Extending the practice of cycling: Policy recommendations to increase e-bike use based on a review of international literature

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Background

A major stated climate policy goal is to encourage and facilitate members of the population to use sustainable transport modes instead of the private car[1], which was estimated to account for 73.7% of all journeys in 2019[2]. In light of revised climate action policy targets to reduce total car kilometres travelled by 20% and increase daily active travel journeys by 50% in Ireland by 2030, the promotion and proliferation of e-bikes and e-cargo bikes (both owned and shared) as a feasible alternative the private car has been highlighted. In particular, measures have been proposed to enable increased access and ownership of e-bikes and e-cargo bikes as a private car alternative for Irish citizens[3].

The policy recommendations in this summary report are derived from a comprehensive literature review of international social science and transport-related academic research evidence. The literature review focused on research investigating the experiences of e-bike users and the observed uses of e-bikes as a means of mobility. It forms part of wider mixed-methods research project being undertaken by the SEAI-funded Research Fellow under the SEAI Fellowship Pilot Programme 2022. This wider project will investigate experiences of private e-cargo bike ownership and use across Ireland in the context of everyday mobility and car use. By the end of 2024, results from the qualitative phase of this study will be developed from an analysis of interviews with private e-cargo bike users across the country. This will be followed by a nationwide survey, informed by the qualitative insights. Importantly, the following policy recommendations relates primarily to measures to increase the use of e-bicycles. Recommendations specifically for e-cargo bicycles (and e-cargo tricycles) will follow from our future work.

[1] Department of Transport, 2022
[2] Central Statistics Office, 2020
[3] Government of Ireland, 2022

Social Practice Theory: The Study Framework

Social practice theory (SPT)[4] is a theory of behaviour that posits that different kinds of (social) practices are the result of the coming-together of three fundamental elements: materials, meanings and competences. This theory been drawn upon considerably as a tool for conceptualising practices of cycling[5], e-cycling[6], shared e-cargo cycling[7], and driving[4], and has been applied across the field of transport research[8]. SPT posits that practices are often in competition. In this way, promoting one practice over another may require reducing the circulation of elements for a competing practice (e.g., with driving – making cars more expensive, reducing car-friendly infrastructure, changing the meaning of car-use to associate it with harmful externalities), while increasing the circulation of elements for another (e.g., with e-bikes – providing subsidies, more cycling and parking infrastructure, promoting an image of accessibility and practicality). This framework is useful for developing comprehensive insights across multiple areas such as infrastructure and town planning, incentive development, social marketing, policing, and regulation. SPT is particularly useful to develop policy measures that, instead of aiming to promote 'good' and prevent 'bad' behaviour (e.g., promoting cycling, and discouraging driving), focus on removing 'bad' elements circulating in a given context and increasing the circulation of 'good' elements (e.g., reducing road and car parking spaces, and increasing segregated cycle networks and bike ownership) [4]. The recommendations that follow are underpinned by this framework, which are summarised in Figure 1.

Policy Recommendations

As outlined in comparative cycling research[9] and in line with the relational orientation of social practice theory[4], the policy recommendations that follow can be understood to work most effectively if implemented as a coordinated package of measures. These measures could be considered highly relevant for incorporation into national and local authority development plans in relation to transport and climate policy.

1. Implement integrated pro-cycling policies

As a growing sub-category of cycling, the policies that support cycling as a driving substitute can help to enable greater e-bike uptake: i) the provision of segregated cycling networks [9], including through the reallocation of road space[10]; ii) lower urban and residential speed limits for motor vehicle traffic[9]; iii) ample, secure and proximal residential, public and workplace cycle parking[11], including through the institutionalisation of cycle parking minimums and car parking maximums in new developments[12].

2. Provide more *secure* cycle parking, particularly at high-density locations

While e-cycling can extend the range of cycle journey distances and purposes, e-cycling involves more intensive locking practices[13] and more cautious parking practices[14]. If particular locations do not have high quality formal cycle parking available, e-cyclists may be more deterred from travelling to these areas than conventional cyclists, despite such locations being more physically accessible to travel to by e-bike. Supporting e-cycling therefore necessitates the availability of higher quality cycle parking across a range of settings, particularly in terms of protection from theft. This can be aided by greater availability of guarded/monitored indoor public cycle parking facilities in high density locations (see 'Protection' [15]) as standard open cycle parking facilities (i.e., unsheltered Sheffield stand-style racks) may not provide sufficient perceived protection

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[4] Shove et al., 2012
[5] Spotswood et al., 2015; Larsen, 2017; Cox, 2019
[6] Edberg, 2023a, 2023b
[7] Hess and Schubert, 2019
[8] Kent, 2022
[9] Pucher and Buehler, 2008; Pucher et al., 2011
[10] OECD, 2022
[11] Heinen and Buehler, 2019; Egan et al., 2023; Pucher & Buehler, 2008
[12] Petzer et al., 2021
[13] Popovich et al., 2014; Thomas, 2022; Edberg, 2023a
[14] Edberg, 2023a
[15] Egan et al., 2023

for e-bike users, particularly for medium- to long-term parking (e.g., attending work, shopping for an extended period). Examples of good quality publicly available cycle parking in an Irish context can be observed in Drury Street Car Park, Dublin[16], whereas additional caged/locked facilities within monitored parking compounds may improve e-bike security in workplace settings for employees.

3. Provide more *accessible* cycle parking, that eliminates the need to carry or lift one's cycle

E-bikes can be heavier than conventional bicycles, making them harder to physically handle and manoeuvre/lift when parking. On this basis, parking provisions to minimise the need to physically lift or carry one's bicycle when parking supports e-cycling. Minimising this need is also an important consideration since increased physical demands for parking e-bikes relative to conventional bikes may undermine the physical accessibility of e-cycling that attracts individuals who would otherwise not cycle[17].

First, providing a greater quantity – and over-supply – of surface-level (versus overhead) formal cycle parking spaces can ensure that users do not have physically lift their bike to position it into a hard-to-reach parking space. Relatedly, e-cyclists may be more reluctant to engage in 'fly-parking' (i.e. parking one's bike on public street furniture), which can lead to more instances of bike theft[18]. In this sense, providing a deliberate over-supply of public cycle parking may enhance both the 'accessibility' and 'protection' of parking for e-cyclists[15]. Second, people who live in apartment complexes without secure ground-level cycle parking may be less inclined to purchase and use a e-bike due to the greater physical exertion potentially required to carry an e-bike to one's apartment relative to a conventional bicycle. Irish research indicates that apartment dwelling may be twice as much of a deterrent for cycling for women compared to men[19], and e-cycling research has notably raised the potential e-cycling has in closing the cycling gender gap in lower-cycling contexts[20]. Thus, ample and highly secure residential cycle parking provision may be especially important for increasing the uptake and use of e-bikes, particularly for multi-storey apartment complexes. In addition, recent efforts to deregulate the construction of front of house parking sheds for home-end cycle parking[21] are also supported by this review, due to the need for greater accessibility and protection when parking e-bikes.

4. Support authorised battery charging spaces in workplaces

Considerations for convenient and authorised e-bike battery charging locations in workplaces and other facilities could improve the accessibility of e-cycling to these destinations, in light of the potential challenges surrounding the permissibility battery charging within particular workplaces due to concerns around fire safety [14].

5. Expand the range of segregated cycling networks

E-cycling can 'extend the practices' of cycling, increasing the potential distance[22], gradient[23], range of weather conditions[24], and cargo[25] of cycling journeys, while extending the range of people engaging in cycling, who may be otherwise deterred by the physicality required for conventional cycling[26]. From this perspective, e-cyclists would benefit from protected and/or priority cycle infrastructure similar to conventional cyclists, over an expanded range of destinations.

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[16] https://www.dublincity.ie/residential/transportation/active-travel/initiatives/bike-parking
[17] Dill and Rose, 2012; Popovich et al., 2014; Johnson and Rose, 2015; Marincek and Rérat, 2021
[18] Lierop et al., 2015
[19] Carroll et al., 2020
[20] Wild et al., 2021
[21] Ginty, 2023
[22] Fyhri and Fearnley 2015; Jones et al., 2022
[23] Wild et al., 2021; Marincek and Rérat, 2021
[24] Dill and Rose, 2012; Popovich et al. 2014; Edberg, 2023b
[25] Melia and Bartle, 2022; Thomas, 2022; Edberg, 2023b
[26] Popovich et al., 2014; Jones et al., 2016; Wild et al., 2021; Edberg, 2023b

6. Improve the surface quality and maintenance of segregated cycling networks

The research reviewed indicates several considerations that are significant for developing cycle infrastructure that is e-bike friendly. First, due to the potentially higher speeds that e-cycling may involve, the quality of cycle mobility infrastructure surfaces may be more important for e-cycling safety [27]. On these grounds, greater levels of surface clearance and maintenance of smooth surface quality are important policy considerations for promoting e-cycling, and for promoting the use of segregated cycle networks by e-cyclists.

7. Remove gates and steps from segregated cycling networks

Off-road 'greenway'-style cycle spaces that may require physically manoeuvring or lifting one's bicycle due to the presence of obstructive gates, steps and/or curbs present an exacerbated barrier to people using e-bikes due to the increased demands of handling them – this is exacerbated further for disabled e-cyclists who may rely on e-cycling for mobility[28]. In these instances, removing obstructions and physical barriers to continuous e-cycling is a valuable remediation measure along with creating accessibility for a broader range of users and cycles[29]. In this respect, providing for e-cycling crosses over with providing for a wider range of people cycling, particularly disabled cyclists who may use tricycles or recumbent cycles of various kinds, including e-assisted hand tricycles [30].

8. Provide bicycle ramps at rail services

Mobility infrastructure should be considered at a more micro-level in relation to negotiating steps at public transport stations for multi-modal journeys, which can be more difficult due to the weight of carrying an e-bike[28]. In these instances, bicycle ramps could be installed alongside steps to make the transition between platforms and modes easier, by eliminating the need to carry the e-bike.

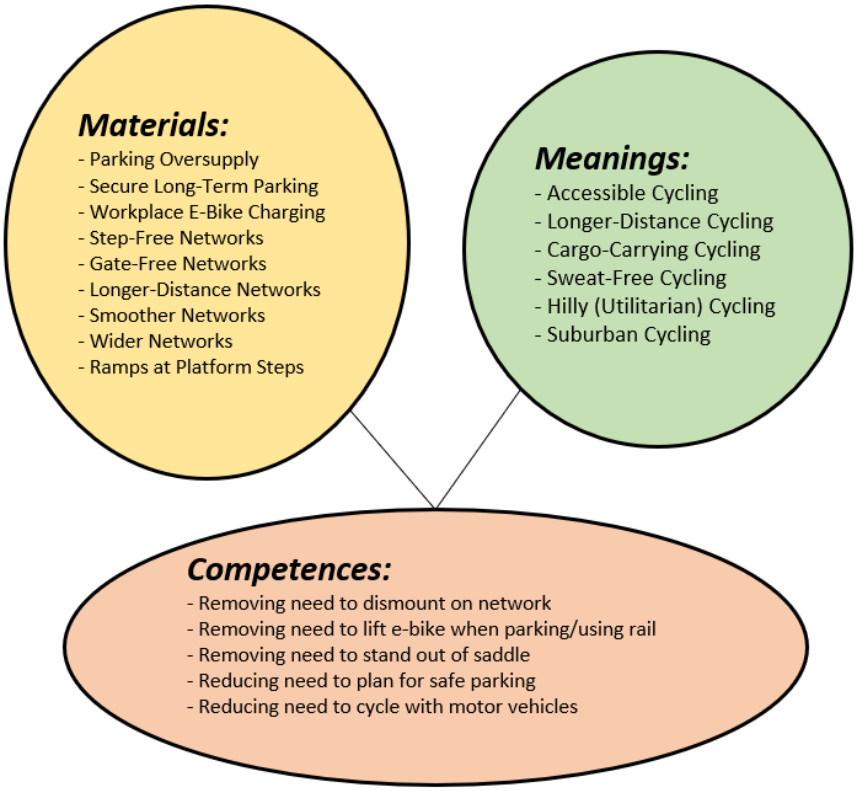
9. Incorporate diverse e-cycling into policy, planning and promotional representations of cycling

This review supports the inclusion of e-bikes/e-cyclists in policy, planning and promotional representations of cycling, which could be particularly beneficial for representations of older people cycling [31]. Age-related reductions in physical ability may lead to defection from cycling. E-cycling can help people to continue cycling [32]. However, care also needs to be taken not to stigmatise e-cycling among younger populations, particularly due to the longer distance travel it enables – which makes it distinct from conventional cycling.

A joint strategy can be undertaken to normalise e-bikes as an accessible and dynamic variant of cycling within policy, planning, and promotional representations of cycling. First imagery of e-bikes can be systematically incorporated into these media. Second, diverse representations of e-cyclists can be incorporated – particularly older people, women and men with loaded panniers or with children in child seats (to indicate cargo-carrying cycling), and people in casual or professional clothing (to indicate sweat-free cycling). This second strategy can represent e-cycling as an accessible variant for groups who might be deterred by the physicality often required for cycling in a car-centric context, but also represents e-cycling as a dynamic type of cycling in its own right that facilitates more varied cycling journeys, primarily in terms of greater cycling distances and cargo-carrying potential.

[27] Popovich et al., 2014
[28] Melia and Bartle, 2022
[29] Ginty, 2022
[30] Hickman, 2015
[31] Rérat, 2021
[32] Marincek and Rérat, 2021

Figure 1: Summary of Policy Recommendations



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