scooters are unsafe for other road users (69.5%) and six in 10 (60.1%) believe e-scooters are unsafe for riders, with both issues being of significant concern for many who responded to the survey (figure 3).

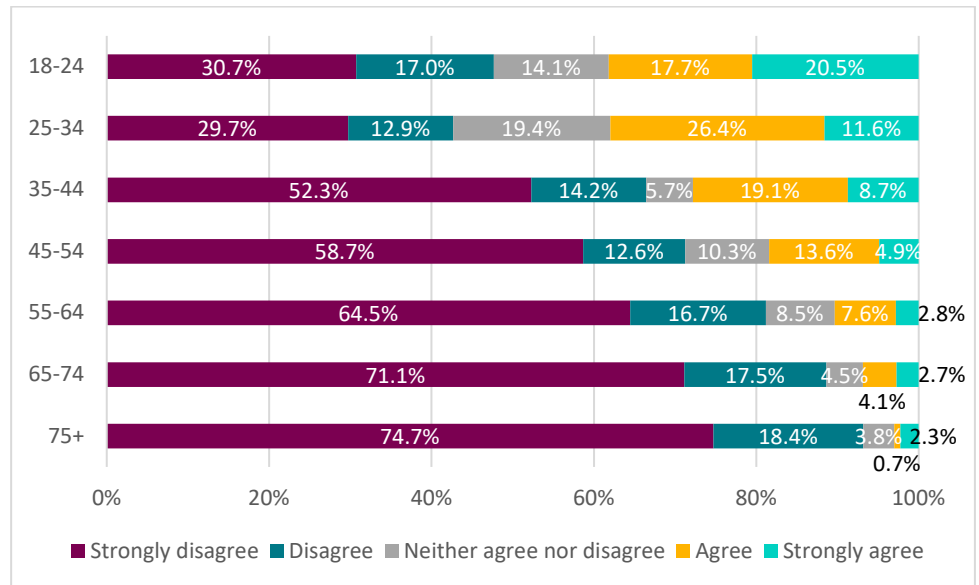
Figure 3: Safety attitudes



Base (weighted) from top: n = 1564; n = 1571.

Our analysis showed a difference across age groups towards e-scooters. Older people were more likely to agree that e-scooters are dangerous compared to younger people who were less concerned about the safety of the mode.

Figure 4: “E-scooters are safe for other road users” by age



Base (weighted) n= 1570.9

Concerns regarding the safety of other road users when e-scooters are being used was statistically significant across several groups. Younger people were statistically significantly more likely than older people to agree that e-scooters are safe for other road users.² Frequent car drivers were also more likely than infrequent car drivers to believe e-scooters make roads unsafe for other road users.³

Respondents noted several concerns about the safety of e-scooters for other road users:

“They are mainly used by teenagers who have no road sense and are used dangerously on the path and road... they would be a good thing if the people riding them are responsible but on the whole, they don't seem to be. I would like the government to make everyone who wants one to attend a course, have a licence and insurance and be treated like mopeds”

Female respondent, 35-44

² One way ANOVA: $F(6,1571) = 43.623, p < 0.01$, showed that there were significant differences between 4 groupings of age, with younger ages differing to older groups: 18-24 (M = 2.80, SD = 1.540), 25 - 34 (M = 2.77, SD = 1.415), 35 - 44 (M = 2.18, SD = 1.451) 45 - 54 (M = 1.93, SD = 1.293), 55 - 64 (M = 1.68, SD = 1.088), 65 - 74 (M = 1.50, SD = 0.96) 75+ (M = 1.37, SD = 0.794)

³ An independent samples T-Test was conducted between frequent (at least once a week) and infrequent (less than once a week) car drivers. There was a statistically significant difference between frequent car drivers (M=1.85 SD=1.258) and infrequent car drivers (M=2.41 SD=1.456) with regards to road safety of other road users; $t(946.956) = 7.575, p < 0.001$, where equal variances are not assumed.

“Considering it is mainly younger people (14-25) using them, there seems to be an attitude of disregarding other path users. E-scooters often have no bell or other signaller, and have little to no regard or respect for other people.”

Female respondent, 18-24

Another member of the public was concerned about the potential danger that e-scooters could pose to people with disabilities, for example those who are visually impaired:

“As someone who works with visually impaired people, consideration needs to go to pedestrian safety, particularly disabled and visually impaired. There are many pavements in Greater Manchester which are not safe for pedestrians due to pavement cyclists as it is, without e-scooters putting us at further risk.”

Female respondent, 35-44

Some saw a comparison between e-scooters and cyclists, and expected that they could be governed and used in a similar way to ensure they are safe:

“I think they are no more dangerous than cyclists. Rented scooters seem a safe option but I think you should have to have some form of licence for them and have insurance.”

Male respondent, 55-64.

And;

“Better and potentially safer than public transport. If I lived closer to work, I would consider it.”

Female respondent, 35-44.

It's clear that whilst the majority of respondents see e-scooters as unsafe, a minority of people consider them to be as safe as other forms of mobility, if used in an appropriate manner.

ENVIRONMENT

The environmental credentials of e-scooters are often advertised as a major benefit to users and urban communities where air and noise pollution from road traffic are growing issues.

Our data shows that almost half (45.6%) see the environmental benefits of e-scooters. We found that those who cycled regularly were statistically significantly more likely to recognise the environmental benefits of e-scooters.⁴ However it is unclear whether this perception is

⁴ An independent samples T-Test was conducted between frequent (at least once a week) and infrequent (less than once a week) cyclists. There was a statistically significant difference between frequent cyclists (M=3.57, SD=1.326) and infrequent cyclists (M=3.18, SD=1.26) with regards views on the environmental benefits of e-scooters: $t(445.5) = 4.742$, $p = <0.001$, where equal variances are not assumed.

based solely on use emissions rather than the whole life cycle of the e-scooter.

“They are without doubt the most energy efficient, powered method of personal transport. They are reliable, quick, easy to store, and very portable; if you go into work or a shop, simply carry them with you to avoid theft. Indeed, at work you can then plug them in for the homeward journey. Such a shame there are so many problems; some people are being prosecuted and having points added to their licence, where this transport should be the first choice for many journeys.”

Male respondent, 55-64

“An excellent way to travel short distances, fresh air, low carbon and fun. I’m a bit long in the tooth but would try riding one if legal.”

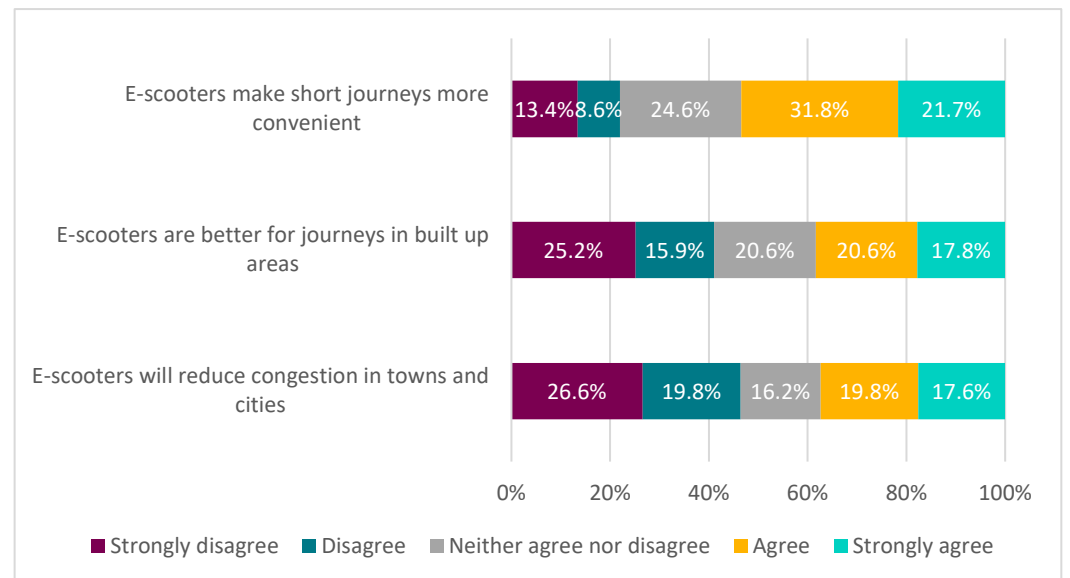
Female respondent, 65-74

SUITABILITY TO UK TOWNS AND CITIES

Current trials of e-scooters are testing their suitability in different urban environments and assessing the experience of users. A commonly considered benefit of e-scooters is that they may reduce journey times for short journeys making them more convenient, particularly for those in urban areas.

As part of the survey, we asked participants to share their views on the suitability of UK towns and cities to e-scooter services.

Figure 5: attitudes towards e-scooter use in urban environments



Base (weighted): n=1570; n= 1569.3; n = 1567.4

Participants in the study noted the issue of e-scooter services which are left outside of designated bays or drop-points, and the issue of poor

micromobility infrastructure as major negatives for current e-scooter schemes.

“Better parking facilities as they are just dumped at parking locations not considering other members of the public.”

Female respondent, 35-44

And;

“Great idea but the infrastructure to ride them (and bicycles) needs huge investment before the public will feel safe.”

Male respondent, 55-64

Another respondent recognised the issue for cities and citizens of the unintended consequences of e-scooter usage, which draws people away from walking and cycling, instead of replacing larger vehicles on the road:

“E-scooters should be discouraged where they displace journeys that could be conducted by walking or cycling, or make pedestrians/cyclists less safe. They should only be used to replace (other) motorized transport.”

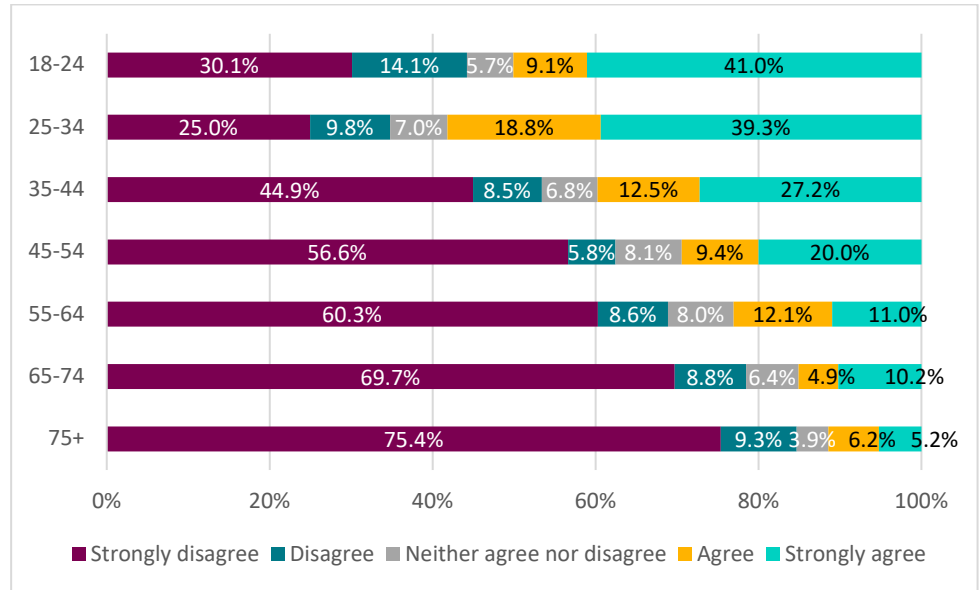
Male respondent, 35-44

LEGAL CONSIDERATIONS

A key challenge for policymakers and local authorities at present is understanding how to govern public use of new forms of micro-mobility like e-scooters. We found that opinions on whether e-scooters should be legal to use differed significantly by age, whilst half (50.1%) of people aged 18-24 believe they should be legal, only 11.4% of people aged 75+ agree.⁵

⁵ One way ANOVA: $F(6, 1561) = 40.678, p < 0.01$, showed that there were significant differences between 3 age groups, with younger ages differing to older groups: 18-24 (M = 3.17, SD = 1.752), 25 - 34 (M = 3.38, SD = 1.651), 35 - 44 (M = 2.69, SD = 1.735) 45 - 54 (M = 2.30, SD = 1.656), 55 - 64 (M = 2.05, SD = 1.470), 65 - 74 (M = 1.77, SD = 1.354) 75+ (M = 1.57, SD = 1.153).

Figure 6: Agreement with the comment: “It should be legal to use e-scooters on UK roads”



Base (weighted) n = 1562

The issue of legality was significant for some respondents, who recognised a need for regulating for safety and insurance purposes:

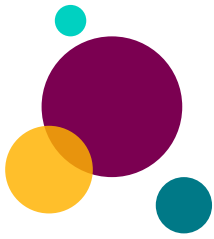
“For me, there should be proper regulation: all must be insured, maybe registered with DVLA and pay £10 for road tax. Maybe the regulation calls for cycle helmets that must be worn (this will help the police; no helmet should mean an instant offence). No tests should be needed, and anyone over the age of 14 can use them with the regulations in place.”

Male respondent, 55-64

And;

“They must be speed controlled and fitted with a noise of some sort. At the moment they are too fast and dangerous for pedestrians. Whipping on and off of pavements and roads, jumping traffic lights, frightening dogs, etc. I also think they should only be ridden by adults - not the pair of 12 year old boys who nearly knocked me over and found it hilarious!”

Female respondent, 55-64



Discussion

E-scooters are a divisive topic, which incites strong emotions in the public. This study is characterised by two groups: a majority of respondents who are against the increased use of e-scooters and who question their value in urban environments as a safe mode of transport, and a second group, who are more positive about e-scooters and their potential to radically redefine urban mobility. These groups tend to divide across age: older people are more negative towards e-scooters, whilst younger people are more positive.

We found that the current market for e-scooters could be characterised as niche, but potentially significant if they were to be designed and implemented with safety, cost and usability in mind. There does appear to be a significant age barrier for e-scooter service providers: younger people are clearly the target market, and one which is more receptive to using e-scooters in the near future. For policy makers, the evidence appears to show that e-scooters may not be appropriate for older people.

A major finding from this work is the lack of knowledge amongst the public as to the environmental credentials of e-scooters. We found interest in the idea of de-carbonising urban transport and the value of e-scooters to do this, but there was little recognition of the full-lifecycle impact of e-scooters in open text responses. Battery life and general wear-and-tear are points that, as of yet, the public is not appreciating in their assessment of the value of this mode of transport. When compared to cycling, for example, e-scooters are less environmentally friendly and do not contribute to active travel targets in the same way as cycling or walking. For local authorities and public health officials, this is a major barrier to their long-term application as a mobility solution.



“A major finding has been the lack of public knowledge about the environmental credentials of e-scooters – there is interest in the idea of low carbon transport, and the potential of e-scooters, but no mention of the full life-cycle impacts.”

For local authorities, there is much to be learned from ongoing trials and engagement with their own communities about e-scooter services today and in the future. Our research shows that a minority of the public sees their value and expects towns and cities to provide the infrastructure for privately-owned and service-based e-scooters to be used safely. It's clear that local authorities, and transport planners in particular, will need to pay close attention to how they adapt to the use of e-scooters.

Under the right conditions, e-scooters present an interesting and valuable alternative mode that could support progress towards low-carbon mobility use. If properly assessed, managed and evaluated, e-scooters could move from a niche innovation to a long-term feature on UK roads.

If this is to happen, policy-makers, local authorities, transport planners and developers will all need to carefully appreciate the benefits and drawbacks of the mode. At present, the information to assess this fully is not available, but the evidence emerging from the trials should help inform future decisions on the role of e-scooters in the micromobility mix.

RECOMMENDATIONS

There are several key takeaways from this study and recommendations that we make to local authorities and policy makers with regards to e-scooter deployment:

Services should be designed in conjunction with end-users and other road users. We captured many divided opinions in our study which highlights the polarising nature of e-scooters. Service-design which incorporates the opinions of diverse communities of service users and other road users should be the ultimate goal of all service development.

Safety is a major concern for the public. This should be reflected in how services are designed and implemented. Our data highlights that safety is a key issue. Some groups, particularly elderly people, are concerned about the safety of scooter riders and other road users. Many are unfamiliar with how they can and should be used, and what is and isn't legal. There are also concerns about e-scooters as a mode of choice for criminals, due to their lightweight and high-speed nature. We received many comments from concerned participants who highlighted issues including speed, lack of noise (and therefore an audible warning they were approaching) and lack of training for users that could cause harm to members of the public as well as the riders of e-scooters.

Regulation and licencing should be better communicated to the public to improve understanding, and flexible options be made available: our data shows that there is some appetite for licencing the use of e-scooters, but compared to other mobility forms this could be unrealistic. There may be more flexible options of regulation available that could go part way to achieve this, e.g. membership of a specific body which provides third-party insurance cover (in the way Cycling UK does for bike owners). Membership of these bodies could be managed through a purchase scheme. This would overcome the resource limitations that come with increased enforcement.

Environmental impacts of e-scooter services, and in particular a full lifecycle analysis, needs to be undertaken and fully appreciated in service design in comparison to other modes: We found instances in which the public demonstrated some interest and knowledge in their environmental positives at the surface level, but did not question the full life-cycle impact of e-scooter services. These assessments need to be undertaken, and awareness raising of the environmental pros- and cons of different mobility services, including e-scooters, should be prioritised to enable the public to make more informed and evidence-based decisions.

Conclusion

Modern transport should be environmentally friendly, accessible, affordable, reliable and not disproportionately impact the road network. Most importantly it must be safe for users and non-users alike. For some criteria, e-scooters show significant potential. Safety however appears to pose the biggest barrier to their long-term viability. It's clear that far more needs to be done to ensure the safety of both scooter riders and other road users.

There is however some cause for optimism. The ongoing pilots are demonstrating value and we found a minority of users recognise the value of e-scooter service. The question remains however about whether e-scooters can even become more than a niche mode, the answer to which lies in data and evidence that is still to be fully understood.

“Against some criteria, e-scooters have significant potential, but more needs to be done to ensure the safety of both the riders and other road users.”

About the authors

DG CITIES

DG Cities is an urban innovation consultancy, specialising in helping clients harness the potential of technology and data to transform our towns and cities. We take a practical approach that puts a city and its people first. Born out of a local authority, our team is packed full of experts, including architects, town and transport planners, master urban planners, sustainability experts, engineers, technologists and project managers.



Ed Houghton, Head of Research and Service Design, DG Cities

Ed is a thought leader in systems-thinking, system resilience, and AI in different contexts. He is a mixed-methods researcher who specialises in evidence-based policy and practice development. Ed leads the research and service design practice at DG Cities.



Kim Smith, Head of Smart Mobility, DG Cities

Kim is a transport specialist with over 25 years in transport planning, project delivery, policy formation and high-level strategy. Kim takes a strategic overview to ensure the successful delivery of DG Cities' mobility projects. She also coordinates work on new mobility proposals.



Hiba Alaraj, Project Manager, DG Cities

Hiba brings to DG Cities a background in master planning, project management and sustainability within the private sector. She has expertise in the energy and sustainability aspects of smart city innovation and is currently working on net-zero carbon, social sustainability and mobility related projects.

CONTACT US

Email: info@DGCities.com
www.DGCities.com