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Exploring the Elements of Private E-Cargo Bike Use: A Mixed-Methods Study Final Technical Report

Project Lead
Robert Egan, Trinity College Dublin

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Executive Summary

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 (Department of Transport, 2022), which was estimated to account for 69% of all journeys in 2022 (National Transport Authority, 2023). 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 as a feasible alternative to the private car has been highlighted (Government of Ireland, 2022).

At present, the uptake of private e-cargo bikes is supported by the Cycle to Work Scheme, which offers up to €3,000 for a new e-cargo cycle (Revenue, 2024). Data gathered by the SEAI Behavioural Economics Unit shows that 15% of car trips in Ireland were undertaken to transport children to school or activities (versus 17% for commuting) in 2023. Of these child-transport trips, 55% were 5km or under. E-cargo bikes are ideal vehicle substitutes for child-transport trips of this range.

Methods

This study explored how private e-cargo cycling is experienced and integrated as a mode of everyday mobility in Ireland among existing e-cargo bike (ECB) owners, using mixed-methods. For the qualitative phase, we undertook 23 in-depth semi-structured interviews with 25 private ECB owners based on the island of Ireland. We used grounded theory methods (Glaser and Strauss, 1967) to identify core problems faced by ECB owners, and to conceptualise the various ways in which these problems were resolved in everyday practice. To explore how e-cargo cycling might change the experience of cycle and road networks in Ireland, we used existing scholarship on the conditions of cycling in Ireland to structure our analysis (Egan and Philbin, 2021).

For the quantitative phase, we ran an online survey informed by the findings of the qualitative phase with 203 private ECB owners based on the island of Ireland. We gathered data on respondent socio-demographics, vehicle ownership/acquisition, travel behaviour, ECB mobility, and ECB parking.

Findings

We found that ECBs were used as a primary mode of family mobility, often replacing the private car as means of providing mobility for children to everyday destinations. In particular, ECB ownership helped people to continue cycling in the face of changing mobility demands related to parenting. However, finding a place to conveniently and securely park the ECB was a major concern among ECB owners relative to parking a conventional bike. In particular, spaces to 'lock away' the ECB off-street both at home, at work, or in public were considered essential for security, particularly for longer term parking.

Lastly, ECB users could be excluded from using protected cycle networks due to design practices that failed not accommodate cargo cycles and maintenance practices that threatened ECB users (and passengers) with discomfort, instability, and/or wheel punctures. On these grounds, developing integrated and protected cycle networks that are both inclusively designed and intensively maintained is essential to ensure such networks can be easily accessed by ECB users.

Introduction

To meet international 2030 climate targets, Ireland needs to halve emissions within its transport sector (Department of the Environment, Climate and Communications, 2021). In pursuing this target, a major stated policy goal is to encourage and facilitate members of the population to use sustainable transport modes instead of the private car (Department of Transport, 2022); in this context, the promotion and proliferation of 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 ecargo bikes as a private car alternative for Irish citizens (Government of Ireland, 2022).

From a socio-technical transitions perspective (Geels, 2012), e-cargo bikes are currently at the level of niche innovation. With right policy support, they could potentially challenge the dominant regime of car use for cargo-carrying journeys in urban contexts. Electrically-assisted cargo cycles might offer an avenue for faster, farther, heavier, and easier cycle goods transport compared to traditional cargo cycles, thereby expanding the scope of cargo cycles as a vehicular substitute in cargo-related journeys (Narayanan and Antoniou, 2022).

However, without a robust and theoretically-informed understanding of why and how people use e-cargo bikes as a car substitute, measures to promote modal shift toward this mode may fundamentally lack effectiveness. The factors influencing both the uptake and use of cargo cycles in general (Lenz and Riehle, 2013; Giordano et al., 2022; Rudolph and Gruber, 2017; Schliwa et al., 2015; Thoma and Gruber, 2020) and electric cargo cycles in particular (Gruber et al., 2014; Gruber and Khim, 2016; Narayanan et al., 2022) have been investigated to some extent – particularly in the area of logistics.

Overall, many constraints identified in this research related to non-electric cargo cycles (Rudolph and Gruber, 2017): problems with weight, low cargo capacity, difficulty cycling uphill (Lenz and Riehle, 2013), and legal regulations on electric cargo cycle max weight (Schliwa et al., 2015). Infrastructure was a factor raised that can constitute a critical enabler or constraint (Lenz and Riehle, 2013; Rudolph and Gruber, 2017; Schliwa et al., 2015; Thoma and Gruber, 2020), along with regulations on vehicular transport modes in terms of access, parking, tolls and taxation relative to cargo cycles (Lenz and Riehle, 2013; Rudolph and Gruber, 2017).

In this way, considerable work has focused on cargo and e-cargo bikes in logistics operations, primarily using quantitative methodologies. More mixed-methods and qualitative understandings of e-cargo bike use and successful substitution are lacking, and explorations of private e-cargo bike use are particularly absent. This absence is striking in light of the potential of e-cargo bikes outside of the logistics sector for particular 'mode-activities' (Cass and Faulconbridge, 2016), such as cycle-shopping, and 'mobilities of care' (Ravensbergen et al., 2020), such as transporting children to everyday destinations. Understanding the behavioural drivers of private car use and private e-cargo bike use as a car substitute is essential for informing effective policy measures in Ireland.

Project Objectives

Car use is a primary and persistent source of unsustainable energy consumption in Ireland, widely used for cargo-related journeys, such as shopping, and passenger-related journeys, such as transporting children to school. As a low-energy vehicle with considerable cargo and passenger capacity, e-cargo bikes may provide a plausible car substitute, particularly in urban contexts. In this project, I aim to explore how private e-cargo cycling is experienced and integrated as a mode of everyday mobility in Ireland among existing e-cargo bike owners, using mixed-methods.

I pursued the following objectives:

1. **Literature Review:** to undertake an extensive interdisciplinary literature review of e-cargo cycle and cargo cycle research, with a particular focus on private use.

2. **Qualitative Interviews:** to design and implement semi-structured interviews to explore the behavioural drivers of e-cargo bike use as a car substitute amongst private users. This involved interviewing private e-cargo bike users/owners regarding the materials, meanings and competences (Shove et al., 2012) of to their e-cargo bike practice relative to cycling and/or driving. Central to this was exploring the 'mode-activities' (Cass and Faulconbridge, 2016) where cargo cycling was engaged in relative to driving (such as 'cycle-shopping' and dropping children to school) and the unique combination of elements required to make e-cargo bikes a successful substitute to the car or bicycle.

3. **Self-Report Survey:** to develop, disseminate and analyse self-report surveys to validate and expand on theoretical understanding developed during qualitative phase. This involved quantitative analysis to identify relationships between the availability and combination of particular materials (e.g., space for e-cargo bike charging, proximity to quiet local roads), competences (e.g., skills in cycling, manoeuvring and parking an e-cargo bike) and meanings (e.g., viewing e-cargo bikes as more convenient than car use and ownership) of everyday e-cargo cycling.

4. **Publication & Communication:** to develop academic research papers and policy briefs, to communicate with relevant public and private stakeholders, and to present findings at academic and policy conferences.

Research Outcomes

This project was the largest dedicated qualitative study of private e-cargo bike owners internationally. It makes several important contributions to the fields of mobilities and transport policy.

Everyday Mobility

We found that the ECB was primarily used as family vehicle in the context of Ireland, where private car use is by far the dominant means of parent-child mobility (Egan, 2025). In particular, parental practices of providing mobility and confining mobility – often engaged in with the private car – were uniquely enacted with the ECB. The ECB enabled existing everyday cyclists to continue cycling as parents, while subverting the cultural dominance of car-based parent-child mobility. In this way, e-cargo cycle parenting may support the maintenance-based growth in cycling practices (Bruno & Nikolaeva, 2020) by preventing, reducing, or delaying parental car use. In the context of Ireland, e-cargo cycle parenting appeared to involve an intergenerational exchange of pro-cycling meanings and competences from parent to child that could also foster sustainable mobility practices in the future (Shove et al., 2012).

Parking Practices

We found that e-cargo cyclists in Ireland struggled to find a secure and convenient place to park their e-cargo cycle, which limited how far they could extend their practice of cycling (Egan et al., 2025a). These findings strongly suggest that the future of private ECB mobilities is highly dependent on an inclusive vision of cycle parking futures (Spurling, 2020), as indicated in existing e-cargo velomobility research (Edberg, 2023; Marincek et al., 2024; Thomas, 2022). Relative to non-cargo bicycles, our research suggests that ECBs are more 'out of place' (Aldred and Jungnickel, 2013) inside of official cycle parking facilities and homes in Ireland, but less 'out of place' when appropriating car parking spaces and home garages, which are often designed to store cars, thereby revealing a unique appropriation practice (Petzer et al., 2021). In other words, where parking is concerned, ECBs appear to find a place more readily within a system of automobility (Urry, 2004) rather than the current system of vélomobility (Cox, 2019) in Ireland.

Cycle Networks

Our study (Egan et al., 2025b) reveals how cycle network planning, maintenance, and design practices on the island of Ireland may produce "systemic sticking points" (Watson, 2013, p.124) to the future growth of e-cargo cycling, in spite of sizeable purchase subsidies (Revenue, 2024). In particular, our research indicates that e-cargo cyclists (i) may especially benefit from protected cycle networks due to the common use of ECBs for transporting children, (ii) may be particularly sensitive to network surface quality and clearance relative to non-disabled conventional cyclists (Cox and Bartle, 2020; Hickman, 2016), and (iii) may be excluded from accessing protected cycling networks, due to exclusionary and/or minimalist design practices that fail to accommodate e-cargo cycles. On these grounds, developing integrated and protected cycle networks that are both inclusively designed and intensively maintained is essential to ensure such networks can be easily accessed by a diversity of ECB users, in keeping with broader calls for "inclusive" cycle network design practice (Clayton, Parkin and Billington, 2017; Cox and Bartle, 2020; Hickman, 2016).

Project Impact

In the context of climate and transport policy goals and measures, this research provides several key insights:

1. E-cargo bikes are used as a primary mode of family mobility, often replacing the private car (Egan, 2025). ECB ownership can therefore contribute to modal shift by maintaining cycling practices in the face of changing mobility demands that could increase car use rather than the traditional focus on recruiting practitioners from driving. This demonstrates a unique way of growing cycling through expanding access to ECBs at critical junctures of family life.

2. Theft or damage to the ECB is a major concern for owners, whose ECBs are often much more expensive than conventional or non-cargo electric bicycles and are relied upon for everyday transport, and lack of secure parking is a major impediment to ECB use (Egan et al., 2025a). This demonstrates an area for policy action to expand ECB use and ownership.

3. ECB owners can be excluded from protected cycle networks due to design practices that do not accommodate cargo cycles and maintenance practices that threaten ECB users with discomfort, instability, and/or wheel punctures (Egan et al., 2025b). Making cycle network design and maintenance practices ECB-inclusive can support ECB growth.

Image 1. Box E-Cargo Bike

Image 2. Long-tail E-Cargo Bike

Recommendations

We make the following recommendations to 1) directly support expanded ECB ownership, 2) facilitate better ECB parking, and 3) improve the protection of current and future ECB owners from motor traffic and increase the accessibility of existing cycle networks. More information can be found in our dedicated policy brief (Egan et al. 2025c).

1. **Ownership:**

   • Develop broader grant schemes for e-cargo bike purchase
   • Support and promote local e-cargo bike trials

2. **Parking:**

   • Increase the availability of e-cargo bike accessible on-street parking zones and stands
   • Increase the availability of secure off-street public cycle parking compounds
   • Enable secure and convenient residential e-cargo bike storage by relaxing planning regulations for cycle storage sheds and providing on-street, enclosed e-cargo bike accessible parking

3. **Mobility:**

   • Expand the provision of e-cargo bike accessible protected cycle networks
   • Retrofit existing cycle networks so they are e-cargo bike accessible Improve standards of cycle network maintenance to improve e-cargo bike accessibility

Image 3. ECB 'Standing Out' on the Street

Image 4. Roadside ECB Parking

Conclusions and Next Steps

With four policy-relevant academic publications (Egan, 2025; Egan et al., 2025a, 2025b, Accepted), several national and international conference presentations, and two policy briefs (e.g., Egan et al., 2025c) which secured direct engagement with the target stakeholders, this study has been highly successful on multiple fronts. Further analysis of quantitative survey data and possibly some qualitative analysis relating to the process of 'committing to the e-cargo bike' remain as possibilities for future publication and policy briefing.

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Rialtas na hÉireann
Government of Ireland

Sustainable Energy Authority of Ireland
Three Park Place
Hatch Street Upper
Dublin 2
Ireland
D02 FX65

w: www.seai.ie
e: info@seai.ie
t: 01 808 2100