University of Southampton

Gender Equitable e-Micromobility (GEM) Guidelines

DTE Network
Decarbonising Transport Through Electrification

Putting Equality and Diversity at the Heart of Decarbonisation
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Research Overview

Aim:

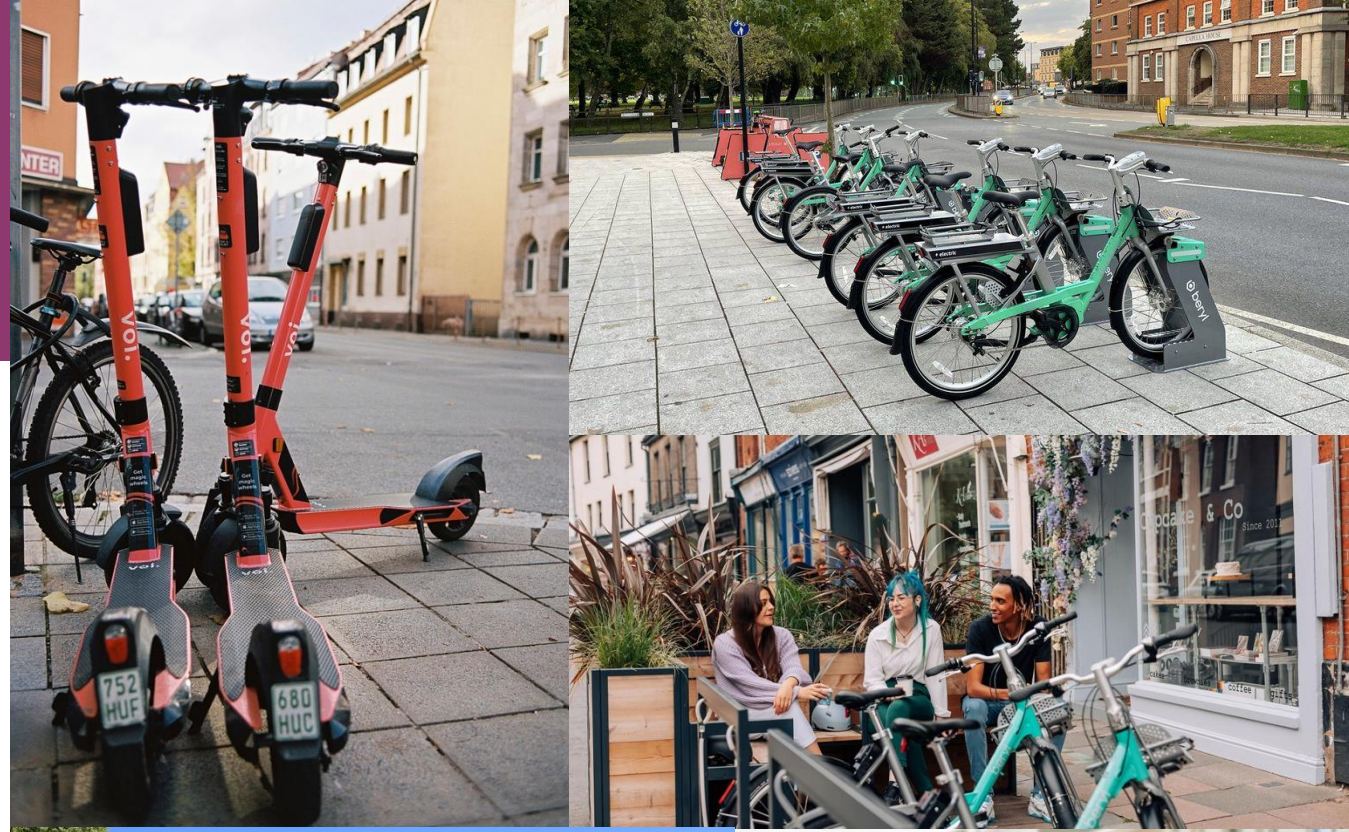
- Review the **gendered use** of e-micromobility and advise on ways to ensure it is inclusive.

Approach:

1. Conduct **interviews** & **focus groups** with users and non-users to understand societal perspectives
2. Apply **sociotechnical methods** to understand the value of e-mircomobility and those responsbile for ensuring its inclusive use.

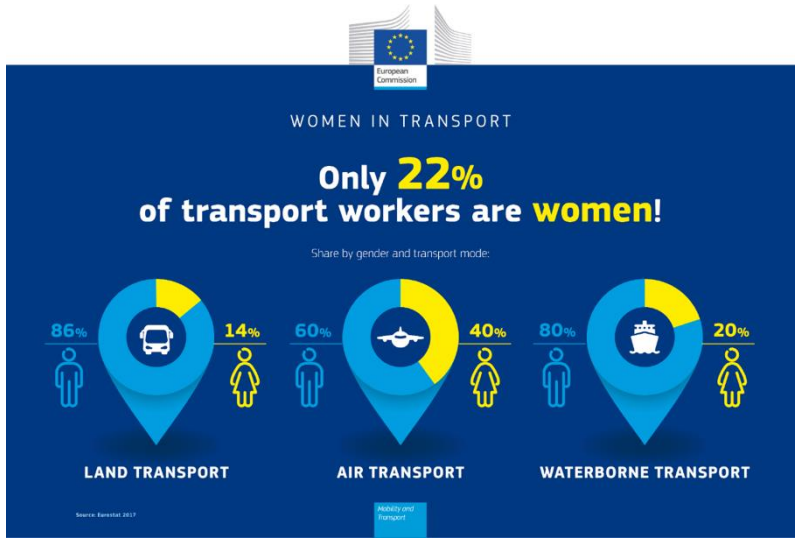
Outcome:

- **Guidelines** that account for gender in the use of e-micromobility

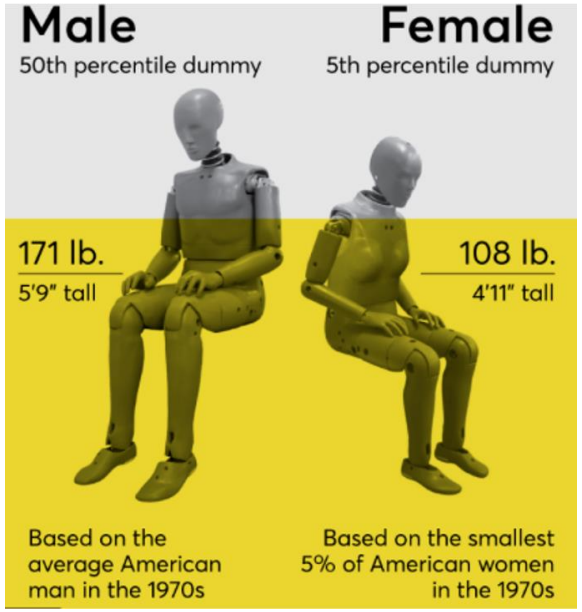


Background - Gender data gap in Transport

Gender impacts employment

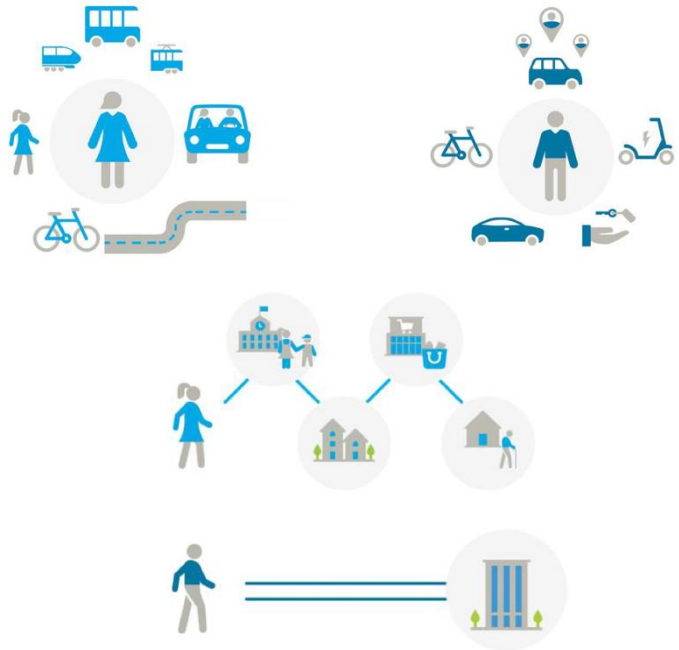


Gender impacts transport safety



https://www.consumerreports.org/car-safety/crash-test-bias-how-male-focused-testing-puts-female-drivers-at-risk/

Gender impacts travel patterns



Gender and (smart) mobility Green Paper 2021. Ramboll.

Methodology

User Focused Approach

- Focus groups and interviews
  - N=24, 12 female, 12 male
  - Matched on age
  - Online and in-peson for inclusivity
  - Mix of users and non-users
- Questions targeted the motivations and barriers for e-micromobility use

Sociotechnical Systems Analysis

- Actormap
  - Responsible actors and drivers
- Abstraction hierachy
  - Values and priorities for e-micromobility use

Gender Factors in Transportation

Top Level Factors	Sub Factors
Family and Community Roles	Dependants
	Division of work
Safety and Perceived Safety	Time of day
	Personal Safety
	Fear
Ergonomic Standards	Injury risk
	Female body shape
Mobility Needs	Facilities
	Trip Characteristics
	Encumbered travel
User Behaviour	Behavioural Trends
	Wellbeing
Urban Structures	Infrastructure

Parnell, K. J., Pope, K. A., Hart, S., Sturgess, E., Hayward, R., Leonard, P., & Madeira-Revell, K. (2022). gender, transportation, and work. *Ergonomics*, 1-17.

Results – Focus Groups and Interviews

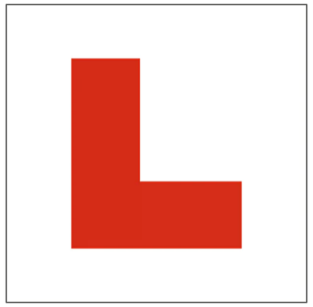
- Only females discussed the impact of 'Famliy and Community Values' and the use of e-micromobility when travelling with children
  - ☺ Benefits of using e-bikes to accompany children to school
  - ☹ Barrier of travelling by e-scooter with young children

- Males talked about logistics, journey type and length when discussing the use of e-micromobilty.
  - ☺Medium journey length
  - ☹Battery duration was a cited as a significant limiter to use

- Safety was a serious concern for males and females
  - ☹ Females spoke more of of a sense of Fear

☹ Infrasturcture and road use was also a serious concern for males and famales

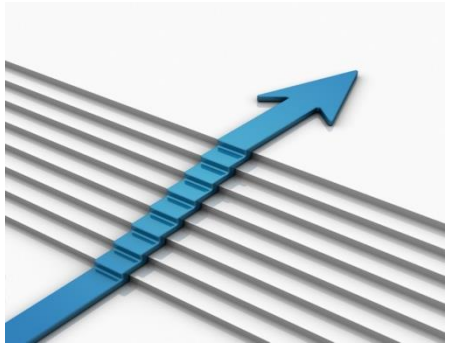
Recommendations



Training:
User training in using technologies effectively

Equipment
Technological design and functionality

Legislation/Organisation:
Structure and governance of systems



Procedure:
Processes for effective and safe performance

Top Level Factors	Sub Factors
Family and Community Roles	Dependants
	Division of work
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	Fear
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	Wellbeing
Urban Structures	Infrastructure

Recommendations

Our report presents **26 recommendations** across the four key areas (legislation, training, equipment & procedure) and they align to the gender in transport factors

Examples:

Equipment:

- **Family and Community Roles:** Consider the use of families and those travelling with dependants within the design stage of e-micromobility development**.**

Training:

- **User behaviour:** More training on how to access and use e-scooters is required. This includes the initial technological barrier of using the application and the road safety aspect of using the e-scooters.

Legislation:

- **User Behaviour:** A legal requirement for training would improve safety and user behaviour. This should extend beyond the current requirement for a provisional driving license.

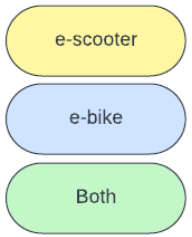
Procedure:

- **Safety and Perceived Safety:** Placement of the e-scooter hubs should consider the lighting available and safety of the locations e.g. cctv, activity at night.

Table 2. Recommendations for gender-equitable e-micromobility

Recommendations	
Legislation	**Family & Community Values** •The governance and decision-making related to road infrastructure must consider e-micromobility to ensure that people traveling with dependants are fully considered. **Safety and Perceived Safety** •Rules surrounding the safety equipment required for e-scooter use should account for time of day (use of high-vis) and consider the mandating of helmet use. **User Behaviour** •A legal requirement for training would improve safety and user behaviour. This should extend beyond the current requirement for a provisional driving license which does not require any road safety knowledge. **Urban Structures** •Legislation is required that enforces the requirements for e-micromobility to be included in the design of roadways, to ensure they safely interact with other road user groups e.g. pedestrians and vehicles. •Enforcement of the laws surrounding the use of e-micromobility on public space and pavements should be tightened to ensure the correct use of e-scooters and e-bikes.
Equipment	**Family and Community Roles** •Consider the use of families and those travelling with dependants within the design stage of e-micromobility development**.** **Safety and Perceived Safety** •The lights on e-scooters needs to be improved to improve their visibility at night and the safety of the users. The use of high-vis and helmets would improve the safety of the user, in line with cyclists. •Consideration should be given to the types of journeys e-micromobility is used for and the availability of safety equipment e.g. when travelling without own helmet **Ergonomic Standards** •Gender disaggregated data should be used to inform the design of e-micromobility with the option for female and male designs, where needed.

Actor Map



International committees	European Union; Society of Automotive Engineers (SAE); United Nations; World Health Organisation; International Panel on Climate Change; International Council on Clean Transportation; International Organisation for Standardisation (ISO); World Bank; International Road Federation
National committees	Transport Select Committees; Business, Energy & Industrial Strategy Committee; Culture, Media & Sports Committee; Science & Technology Committee; Economic Affairs Committee; Environment, Food & Rural Affairs Committee; Environmental Audit Committee; National Policy for Build Environment Committee; British Standards Institute
Government policy & Budget	Competition & Markets Authority; Dept. for Digital, Culture, Media & Sports; Dept. for Health; Dept. for Food, Environment & Rural affairs; Dept. for Education; Dept. for Business, Energy & Industrial Strategy; Dept. for Transport; UK Statistics Authority
Regulatory Bodies & associations	Police; Research Councils; Office for national statistics; Highways England; DVSA; Advertising standards agency; Funding bodies; Royal Town planning institute; Public health England; Faculty of public health; Institute of civil engineers
Industry, local government	Local councils; Research centers; Local police constabulary; Construction companies; Bike insurance companies; E-bike manufacturer; Mobile phone companies; e-scooter companies
Resource Providers	Battery technology developers; Road safety Researchers; Marketeers; Traffic planners; Road maintenance workers; Road policing unit; Parish councils; Urban planners; Protective clothing/ equipment vendors; e-scooter collectors/chargers; e-scooter manufacturers; Rental point developers; e-scooter mechanics; App developers; Mobile phone traders; e-scooter trainers; Cycle to work scheme; e-bike designers; e-bike traders; e-bike mechanics
End users	Other road users; Non-user; User of e-scooter and e-bike; e-bike users; e-scooter users
Equipment & environment	Road (no provision for non-cars); Dedicated cycle lane; Lights; Hi-vis clothing; Road infrastructure; Personal items; Shared road space (bike & cars); Shared road space (bike & pedestrians); e-scooter; mobile phone; Rental point; Drivers license; e-bike; Helmet; Lock; Battery Charger; Bell

Future work

- This work has provided an insight in how the gender factors that are evident within traditional transport modes relate to the relatively new modes of e-micromobility.
- An equal gender sample size enabled disaggregation by gender within the analysis and the similarities and differences within the perspectives of males and females were used to inform the recommendations.
- Considering gender within the design and development of future travel modes will make them more inclusive for all.

Future work:

- Online survey to understand publics view of some recommendations
  - Legislation (and knowledge of)
  - Training requirements
  - Safety perceptions

Publications

Journal Publications

- Parnell, K.J., Merriman, S.E., Plant K.L. (Accepted) Gender Perspectives on Electric Micromobility. *International Journal of Human Factors and Ergonomics in Manufacturing and Service Industries*
- Parnell, K.J., Merriman, S.E., Plant K.L. (In preparation)A Gendered Lens on Electric-micromobility Values and Priorities. *Journal of Cycling and Micromobility Research*

Conference Publications

- Transport Research Board Annual Meeting 2023: Parnell, K.J., Merriman, S.E., Plant K.L. Applying a Sociotechnical Systems Approach to Ensure Gender Equitable Electric Micromobility.
- Chartered Institute for Ergonomics and Human Factors 2023: Parnell, K.J., Merriman, S.E., Plant K.L. Gender Equitable Human Factors and E-micromobility

Thank-you for your time

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