3-044 iMOVE Project

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THE UNIVERSITY OF QUEENSLAND
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CREATE CHANGE

CLOSING THE LOOP ON FIRST/LAST MILE TRANSPORTATION

Assessing the Connection between Micromobility and Public Transport in Brisbane

This research is funded by iMOVE CRC and supported by the Cooperative Research Centres program, an Australian Government initiative

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This project, titled *‘Closing the Loop on First/Last Mile Transportation: Assessing the Connection between Micromobility and Public Transport in Brisbane’*, was a collaboration between the University of Queensland (UQ), Brisbane City Council (BCC), and iMOVE Australia. The project addressed a critical urban mobility challenge: the first/last mile connectivity gap that affects many public transport users in Brisbane. It aimed to evaluate whether micromobility, particularly shared e-mobility schemes such as e-scooters and e-bikes, could effectively complement public transport to provide door-to-door sustainable and equitable transport solutions.

This 8-month study (July 2025 – February 2026) represents the first controlled natural experiment globally to systematically test the integration of shared e-mobility with public transport using a phased intervention design. A three-phase trial at Albion Train Station tested new infrastructure integration (dedicated e-mobility parking hubs), pricing intervention ($1 reduced e-mobility fares), and their combined effects. The study drew on GPS e-mobility data (3,454 trips from Lime and Neuron) with intercept surveys (1,467 passengers) to understand actual usage patterns alongside public perceptions.

Key findings

Over the three project phases, e-scooter uptake rose

- Daily trip rates grew 76% from baseline (15.2 trips per day) to full integration (26.7 trips per day)
- Infrastructure improvements drove the largest gains (adding 52%); subsidised pricing added modest further growth (adding 16%)
- Usage remained consistently commuter-oriented with around 50% of all trips being 1 to 4km in distance, with trip activity mostly concentrated during weekday peak periods (between 16:00 and 20:00)
- Trip characteristics remained relatively stable across all three phases. The two interventions (first infrastructure followed by pricing reductions) enhanced existing first/last-mile patterns rather than creating new ones.

Public awareness increased, but willingness remained low

- Awareness of shared e-mobility options nearly doubled from 27% to 52% across the three survey rounds.
- Yet willingness to use a shared e-mobility device remained consistently low, with 53-58% responding "extremely unlikely" throughout.
- Prior e-mobility experience was the strongest predictor of willingness.
- Negative sentiments were prevalent in public perceptions of shared e-mobility, which might have hindered willingness to try.

Behavioural and perceptual barriers dominated

- Most listed barriers: preference for their currently adopted mode (33-35%), identity resistance (i.e., "not an e-scooter rider") (24-31%), safety concerns / fear of riding (18-25%).
- Cost was cited by 19-21% and was not reduced by the implementation of subsidised fares.
- Car-dependent commuters were revealed as the least willing to try e-mobility as part of their travel, while walkers and public transport users were comparatively more open.

- Safety concerns, high pricing, and public nuisance concerns dominated public perceptions of shared e-mobility schemes.

Key policy implications

What worked well

- Shared e-mobility effectively served short-distance first/last-mile connections (1-4km) particularly during peak commute times (for the Albion Train Station).

What did not work (at least alone)

- Pricing subsidies alone produced minimal impact without supporting e-mobility infrastructure
- Negative perceptions of e-mobility persisted, suggesting a pressing need for safety inductions, stricter regulations and targeted communications to improve public acceptance.

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We are grateful to the broader research team at the UQ Micromobility Research Cluster for their contributions to research design, data analysis, and reporting. Finally, we thank the public transport and e-mobility users who participated in the surveys and whose trips formed the basis of the analyses contained within this report.

Acknowledgement of Country

We acknowledge the Traditional Owners and their custodianship of the lands on which this project originated. We pay our respects to their Ancestors and their descendants, who continue cultural and spiritual connections to Country. We recognise their valuable contributions to Australian and global society.

Disclosure statement

This research was a collaboration between the University of Queensland (UQ), Brisbane City Council (BCC), and iMOVE Australia. While the report, and the associated research project, was sponsored and endorsed by BCC and iMOVE Australia, all findings and insights were drawn from independent work conducted by the authors at UQ and were not influenced by BCC or iMOVE Australia.

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Section 1: Project Description

1.1. Project overview, research context and significance

This project, titled **'Closing the Loop on First/Last Mile Transportation: Assessing the Connection between Micromobility and Public Transport in Brisbane'**, was a collaboration between the University of Queensland (UQ), Brisbane City Council (BCC), and iMOVE Australia. The project addressed a critical urban mobility challenge: the first/last mile connectivity gap that affects many public transport users in Brisbane. It aimed to evaluate whether micromobility, particularly shared e-mobility schemes such as e-scooters and e-bikes, could effectively complement public transport to provide door-to-door sustainable and equitable transport solutions.

While Brisbane's public transport network is a robust mix of a modern bus fleet, intercity train services, ferries, and a newly launched all-electric metro service, barriers to its usage exist. The introduction of 50-cent public transport fares in Brisbane largely eliminated price as one of these barriers. Still, the classic first/last mile problem in connecting a person's starting and ending locations persists. This transport gap typically occurs between the trip origin/destination and the location of public transport services, which dissuades public transport usage. One possible solution is to encourage the usage of micromobility to access public transport. Particularly, shared e-mobility (e.g., e-scooters, e-bikes) presents an option to combat the first/last mile problem, allowing for on-demand and convenient short-distance transport. With over 19 million shared e-scooter trips since its launch in 2018, Brisbane has led the nation in embracing micromobility as a major component of the transport ecosystem.

This project aimed to examine the uptake of shared e-mobility and its interaction with public transport in an environment where cost as a barrier to public transport usage was significantly reduced. It involved extending the shared e-mobility services into a previously unserved area, within the catchment of a mass transit hub. The study examined three scenarios to explore the effects of infrastructure and pricing changes on e-mobility and public transport usage. With specific focus on examining e-mobility uptake, perceptual/behavioural shifts, and motivations/barriers of e-mobility use, the research sought to generate evidence-based insights to inform transport policy and infrastructure investment decisions across Australian cities regarding the strategic integration of micromobility into transport ecosystems.

1.2. Study scope and experimental design

This 8-month study (July 2025 – February 2026) adopted a mixed-methods approach, combining (1) a natural experiment of observed travel behaviour through shared e-mobility trip data and (2) primary data collection through intercept surveys of passengers at the chosen site, to provide the requisite understanding of the connection between micromobility and public transport. A trial site was identified and selected by BCC at Albion Train Station (the site), which is on the North Coast Line in Brisbane and has a Park 'n' Ride facility.

The experimental design encompassed three distinct scenarios implemented sequentially:

- ***Phase 1 – Baseline (1 July - 31 August):*** Assessment of existing transport patterns with no provision of e-mobility parking infrastructure at the site, using existing e-mobility pricing schemes.
- ***Phase 2 – Infrastructure integration (1 September – 12 October):*** Evaluation of transport behaviour changes following the provision of dedicated e-mobility parking infrastructure at the site, while maintaining existing e-mobility pricing schemes.
    - BCC constructed dedicated e-mobility parking hubs at the site, which would remain there indefinitely.
    - Shared e-mobility service providers (Lime and Neuron) started deploying devices (e-scooters and e-bikes) to the station and surrounding catchment areas.

- ***Phase 3 – Infrastructure & pricing integration (13 October – 7 December):*** Analysis of transport patterns with both dedicated e-mobility parking infrastructure and reduced e-mobility pricing, representing full infrastructure and pricing integration.
    - BCC and e-mobility service providers agreed upon the designated catchment are for e-mobility fare reduction. From 13 October to 7 December, a flat fee of $1 applied to every e-scooter and e-bike trip that started or ended at the Albion Train Station.

Each phase comprised two weeks of intercept surveys undertaken with passengers accessing the site, with questions exploring transport modes to/from Albion Station; motivations and barriers to shared e-mobility usage; trip purpose; station usage frequency; travel distance; micromobility usage and perceptions; and demographics (see Appendix 1).

More details of the data collection and analysis processes are explained in Section 3.

1.3. Project team

1.3.1. The University of Queensland (UQ)

UQ researchers were responsible for conducting the original research associated with this project, that included: (1) obtaining ethics approval; (2) collecting and analysing primary data (intercept surveys) and secondary data (e-mobility trip data); and (3) research reporting. The core UQ research team included:

- Dr Richard Buning – Project lead
- Professor Jonathan Corcoran – Project lead
- Dr Zhenpeng (Frank) Zou
- Associate Professor Thomas Sigler
- Associate Professor Dorina Pojani
- Dr Scott Lieske
- Dr Wendy Pham
- Mr Abolghasem Azhdari

1.3.2. Brisbane City Council (BCC)

The BCC staff were responsible for coordinating with the UQ research team and key stakeholders – including shared e-mobility providers (Lime and Neuron), Queensland Rail, Translink, and local councils – to support project delivery and the successfully implementation of the research. BCC's main tasks included: (1) establishing designated e-mobility parking areas at the chosen site (Albion Train Station); (2) working with providers to deploy e-mobility devices and introduce reduced trip fares, and (3) collaborating with local authorities to promote the trial. The key staff involved in this project were:

- Mr Brendan O'Keeffe – Principal Engineer Policy and Strategy | Transport Assets and Operations | Infrastructure Services
- Mr Joe Morgan – A/Principal Contracts Manager | Commercial and Contract Services | Public Transport Services
- Mr Yru Redhead – Project Officer | Transport Partnerships, Commercial and Contract Services | Public Transport Services

Section 2: Literature Review

The first and last mile problem remains one of the key barriers to achieving fully integrated and sustainable urban mobility systems. It refers to the initial and final segments of a journey, often between home or work and a public transport stop, where conventional mass transit options are less efficient or accessible (van Kuijk et al., 2022). Bridging this gap effectively is essential for encouraging public transport use and reducing reliance on private vehicles (Oeschger et al., 2020).

In recent years, micromobility, including shared e-scooters and e-bikes, has emerged as a promising solution for these short-distance connections. Micromobility offers flexible and space-efficient travel options that complement public transport by providing door-to-door accessibility between transit hubs and final destinations (Oeschger et al., 2020; Tsouros et al., 2025). Empirical studies indicate that shared e-scooters often complement public transport when stations are within moderate walking distance, enhancing first/last-mile accessibility (Jayawardhena et al., 2025). When strategically integrated with transit hubs, they are also associated with increases in public-transport ridership and substitution of short car or ride-hailing trips (Ahmad et al., 2025). For instance, evidence from Doha and multiple U.S. cities indicates that over half of shared scooter trips begin or end near metro or bus stations, highlighting their value as feeder modes (Tsouros et al., 2025).

Shared micromobility systems provide flexible and efficient transport options that fill critical gaps in urban travel. They enhance accessibility by connecting people to transit networks and nearby destinations while helping to reduce congestion and vehicle emissions (Fearnley & Veisten, 2025; Oeschger et al., 2020). For users, key benefits include shorter travel times, cost savings, and the convenience of app-based access (Teixeira et al., 2023). These systems make more efficient use of limited street space compared to cars and can support cities' low-carbon mobility goals by promoting short, sustainable trips.

However, the potential of shared micromobility depends on addressing several challenges. Safety concerns, especially related to road sharing and inadequate infrastructure, are among the most cited barriers (Sanders et al., 2020; Teixeira et al., 2023). Other barriers include affordability concerns and uneven spatial access to vehicles, with some neighbourhoods having fewer scooters available (Delbosc & Thigpen, 2024). Equity challenges remain, as shared micromobility is used more by younger, higher-income men, highlighting the need for subsidised programs that improve access for under-represented groups (Delbosc & Thigpen, 2024).

Also, the local context of Brisbane adds important nuances to these dynamics. Factors like climate, topography, and transit layout influence the uptake of shared e-scooters and e-bikes. Evidence from Doha shows that even in hot climates, effective planning and multimodal integration can sustain e-scooter use (Tsouros et al., 2025). Similarly, Oeschger et al. (2020) emphasise that contextual planning, considering safety and equity, is critical to successful integration. In Brisbane, proximity to stations has been a strong predictor of bikeshare use (Fishman et al., 2015), reinforcing the importance of well-located and accessible infrastructure.

Closing the first/last-mile gap in Brisbane through shared e-mobility requires context-sensitive infrastructure, safety measures, and equitable policies. The literature suggests that when supported by strong planning and multimodal integration, shared e-scooters and e-bikes can play a key role in transforming Brisbane's transport network into a more sustainable, accessible, and user-friendly system.

2.1. First/last-mile integration between shared micromobility and public transport

A large body of research demonstrates that shared micromobility has significant potential to enhance first- and last-mile access to public transport, although the extent to which these benefits materialise varies substantially across cities and depends on system design, land-use patterns, fare policies, and multimodal planning. At a conceptual level, shared micromobility is most effective in providing short, flexible access trips that bridge the distance between homes or workplaces and the nearest high-frequency public transport station (Chen et al., 2025; Zheng et al., 2025). In Beijing, real-world trip data show that shared bicycles are highly competitive within short connection distances and overwhelmingly dominate bus feeder services when the walking access path becomes long or when the bus requires transfers or indirect routing (Chen et al., 2025). Similarly, Zheng et al. (2025) model the multimodal commuter journey and demonstrate that the introduction of bike-sharing lowers the generalised access cost to transit and expands the feasible catchment of metro stations. They show that bike-to-transit is especially advantageous for long-distance rail commuters who cannot complete their entire trip by bike but can dramatically reduce their access times by switching from walking to bike-sharing. Together, these modelling and empirical studies highlight how the effectiveness of bike-sharing as a feeder mode is fundamentally grounded in the micro-scale geography of station access.

The influence of spatial planning and integration strategies is equally important. Evidence from Regensburg shows that even if a shared micromobility system is designed for typical first/last-mile trip lengths (approximately 3 km), poor coordination with the public transport network can convert bike-sharing from a complement to a competitor (Narayanan et al., 2025). Their scenario modelling indicates that a significant share of prospective bike-sharing users are drawn disproportionately from public transport, signalling weak integration and poor station-area planning. They argue that shared micromobility must be explicitly positioned as a feeder mode, supported by integrated fare products, coordinated station locations, and multimodal service platforms (such as Mobility-as-a-Service) if it is to strengthen rather than undermine public transport.

Important operational insights come from disruption contexts. In Milan, where COVID-19 social distancing dramatically reduced subway capacity, shared bicycles and e-bikes were shown to help absorb displaced transit riders when deployed strategically around overloaded stations (Liouta et al., 2024). Although the system was unable to compensate fully for lost rail capacity, reshaping bike-sharing supply effectively transformed it into an adaptive first- and last-mile service during a capacity shock.

Additional evidence shows that integration depends heavily on station siting choices. In Lisbon, for example, the GIRA docked system is often located directly along metro lines, which has the unintended effect of inducing bike-sharing substitution away from transit rather than serving access gaps (Moura et al., 2023). The authors argue that bike-sharing only functions as a feeder where it is placed in under-served areas, rather than co-located with high-quality transit stops. Complementary findings from Poland show that although many users employ shared bikes and scooters to reach public transport stops, the systems lack multimodal coordination and thus generate substantial substitution away from transit (Bieliński et al., 2021). They provide insights into how shared micromobility interacts with public transport in Polish cities, noting that a notable subset of users employ shared bikes and e-scooters for access and egress to transit stops. This suggests that shared micromobility has potential as a first- and last-mile solution. However, the authors also report high levels of public transport substitution, indicating that systems are not yet integrated strategically with transit. The findings therefore point to a dual pattern; micromobility can complement public transport by bridging gaps in coverage, but in practice, it more often competes with it due to overlapping catchment areas and insufficient multimodal coordination.

Equity-focused studies also shed light on integration dynamics. In the United States, low-income subscribers of the Lime Access discount program are far more likely than regular users to combine shared micromobility with transit (Delbosc & Thigpen, 2024). These users rely on shared devices to bridge the geographic and temporal gaps left by infrequent or unreliable transit services, demonstrating that integration is not simply a matter of infrastructure but also affordability and reliability.

Research conducted in cities that had not yet introduced a bike-sharing scheme at the time of study also shows that residents can still conceptually recognise the potential of such systems to enhance multimodal connectivity. In Drama, Greece, survey participants anticipated that a future bike-sharing service would complement public transport and facilitate short first- and last-mile movements, despite the city having minimal cycling culture and no operational system at the time of data collection (Nikitas, 2018). This demonstrates that expectations of integration can emerge even in low-cycling contexts, although whether these expectations translate into actual behaviour depends on infrastructural, cultural, and service design conditions once a system is implemented.

Taken together, the literature consistently reinforces the idea that shared micromobility can meaningfully support first- and last-mile connectivity, but only when system design, spatial configuration, reliability, and affordability are aligned with transit planning. Without integration, shared micromobility risks competing with public transport rather than complementing it, reducing the broader system's efficiency.

2.2. Modal shift and substitution effects of shared micromobility

Research examining modal substitution consistently reveals that shared micromobility exhibits highly diverse substitution patterns, shaped by local transport contexts, system design, and user demographics. A major concern raised across multiple studies is that shared micromobility may substitute public transport rather than displace private car use. In Regensburg, approximately 41% of anticipated bike-sharing trips were projected to be diverted directly from public transport, compared with only 15% from cars, indicating that the absence of integration can redirect riders away from sustainable high-capacity modes (Narayanan et al., 2025). In Lisbon, a geographic overlap between bike-sharing stations and metro corridors resulted in shared bikes substituting heavily for metro trips rather than supporting access to stations, with minimal reductions in car travel (Moura et al., 2023). Polish cities show similar patterns; Bieliński et al. (2021) show that walking is the most commonly replaced mode for both shared e-scooters and shared bikes, followed by public transport. Car substitution is relatively limited, accounting for only around one in ten trips, while ride-hailing substitution is minimal. Younger users tend to substitute active modes, whereas older users more frequently shift from public transport. The study also finds mode-specific differences, with e-scooters showing particularly strong substitution from PT and walking. These patterns suggest that, in transit-rich environments, shared micromobility often competes with sustainable modes rather than shifting users away from private cars.

At the same time, shared micromobility often lacks the capacity to substitute for public transport even when users attempt to use it as such. During pandemic-induced subway disruptions in Milan, bike-sharing systems were able to absorb only around 6% of combined transit and bike-sharing demand, even in enhanced configurations with expanded fleets and additional stations (Liouta et al., 2024). This finding, echoed by theoretical work showing that substitution away from transit is feasible only within narrow trip distance windows (Zheng et al., 2025), suggests that shared micromobility is structurally unsuited to replace high-capacity transit for most trips.

Nevertheless, car substitution does occur in specific contexts, particularly in more car-dependent cities or where urban form is less transit supportive. Sacramento's dockless e-bikes system shows that walking is the most common substituted mode for short trips, while car-related modes, driving alone, carpooling, and ride-hailing, are substituted more often for longer and non-downtown trips. Car substitution accounts for roughly 36% of all e-bike-share trips, representing a substantial shift away from private vehicle use (Fukushige et al., 2021). Australian cities show similar patterns; Fishman et al. (2014) offer one of the clearest cross-national assessments of modal substitution in bike-sharing, revealing substantial variation between cities. Across the five systems studied, bike-share trips most frequently replaced walking and public transport, while car substitution varied sharply by urban context. The strongest car-replacement effects occurred in the Australian cities, with Brisbane showing the highest rate of car substitution (21%) and Melbourne close behind (19%), outperforming all U.S. and U.K. systems. The authors attribute this to the more car-dependent travel patterns of Australian cities, where bike-share provides a more realistic alternative to driving than in dense, transit-rich settings. By contrast, car substitution was low in London (2%) and Washington, D.C. (7%), where public transport substitution dominated. These findings point strongly to a contextual relationship between baseline car-dependence and the likelihood of car substitution; shared micromobility displaces car trips most effectively where car use dominates and where public transport alternatives are weak or indirect.

Substitution patterns also reflect differences in system design. Ma et al. (2020) examined modal shift responses to three different bike-sharing systems, dockless Mobike, docked OV-fiets, and subscription-based Swapfiets, in Delft, the Netherlands, a city with an exceptionally high cycling mode share. The results showed that dockless Mobike and subscription-based Swapfiets generate substantial modal shifts for commuting but largely from walking, public transport, and especially private cycling, rather than from cars. OV-fiets, conversely, generates less overall substitution because it functions primarily as a rail feeder system, although it still replaces some bus/tram trips. Lisbon's docked GIRA system similarly induces high rates of metro substitution due to its corridor-aligned station placement (Moura et al., 2023). These cases show that mode substitution is not only culturally and spatially contingent, it is also highly sensitive to system form.

Overall, the literature demonstrates that shared micromobility's modal substitution effects are deeply conditioned by context; strong car substitution emerges in car-dependent environments; public transport substitution emerges in transit-rich environments; and walking substitution is common almost everywhere. Shared micromobility has potential to reduce car use, but real-world substitution outcomes depend far more on system design, integration, infrastructure, and baseline travel patterns than on the micromobility mode itself.

2.3. Affordability and subsidy as barriers and policy levers in micromobility adoption

Affordability has emerged as a primary barrier to the widespread adoption of shared micromobility, particularly among low-income populations. Surveys and case studies from the U.S. and other contexts consistently show that shared micromobility users tend to be younger, male, and disproportionately from higher-income groups, while lower-income populations remain underrepresented (Brown & Howell, 2024; Delbosc & Thigpen, 2024). Prior research on U.S. systems found that the price of using these services, lack of cash payment options, and lack of banking or smartphone access have all limited uptake in marginalised communities (Brown & Howell, 2024; Chen & Huang, 2024). Similarly, Delbosc and Thigpen (2024) found that among users not enrolled in reduced-fare programs, 30% identified cost as a primary barrier.

One of the approaches to address this barrier is through public subsidy. For example, providing purchase subsidies has been found to be a strong predictor of the intention to acquire an e-bike, highlighting that many potential e-cyclists are price-sensitive. In Eugene, Oregon, a rebate program led to clear reductions in car use and increased adoption of e-bikes, while in Oslo, a 50% e-bike purchase subsidy generated a 12.6-percentage-point rise in bicycle mode share (Meng et al., 2025; Sundfør et al., 2024). Although these studies focus on private micromobility ownership, their findings provide strong evidence that reducing acquisition costs results in measurable modal shifts.

Mobility-as-a-Service (MaaS) has also been explored as a broader framework for addressing cost-related barriers. MaaS platforms can reduce user costs through subscription models, bundling, and integrated fare systems (An & Shen, 2025; Guidon et al., 2020). Kriswardhana and Esztergár-Kiss (2025) further showed that younger users are especially responsive to discounted MaaS bundles that include shared micromobility services. These insights underscore how integrated pricing strategies can serve as indirect subsidy mechanisms for shared mobility access.

However, subsidies targeting shared micromobility itself remain rare. Few cities or operators offer robust financial support for shared e-bikes and e-scooters, and even fewer are supported by public funds. A notable exception is Lime's Access program, which offers 50–100% fare discounts to low-income riders across the U.S., Australia, and New Zealand. Delbosc and Thigpen (2024) found that Access riders used shared micromobility significantly more often than others, with 35% riding daily and 44% using it to connect with transit. Cost was identified as a major barrier by 30% of non-Access riders but only 13% of Access users, suggesting that subsidies can dramatically reduce price sensitivity and increase usage frequency.

Chen and Huang (2024) similarly showed that income-based discounts substantially increased bike-share usage among low-income riders in the U.S., more so than infrastructure expansion alone. Using a uniquely large dataset covering more than 100 million trip records across the 14 largest bike-sharing systems in the United States, this study provides strong causal evidence that affordability is a major barrier to bike-share adoption among low-income users. The authors combine detailed trip data, equity-program information, and neighbourhood income statistics to estimate the impact of income-based discount programs using a staggered difference-in-differences approach. Their results show that price reductions substantially increase bike-share usage among low-income members, raising trip duration by 14–31% in the first year after the subsidy is introduced, whereas simply adding more stations raises usage overall but fails to reduce income-based disparities. The study also demonstrates that dockless systems reduce usage among low-income residents due to smartphone requirements, further reinforcing the role of structural affordability barriers.

Modelling studies have also explored how subsidy design affects shared micromobility system stability and access. Chen et al. (2025), for instance, simulated integrated subsidy schemes for shared bikes and public transit in Beijing. Their evolutionary game theory model showed that subsidies to both users and operators were critical to sustaining metro–bike integration and service availability, especially in peripheral areas. Yet they also noted that subsidies often erode operator profit margins, raising concerns about financial viability. These concerns are echoed by Delbosc and Thigpen (2024), who noted that most reduced-fare programs run by private micromobility companies are not financially sustainable without external public support.

Despite these early insights, subsidy policy for shared micromobility remains underdeveloped. Delbosc and Thigpen (2024) point out that while some cities offer e-bike purchase rebates or eliminate permit fees for operators in exchange for equity commitments, very few provide ongoing financial support for discounted shared rides. Brown and Howell (2024) found that among 239 U.S. micromobility programs, only 32% included reduced-fare requirements, and even fewer included supporting infrastructure like smartphone alternatives or geographic equity mandates. The majority of programs bundled only one or two equity mechanisms, leaving many low-income, unbanked, or digitally excluded riders without meaningful access.

These findings suggest a clear gap in both research and policy practice. While the importance of affordability is widely acknowledged, and direct financial support has been shown to shift behaviour in both shared and private micromobility, robust, publicly funded subsidy programs for shared e-scooters and e-bikes remain the exception. This gap is particularly notable given that most shared micromobility systems are operated by private companies, whose business models rely on fare revenue and who cannot reasonably be expected to absorb the financial burden of large-scale fare-reduction programs on their own. As a result, the policy responsibility for ensuring equitable pricing structures falls largely on public agencies rather than operators. Further empirical work is needed to test how different subsidy models influence usage, equity outcomes, and system sustainability, especially in contexts where private operators control service delivery.

Section 3: Methodology

This study represents the first controlled natural experiment globally to systematically test the integration of shared e-mobility with public transport using a phased intervention design. It drew on two complementary data sources to examine the role of shared e-mobility in addressing first- and last-mile connectivity at Albion Train Station. The first dataset comprised GPS-based shared e-mobility trip records, which captured detailed information on the timing, location, distance, and frequency of e-scooter and e-bike trips across the three study phases. The second dataset consisted of intercept survey responses collected from passengers at the station, providing insights into travel behaviour, willingness to use shared e-mobility, perceived barriers, and user motivations.

The analysis combined quantitative methods, including descriptive statistics and regression modelling, with qualitative analysis of open-ended survey responses to provide a comprehensive understanding of both observed travel behaviour and underlying perceptions. Together, these methods enabled the study to assess how infrastructure and pricing interventions influence e-mobility uptake, travel patterns, and attitudes toward first- and last-mile travel.

3.1.Study context

Albion Train Station is a key suburban transit hub on the North Coast Line in Brisbane's inner-north, serving the suburb of Albion about 5km north-northeast of the Brisbane CBD. It has four ground-level platforms and is part of the TransLink network, with regular services such as the Shorncliffe, Airport and Doomben lines that connect commuters to the city and beyond.

The station supports commuters with park-and-ride options: the Albion Station car park includes approximately 280 parking spaces, offering convenient access for those driving to the station before completing their journey by rail. Parking is managed alongside station facilities like accessible car spaces and kiss-and-ride drop-offs on Albion Road and Mawarra Street. This parking context is important for understanding mode choice patterns observed in the study.

The surrounding suburb of Albion is a vibrant inner-northern Brisbane neighbourhood, featuring a mix of historic homes and newer developments, local shops, cafes, and parks. Its location close to major transport routes and just a few minutes' drive from the CBD, as well as its proximity to Brisbane Airport and the broader public transport network, makes Albion Station popular with commuters and leisure travellers alike.

3.2. E-mobility trip data

3.2.1. E-mobility trip data collection

This study used trip-level GPS data provided by two shared e-mobility providers, Lime and Neuron, covering three sequential trial rounds conducted between 1 July 2025 and 7 December 2025. The data consisted of time-stamped GPS point records representing individual e-mobility trips.

Each record contained latitude and longitude coordinates alongside associated trip metadata, including a unique trip identifier, anonymised user identifier, timestamp, provider name, and trip direction (inbound or outbound relative to Albion Station). A trip was defined as sequences of GPS points sharing a common trip ID.

In total, the dataset comprised 3,454 trips, including 1,503 trips from Lime and 1,951 trips from Neuron. The Lime dataset contained 28,810 GPS points, while the Neuron dataset contained 236,015 GPS points, reflecting differences in providers' sampling frequency and data resolution. All GPS records were imported into a geodatabase environment and organised by provider and trip ID to enable consistent spatial processing and analysis across the two datasets.

3.2.2. E-mobility trip data analysis

All spatial data processing and analysis were conducted using ArcGIS Pro. The raw GPS point data were first converted into point feature layers using recorded latitude and longitude coordinates. Points were then grouped by trip ID and ordered temporally to reconstruct individual trip sequences.

To generate continuous trip routes from discrete GPS points, the Route Solver from the Network Analyst toolset was applied. This method estimated the most likely path travelled by each e-scooter by identifying the shortest network-constrained route between successive GPS locations, rather than drawing straight-line connections between points. This approach reduced the influence of GPS noise and improved spatial realism by constraining movement to the road network.

The underlying road network was derived from Queensland Roads and Tracks (QRT), a foundation dataset produced by the Queensland Department of Resources. The road network included all mapped transport corridors in the Queensland Roads and Tracks dataset, encompassing motorways, arterial and local streets, as well as shared paths, bikeways, and pedestrian walkways, ensuring that route estimation was not restricted to motor-vehicle roadways only. The QRT dataset provided a comprehensive and topologically consistent representation of public roads and paths across Queensland and was used to build the network dataset required for route solving.

Generated trip routes were stored as polyline features retaining their original trip identifiers and metadata. These route geometries were subsequently used for spatial visualisation, aggregation, and density-based mapping to examine recurring travel corridors, route overlap, and spatial patterns of e-mobility use across the study area.

Results from the trip data analysis are presented in Section 4.

3.3. Intercept survey data

3.3.1. Survey design & data collection

The researchers obtained ethics approval from the UQ Human Research Ethics Committee on 31 July 2025 (ethics ID: 2025/HE001424) (see Appendix 2). A team of research assistants were recruited and trained to support survey distribution at Albion Station. Data collection protocols were developed and communicated among the research assistants to ensure the quality of data collected as well as their health and safety on-site (see Appendix 3). Brisbane City Council facilitated liaison with Queensland Rail staff to secure approval for on-site data collection.

The survey questionnaire (see Appendix 1) was designed to capture passengers' first- and last-mile travel (i.e., journeys to and from the train station). Any passenger aged 18 and over at Albion Station could participate voluntarily in the survey, including both users and non-users of shared e-mobility services. The trained research assistants approached every fourth person to ensure a quasi-random sample of station passengers. To ensure feasibility in a busy transit setting, the survey was kept brief, requiring respondents less than five minutes to complete while waiting for a train or continuing to their next destination. It included questions on travel mode, motivations and barriers to using shared e-mobility, trip purpose, station usage frequency, travel distance, daily micromobility usage and perceptions, and demographic characteristics. The survey was accessible online via a QR code, which was shown by the research assistants to the passengers at Albion Station (see Figure 3.1). Paper surveys were also prepared for those preferring this option. Corflute signs and flyers were used to raise awareness and encourage participation of the public (see Figure 3.2).

Figure 3.1: Research assistants providing the QR code for respondents to access the online survey

Figure 3.2: Physical signage displayed at Albion Station to promote the study

There were three distinct rounds of intercept surveys corresponding to the three phases of research (see Section 1.2). Survey time was scheduled in accordance with peak travel hours at the station (see Table 3.1 for a typical weekly survey schedule). Table 3.2 provides a summary of the survey period, detailing the time on the field and response rates. In total, the research team conducted 274 hours of surveying at Albion Station, approaching 4,719 passengers and collecting 1,467 valid survey responses (response rate 31%) across the three rounds.

Table 3.1: Weekly schedule for data collection at Albion Station

Weekdays (Monday to Friday)	Weekends (non-game day)	Weekends (game day)
6.30-10.30am	8am-12pm	
3-7pm	2-6pm	2-8pm

Table 3.2: Summary of the three survey rounds

	Survey period	Number of hours on-site	Number of passengers approached	Number of valid survey responses	Response rate
Phase 1	14-27 August	84	2,262	694	31%
Phase 2	29 September – 12 October	87	1,113	323	29%
Phase 3	10-30 November	103	1,344	450	33%
Total		**274**	**4,719**	**1,467**	**31%**

The first survey round (14-27 August 2025) examined the baseline scenario – no provision of e-mobility parking infrastructure at the site and using pre-existing e-mobility pricing scheme. Two dedicated e-mobility parking areas were installed at Albion Station immediately following the completion of the first survey round (1 September 2025) (see Figure 3.3 and 3.4). At the same time, e-mobility providers Lime and Neuron began deploying e-scooters and e-bikes and expand their service coverage to the neighbourhoods surrounding the station. After a four-week waiting period following the first survey, the second survey round (29 September – 12 October 2025) was conducted to examine the effects of infrastructure integration on shared e-mobility uptake. The timing of this round spanned one week of Queensland's school holiday and one regular working week, which was intentional with an aim to capture a broader mix of respondents, particularly leisure travellers.

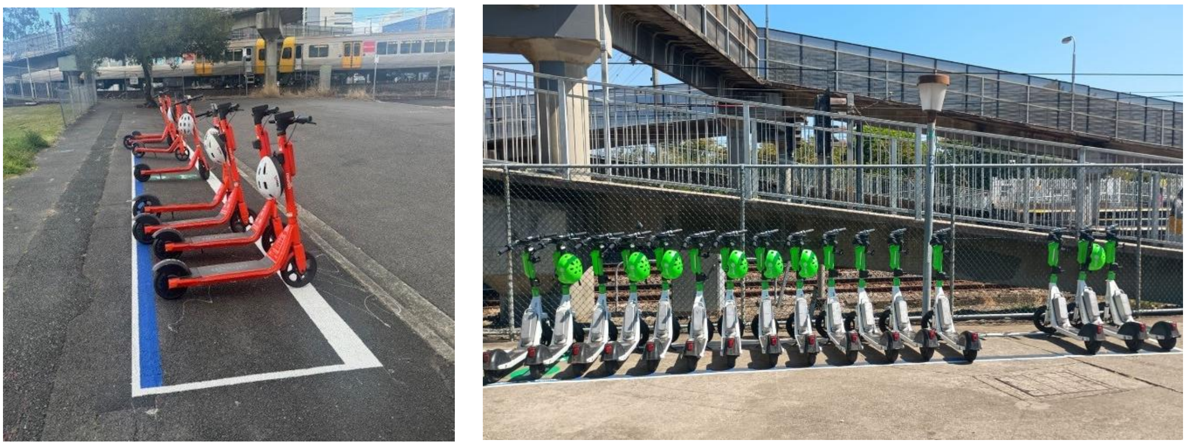


Figure 3.3: New dedicated e-mobility parking areas at Albion Train Station

The final phase introduced a reduced fare scheme, offering $1 shared e-mobility trips that started or ended at Albion Station. This initiative, implemented by both Lime and Neuron, commenced on 13 October 2025, immediately after the conclusion of the second survey round, and continued until 7 December 2025. Users residing within the trial catchment areas received targeted in-app notifications promoting the limited-time offer, while corflute signs were displayed at key public locations nearby and information was posted on local community Facebook groups to raise broader community awareness (see Figures 3.4 and 3.5). The final survey round (10-30 November 2025) examined the effects of full infrastructure integration and price reduction on uptake and perception of shared e-mobility.

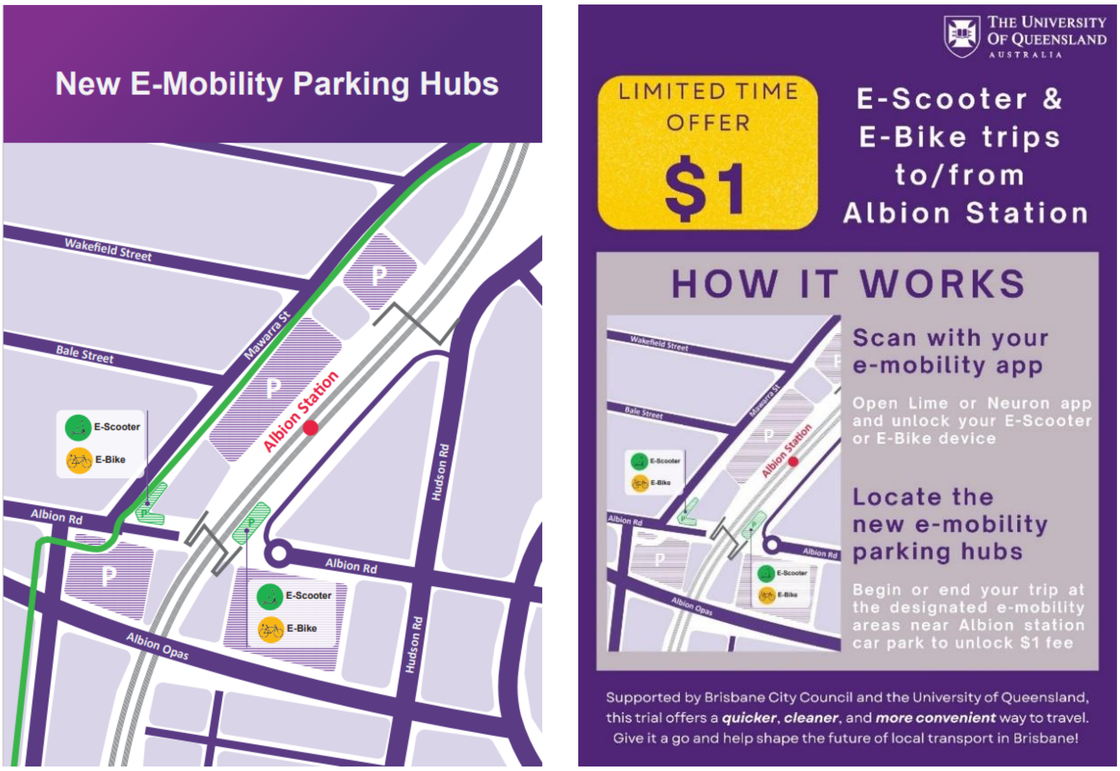


Figure 3.4: Physical signage to promote the new e-mobility parking hubs and reduced fare offer

Figure 3.5: An example of promotional posts on Facebook local community groups

3.3.2. Survey data analysis

Quantitative analysis

In addition to descriptive analysis, we examined people's willingness to use shared e-scooters or e-bikes using a statistical model designed for ordered responses. Willingness was measured on a five-point scale ranging from "extremely unlikely" to "extremely likely", and the modelling approach allowed us to analyse how different factors shifted respondents toward higher or lower levels of willingness rather than treating all responses as equal.

We used a step-by-step modelling approach, which allowed us to see how willingness changed as different types of factors were added, and to identify which influences mattered most once others were taken into account. It also made the results easier to interpret and compare across models.

Five models were estimated with an increasing number of factors added. The first model controlled for survey round, key demographic characteristics, and whether the trip related to the first or last mile of a journey. The second model added information about how and when respondents typically used the station, such as travel frequency, day of travel, and trip purpose. The third model incorporated prior exposure to micromobility, including awareness of shared services and previous experience using similar devices. The fourth model examined whether existing travel habits, such as current access mode and driving distance, shaped openness to shared micromobility. The final model added respondents' perceived barriers to use, with particular attention to cost concerns during the subsidised pricing period.

Model performance was assessed using standard statistical indicators that captured how well each model explained observed responses while accounting for model complexity. Improvements across models indicated that adding behavioural, contextual, and attitudinal factors provided a clearer explanation of willingness to use shared micromobility.

Results from the quantitative analysis of survey responses are presented in Section 5.

Qualitative analysis

To complement the quantitative and trip data, the intercept survey included open-ended questions asking respondents to describe their perceptions towards shared e-mobility using three words/short phrases. Out of 1,467 survey respondents across the three survey rounds, 1,193 (81%) provided a total of 3,237 words/short phrases. Sentiment analysis and thematic analysis were carried out to investigate these perceptions in depth.

Results from the qualitative analysis of survey responses are presented in Section 6.

Section 4: Quantitative Findings from E-Mobility Trip Data

4.1.E-mobility uptake

This section examines overall e-mobility uptake across the three trial rounds using GPS trip data provided by Lime and Neuron. The dataset captured all recorded trips within each round and included information on trip direction, distance, duration, and anonymised user identifiers, enabling consistent comparison of usage levels and user participation over time.

Table 4.1 summarises key uptake indicators by round. Overall e-mobility use increased steadily across the trial period, with total trips rising from 944 in Round 1 to 969 in Round 2, followed by a much larger increase to 1,541 trips in Round 3. This pattern was more clearly reflected in the trip rate per day, which rose from 15.2 trips/day in Round 1 to 23.1 trips/day in Round 2, and further to 26.7 trips/day in Round 3. The sizeable increase between Rounds 1 and 2 suggests that the introduction of painted parking areas and improved e-mobility visibility supported higher day-to-day usage. The additional, though smaller, increase in Round 3 indicates that subsidies further reinforced uptake, albeit with diminishing marginal gains relative to the availability intervention.

Table 4.1: Summary of e-mobility uptake, trip rates, trip characteristics, and user composition by round, based on GPS trip data from Lime and Neuron

		Round 1 (62 days)	Round 2 (42 days)	Round 3 (56 days)
Trip counts	**Total trips**	944	969	1541
	Inbound trips	404 (43%)	448 (46%)	677 (44%)
	Outbound trips	540 (57%)	521 (54%)	864 (56%)
Trip distance (km)	**Mean (SD)**	2.3 (2.5)	2.4 (3.0)	2.4 (2.9)
	Range	1 m – 20.5 km	1 m – 48.2 km	1 m – 24.1 km
Trip duration	**Avg trip duration (min)**	10.6	10.1	10.4
Trip rate	**Daily rate**	15.2	23.1	26.7
Unique users*	**Total unique users**	386	374	574
	One-time users	241 (62%)	220 (59%)	336 (59%)
	Repeat users	145 (38%)	154 (41%)	238 (41%)

Note: Two of the survey rounds coincided with Queensland school holiday periods. Round 1 overlapped with the Term 2 holidays (27 June – 12 July), and Round 2 partially overlapped with the Term 3 holidays (19 September – 5 October).

***Across the entire study period (Rounds 1–3), a total of 1,141 unique users made e-mobility trips to or from Albion Station, of whom approximately 40% were repeat users who used the service more than once.**

Despite higher usage levels, the directional split of trips remained stable, with inbound trips consistently accounting for around 43-46% of all trips and outbound trips making up 54-57%. Average trip distance (~2.3-2.4 km) and duration (~10-11 minutes) also remained largely unchanged across rounds, suggesting that increased uptake reflected more frequent use of similar first- and last-mile trips rather than longer or different types of journeys. For context, Neuron reported an average trip length of 1.65 km and an average duration of 9 minutes and 46 seconds across all Brisbane e-mobility trips over the same period, indicating that trips associated with Albion Station were slightly longer and more time-intensive than the citywide average. This difference is consistent with Albion Station trips serving a first- and last-mile access function linked to rail travel, rather than shorter, more discretionary urban trips.

User participation expanded most noticeably in Round 3, when total unique users increased to 574, compared with 386 in Round 1 and 374 in Round 2. However, the share of one-time users remained remarkably consistent, accounting for 59–62% of users in every round. This indicates that while both availability improvements and subsidies increased overall usage intensity, they did not substantially alter the balance between new and repeat users at an aggregate level.

Consistent with the summary statistics in Table 4.1, Figure 4.1 illustrates how e-mobility uptake evolved over time. Uptake increased gradually from Round 1 to Round 2, suggesting that better visibility translated into higher baseline use. Weekly trip totals in this period typically ranged between 100 and 150 trips.

The introduction of subsidies in Round 3 was associated with a further increase in weekly trips, with several weeks exceeding 200 total trips, compared with typical weekly totals of around 100-150 trips in earlier rounds (Figure 4.1). However, the relative balance between inbound and outbound trips remained stable across all rounds, indicating that higher uptake reflected a proportional scaling-up of existing travel patterns rather than a structural shift in trip direction. Taken together, the temporal pattern suggests that availability improvements were critical in establishing baseline uptake, while subsidies helped amplify usage levels without fundamentally changing how or why e-mobility devices were used.

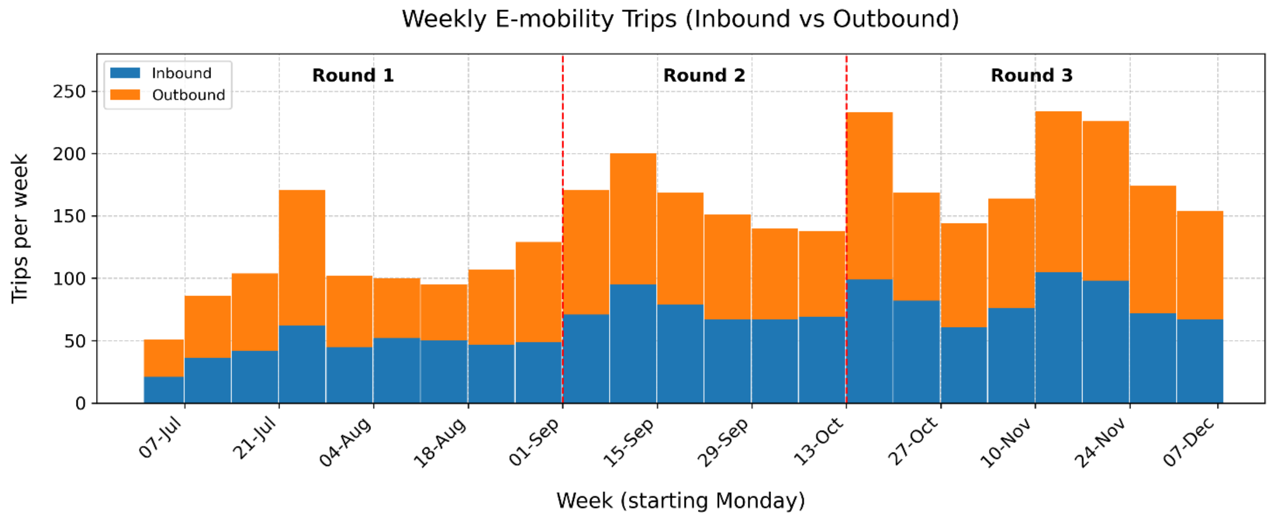


Figure 4.1: Weekly e-mobility trips by direction across trial rounds

To complement the aggregate trends shown in Table 4.1 and Figure 4.1, Appendix 4 presents road-segment–level maps of inbound and outbound e-mobility trip counts for each round. These maps show that higher uptake was spatially concentrated along a consistent set of corridors connected to Albion Station, with the intensity of use increasing across rounds while the overall spatial structure of trips remained largely unchanged.

Headline Findings	Key Implications for Industry & Policy
E-mobility uptake increased steadily across rounds, with the largest jump occurring in Round 3	Availability improvements establish baseline demand, while subsidies can further scale usage
Trip distance and duration remained consistent despite higher usage	Increased uptake is driven by more frequent first/last-mile trips, not longer journeys
Unique user numbers rose sharply in Round 3, but the share of one-time users stayed constant	Subsidies increase overall participation without disproportionately benefiting repeat users

4.2. Service reach and trip characteristics

Building on the aggregate uptake trends in Section 4.1, this subsection examines how the spatial reach, temporal patterns, and trip characteristics of e-mobility use around Albion Station evolved across the three rounds.

4.2.1. Spatial changes in service reach

Figure 4.2 illustrates how changes in e-mobility use were distributed spatially across the road network around Albion Station. The maps show changes in average daily trip rates per road segment, separately for inbound and outbound trips, between Round 1 and Round 2 and between Round 2 and Round 3.

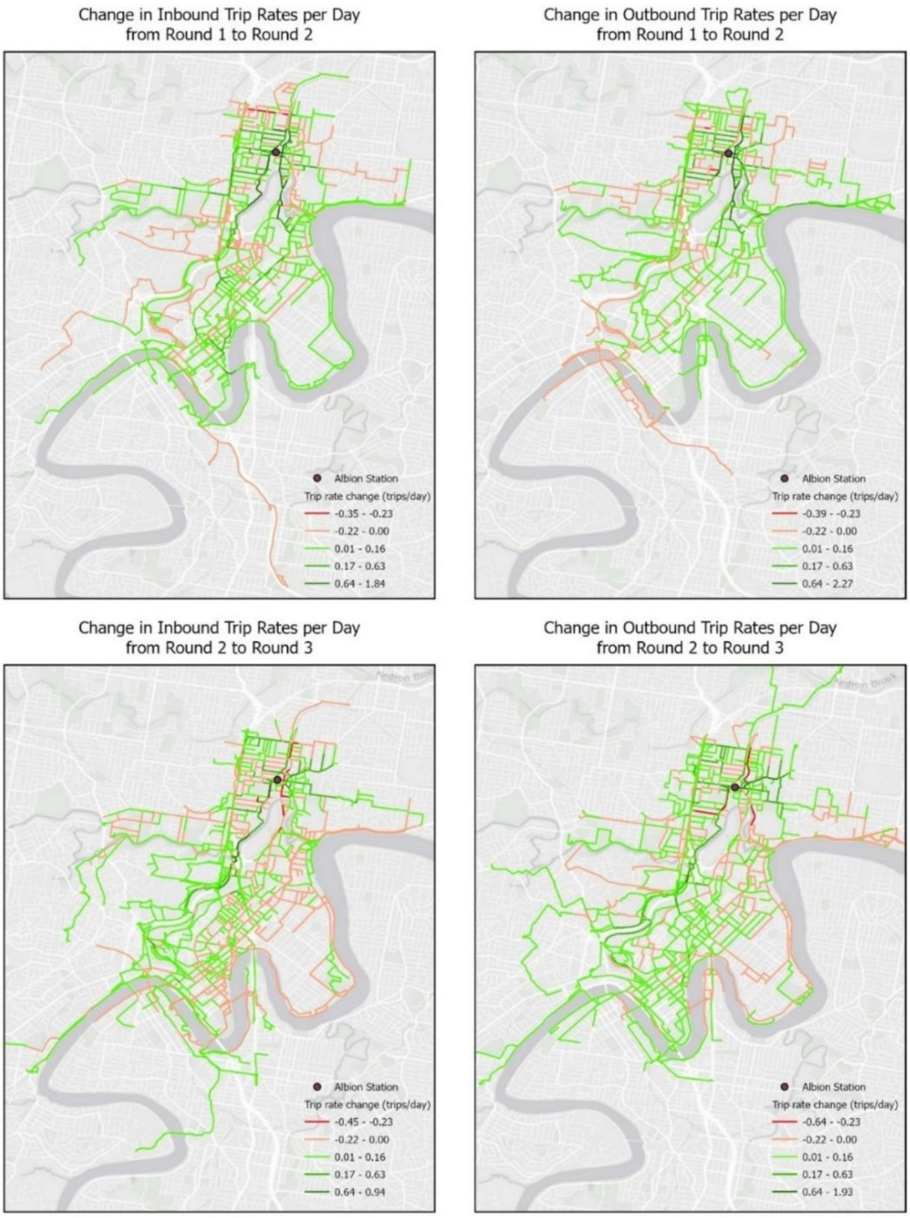


Figure 4.2: Spatial change in inbound and outbound e-mobility trip rates per day between rounds (Road-segment-level changes in average daily trip rates between Rounds 1–2 and Rounds 2–3)

Across both transitions, increases in trip rates were most strongly concentrated on road segments closest to Albion Station, which was consistent with trips either originating from or terminating at the station. In both inbound and outbound maps, most segments showed positive changes, typically in the range of 0.01-0.63 trips per day, while higher increases (above 0.64 trips per day) were largely confined to the immediate station catchment. Importantly, the overall spatial structure of trips remained stable across rounds, with growth occurring primarily along already active corridors rather than through the emergence of new travel routes.

Comparing the two periods, the Round 2 to Round 3 maps show a modest expansion in the spatial reach of positive changes, particularly for outbound trips, with increased activity extending further into surrounding neighbourhoods. This suggests that while the core travel pattern remained station-centred, the third round was associated with a broader use of e-mobility devices across the network rather than purely intensified use near the station.

4.2.2. Time-of-day patterns

Figure 4.3 shows time-of-day trip rate distributions for combined first- and last-mile e-mobility trips associated with Albion Station. Time-of-day trip rate distributions reveal that increases in usage were not evenly distributed across the day. Growth between rounds was strongest in the afternoon and early evening periods (approximately 16:00–20:00), consistent with commuter-related access to the station. While Round 2 showed moderate gains relative to Round 1, Round 3 exhibited a clearer intensification during peak periods, with higher trip rates across multiple adjacent time bins. Importantly, off-peak usage remained relatively stable, indicating that higher overall demand was driven by peak-hour amplification rather than a broad temporal shift.

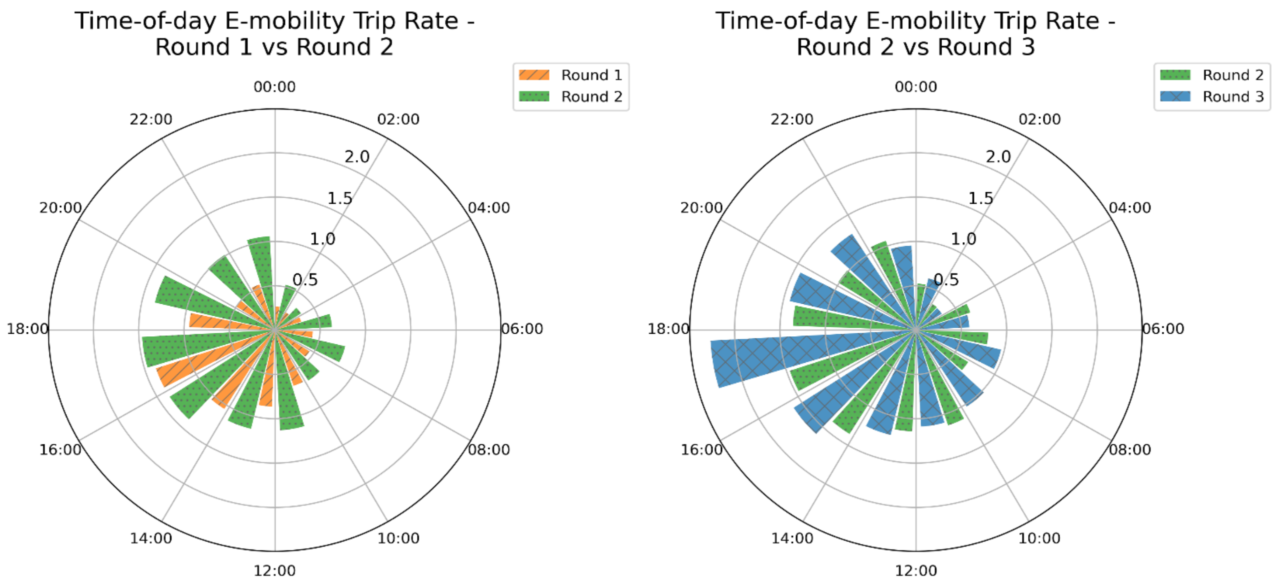


Figure 4.3: Average e-mobility trip rates by time of day, comparing Round 1 vs Round 2 (left) and Round 2 vs Round 3 (right)

4.2.3. Weekday variation in e-mobility trip rate changes

Changes in trip rates by weekday further reinforced this pattern (Figure 4.4). The largest increases between Round 1 and Round 2 occurred on weekdays, particularly Thursday and Friday, with gains of up to 12 trips per day, while weekends showed little change. Between Round 2 and Round 3, weekday increases persisted but were more uneven, with some days showing marginal growth and others stabilising or declining slightly. This suggests that increased uptake was closely tied to regular weekday travel routines, rather than discretionary weekend use.

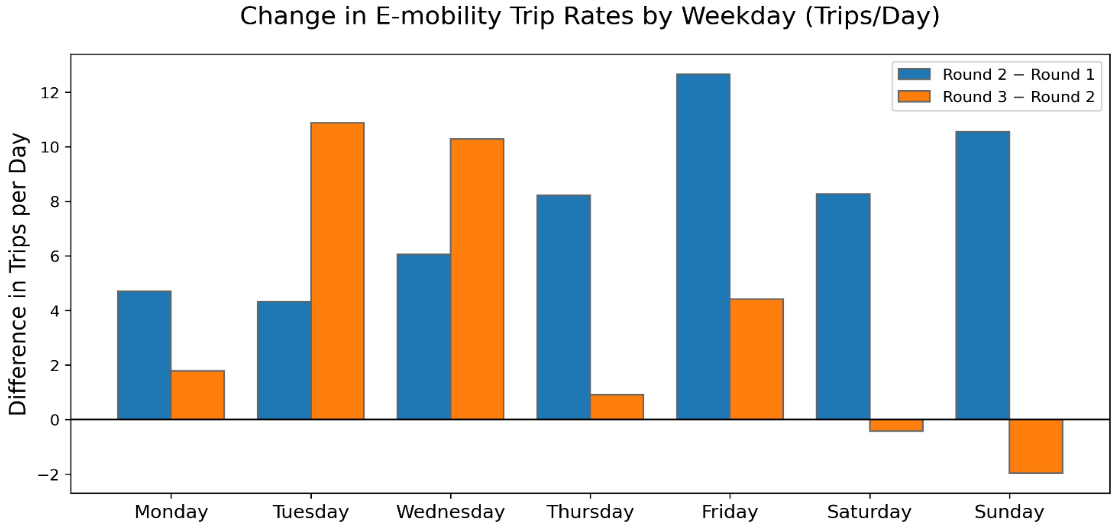


Figure 4.4: Differences in average daily trip rates by weekday between Round 1 and Round 2, and between Round 2 and Round 3

4.2.4. Trip distance characteristics

Across all three rounds, e-mobility devices were used for both short and longer trips; however, the core of usage was consistently concentrated within a mid-range distance band (Figure 4.5). Approximately half of all inbound and outbound trips were between 1 km and 4 km, a range that closely aligns with typical first- and last-mile distances to rail stations. This distribution remained highly stable across rounds, indicating that increased uptake did not reflect a shift toward longer journeys but rather greater intensity of use within an established commuter-relevant distance range. When considered alongside the time-of-day and weekday patterns, both of which showed pronounced weekday and peak-period demand, these findings reinforce the role of shared e-mobility devices as an effective commuter access mode, helping to close first- and last-mile gaps in station access rather than functioning primarily as a discretionary travel option. Also, while the upper tails of inbound and outbound distance distributions were similar, outbound trips showed a stronger concentration at shorter distances, suggesting greater reliance on e-mobility for short last-mile trips after work when walking may be less attractive.

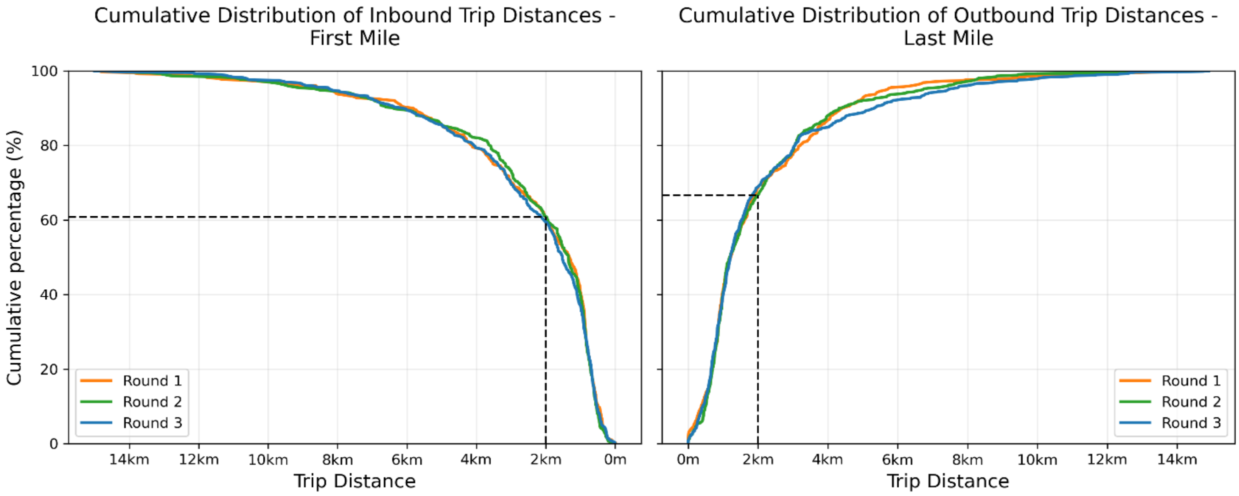


Figure 4.5: Cumulative distributions of inbound (first-mile) and outbound (last-mile) e-mobility trip distances across all three rounds

Headline Findings	Key Implications for Industry & Policy
Increases in trip rates were concentrated in weekday afternoon and early evening periods (≈16:00–20:00)	Demand is commuter-driven; coordination with peak rail schedules can maximise system effectiveness
Weekday trip rates rose more strongly than weekend rates across both transitions	Shared e-mobility devices complement regular work and study travel rather than discretionary leisure trips
Around 50% of inbound and outbound trips consistently fell between 1-4 km across all rounds	E-mobility devices are well suited to first- and last-mile distances, reinforcing their role in closing station access gaps rather than replacing longer trips

4.3. Weekly one-time users versus repeat users

Building on the temporal and spatial patterns of trip activity discussed in the previous subsection, this analysis shifts attention from where and when trips occurred to who generated them. In particular, it examines whether observed increases in trip activity over time reflected the entry of new users or intensified use among users already engaged with the system. Distinguishing between one-time and repeat users is critical for assessing whether the interventions fostered new transport routines or primarily reinforced existing behaviour.

Figure 4.6 therefore compares weekly average trip rates (trips per day) generated by one-time and repeat users across the three survey rounds, allowing assessment of whether the introduction of subsidies primarily stimulated new uptake or increased usage among existing users. Across the entire study period, repeat users consistently generated substantially higher trip rates than one-time users, typically around 15-22 trips per day compared to 5-11 trips per day for one-time users. Importantly, this gap was already clearly visible in Round 2, prior to the introduction of subsidies, where repeat-user activity frequently exceeded one-time user activity by 7-10 trips per day.

Round 3 showed some of the highest repeat-user trip rates, peaking at over 21 trips per day in late November. The overall magnitude of the gap between repeat and one-time users was not considerably larger than in Round 2. This suggests that although repeat users remained the dominant contributors to trip volume, the subsidy period did not appear to fundamentally widen the behavioural divide between repeat and one-time users, nor did it provide strong evidence that subsidies disproportionately benefited repeat users at the expense of attracting new users.

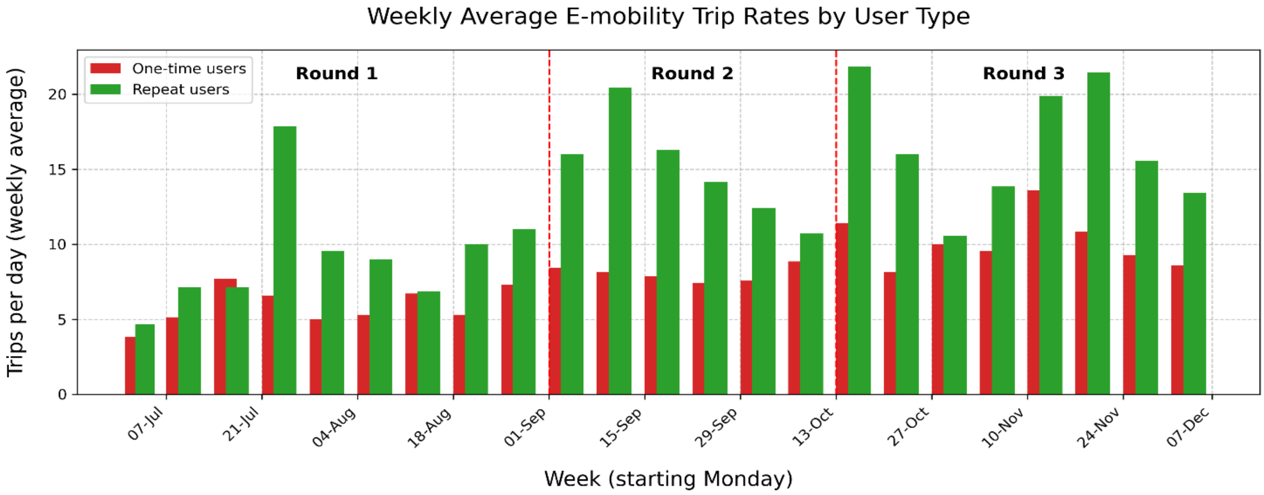


Figure 4.6: Weekly average trip rates (trips per day) generated by one-time and repeat users across the three rounds. Users are classified weekly based on the number of trips made.

Taken together, the GPS-based trip data indicate that shared e-mobility devices at Albion Station were predominantly used for short-distance, station-oriented trips consistent with first- and last-mile travel. The concentration of trips within a 1–4 km range, their spatial proximity to the station, and their alignment with weekday peak commuting periods all pointed to a commuter-oriented user profile. While overall trip volumes increased substantially across the three rounds, the underlying characteristics of trips, including distance, duration, temporal distribution, and the balance between one-time and repeat users, remained highly stable. This suggests that improvements in availability and affordability intensified existing first- and last-mile usage patterns and broadened participation, rather than altering the fundamental nature of how shared e-mobility devices are used.

Headline Findings	Key Implications for Industry & Policy
Repeat users consistently generated higher weekly trip rates than one-time users across all rounds	Shared e-mobility systems rely heavily on a core group of engaged users for sustained trip volume
The gap between repeat and one-time users was already evident in Round 2, prior to subsidies	Differences in usage intensity reflect pre-existing behavioural patterns rather than subsidy effects alone
One-time users continued to contribute meaningful trip activity, despite lower average trip rates	Policies aimed at converting occasional users into repeat users may yield further demand growth

Section 5: Quantitative Findings from Intercept Surveys

5.1. Demographic and station usage profile

Across the three survey rounds, a total of 1,467 respondents participated, including 694 in Round 1, 323 in Round 2, and 450 in Round 3 (Table 5.1). Overall demographic characteristics remained broadly stable across rounds. The average age of respondents stayed in the mid-30s, declining slightly from 36.3 years in Round 1 to 34.1 years in Round 3, with a consistently wide age range. This indicates that Albion Station continued to attract users across a broad life-course, rather than being dominated by a single age group.

Gender composition was relatively balanced in all rounds with a higher proportion of female respondents and a lower proportion of male respondents. The share of respondents identifying as another gender remained small across all rounds.

Patterns of station use were largely consistent across all three rounds. Weekday travel continued to dominate, accounting for around two-thirds of responses in each round, reinforcing Albion Station's role as a commuter-oriented facility. Weekend-only usage remained limited throughout. Station usage frequency also showed strong stability over time, with most respondents reporting regular use of the station two to five days per week. Round 3 exhibited a slight increase in very frequent users (five or more days per week), alongside a modest decline in occasional users.

Table 5.1: Respondents' demographics and station usage across three survey rounds

Variable	Statistic	Round 1	Round 2	Round 3
General statistics	Number of Respondents (*N*)	694	323	450
Age	Mean (SD)	36.3 (12.3)	35.4 (13.9)	34.05 (11.2)
	Median	34	32	31
	Range	18-80	18-79	18-73
Gender	Female	335 (48%)	169 (52%)	255 (58%)
	Male	315 (46%)	131 (41%)	174 (40%)
	Other	44 (6%)	23 (7%)	7 (2%)
Day of usage	Weekdays	457 (66%)	186 (58%)	305 (68%)
	Weekends	45 (6%)	24 (7%)	24 (5%)
	Both	142 (20%)	77 (24%)	86 (19%)
	No preference	50 (7%)	36 (11%)	34 (8%)
Station usage	5 days or more per week	239 (34%)	103 (32%)	158 (35%)
	2-4 days per week	284 (41%)	116 (36%)	176 (39%)
	About once per week	27 (4%)	30 (9%)	39 (9%)
	Occasional use	144 (21%)	74 (23%)	76 (17%)

Taken together, the results indicate that Albion Station consistently functioned as a weekday-focused commuter hub serving a diverse and largely regular user base. The broad stability in demographic and usage profiles across rounds provided a robust foundation for interpreting behavioural changes observed in Round 3 following the introduction of reduced fares for shared e-mobility trips.

Headline Findings	Key Implications for Industry & Policy
Respondent demographics remained broadly stable across all three rounds, with users consistently in their mid-30s and spanning a wide age range	Shared e-mobility initiatives at stations can be designed for a broad adult user base, rather than targeting only younger cohorts
Albion Station use remained strongly weekday-oriented across all rounds	First/last-mile shared e-mobility interventions are best aligned with weekday commuter demand rather than leisure-focused travel

5.2. Spatial distribution of respondents' place of residence

Figures 5.1 – 5.3 depict the spatial distribution of respondents' residential suburbs, providing insights into the geographic reach of Albion Station across the three survey rounds. Although the maps distinguished between first- and last-mile respondents, the data reflected their place of residence rather than the exact origins or destinations of their trips.

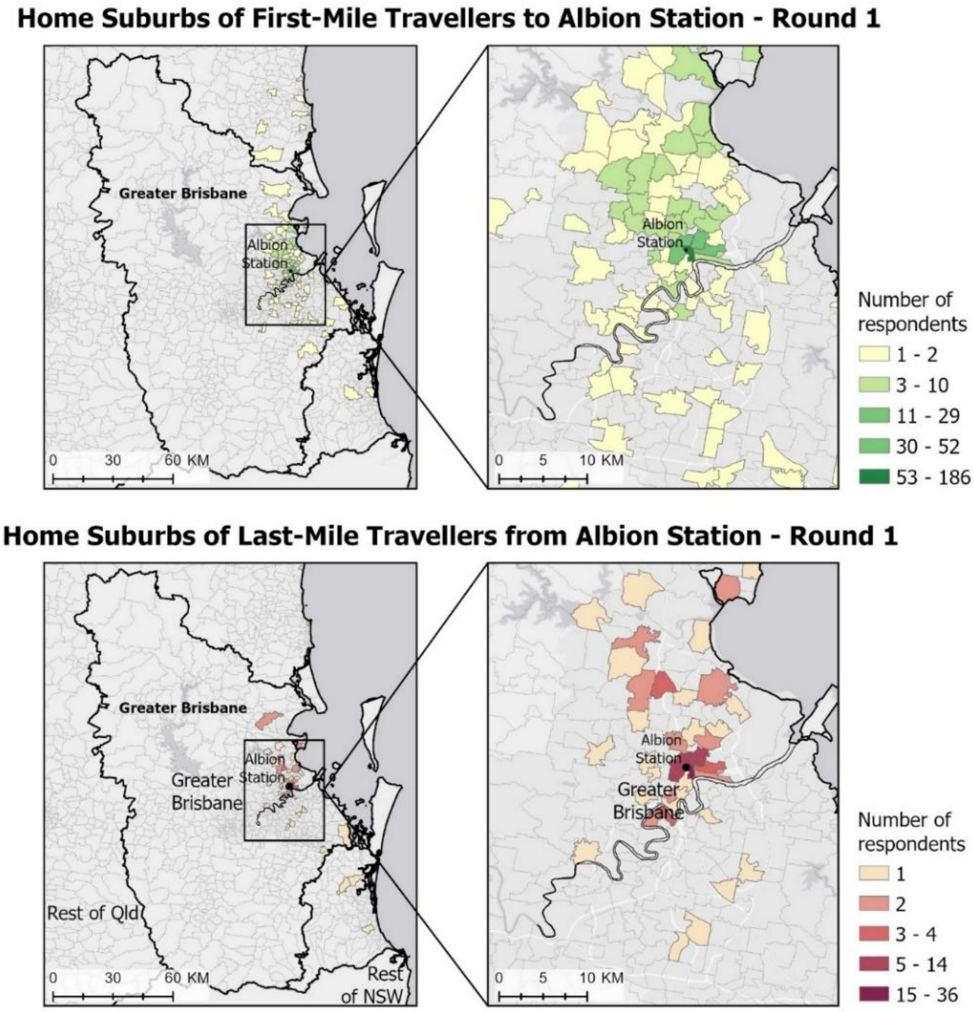


Figure 5.1: Home suburbs of first- and last-mile respondents (Round 1)

In Round 1, respondents identifying as first-mile travellers predominantly lived in Brisbane's northern suburbs, including key areas such as Ascot, Clayfield, Nundah, and Aspley. This distribution highlighted the station's broad residential catchment across the city's inner and middle northern corridor, with some participants residing in more distant suburbs of Greater Brisbane. The pattern suggests that Albion Station functioned as an important regional access point within Brisbane's wider transport network.

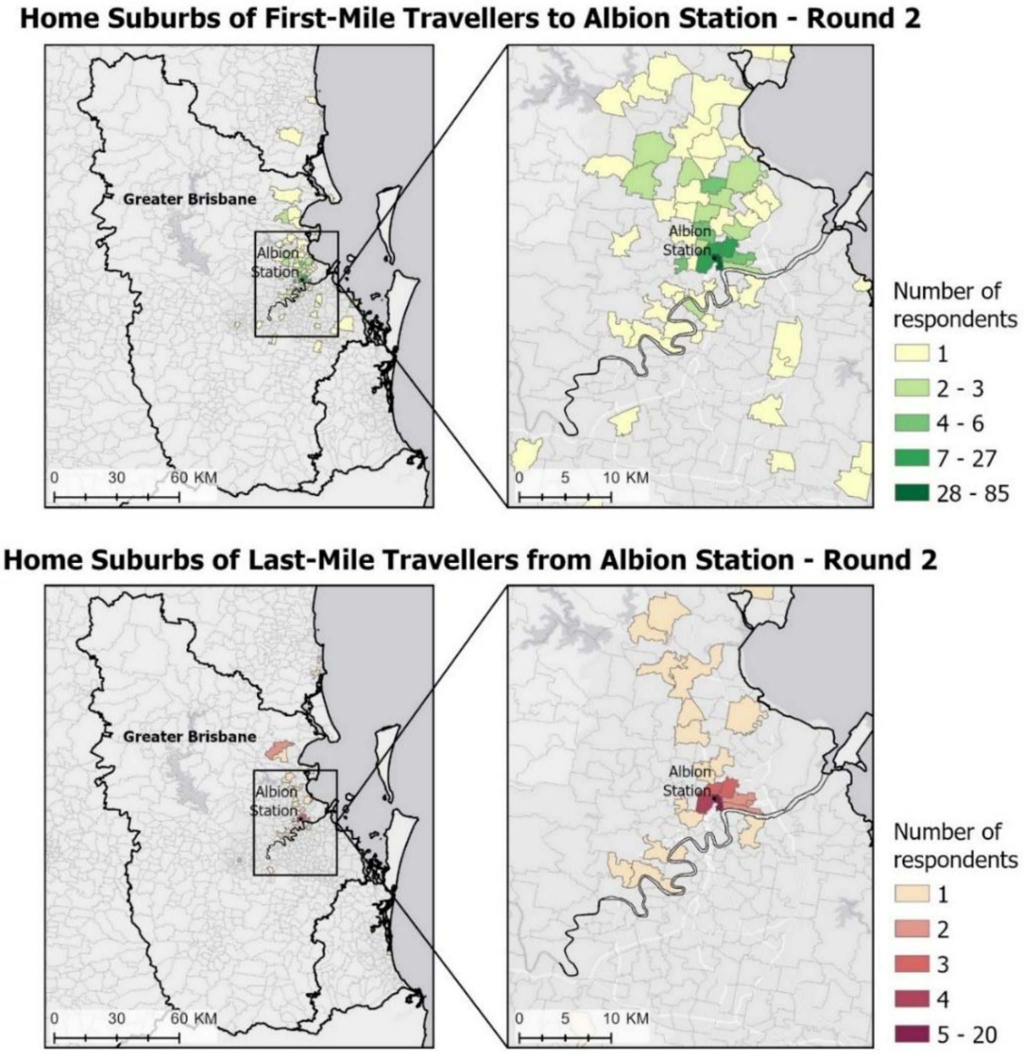


Figure 5.2: Home suburbs of first- and last-mile respondents (Round 2)

Respondents classified as last-mile travellers tended to reside closer to the inner city, particularly in suburbs such as Newstead and Fortitude Valley. This contrast between first- and last-mile groups implies that Albion Station primarily served inbound commuters who lived further north and travelled toward the central employment corridor, while also accommodating a smaller group of residents who lived nearby and used the station for short local connections.

The Round 2 and 3 results revealed a similar residential pattern, confirming Albion Station's role as a northern commuter hub. This pattern is likely reinforced by the availability of free park-and-ride parking at Albion Station, which encourages commuters from northern suburbs to drive to the station before completing their journey by rail. While the number of respondents in the two subsequent rounds was smaller, the overall distribution remained consistent, with most first-mile respondents still concentrated in the northern suburbs and last-mile respondents clustered around the inner city.

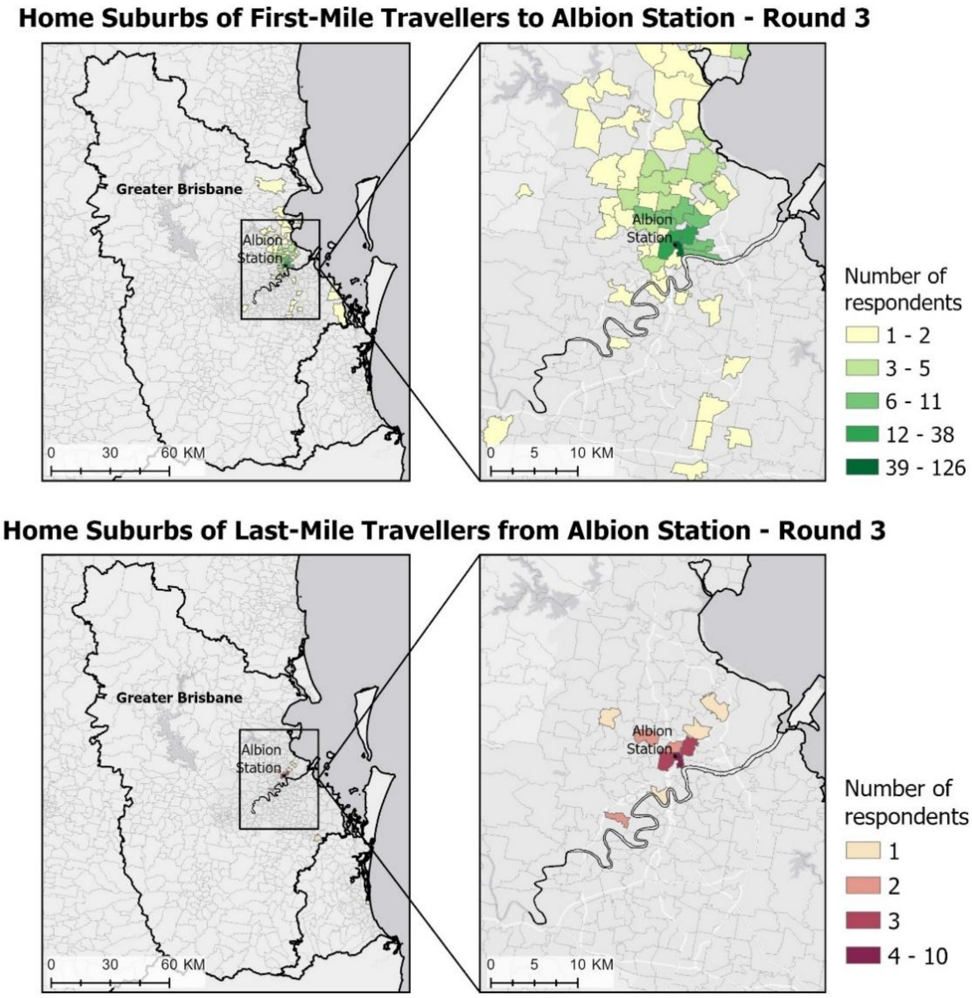


Figure 5.3: Home suburbs of first- and last-mile respondents (Round 3)

Headline Findings	Key Implications for Industry & Policy
Across all rounds, first-mile respondents were predominantly drawn from Brisbane's northern suburbs	Albion Station plays a consistent role as a northern access point to the rail network, supporting inbound commuter flows
Last-mile respondents were consistently concentrated in inner-city suburbs close to the station	Shared e-mobility around stations is more likely to support short local connections at the destination end rather than long last-mile dispersal

5.3. Trip purposes and travel modes

Figures 5.4 – 5.6 present the relationship between trip purposes and travel modes for first- and last-mile journeys to and from Albion Station across the three survey rounds. The diagrams illustrate both the dominance of commuter travel and the stability of access modes over time.

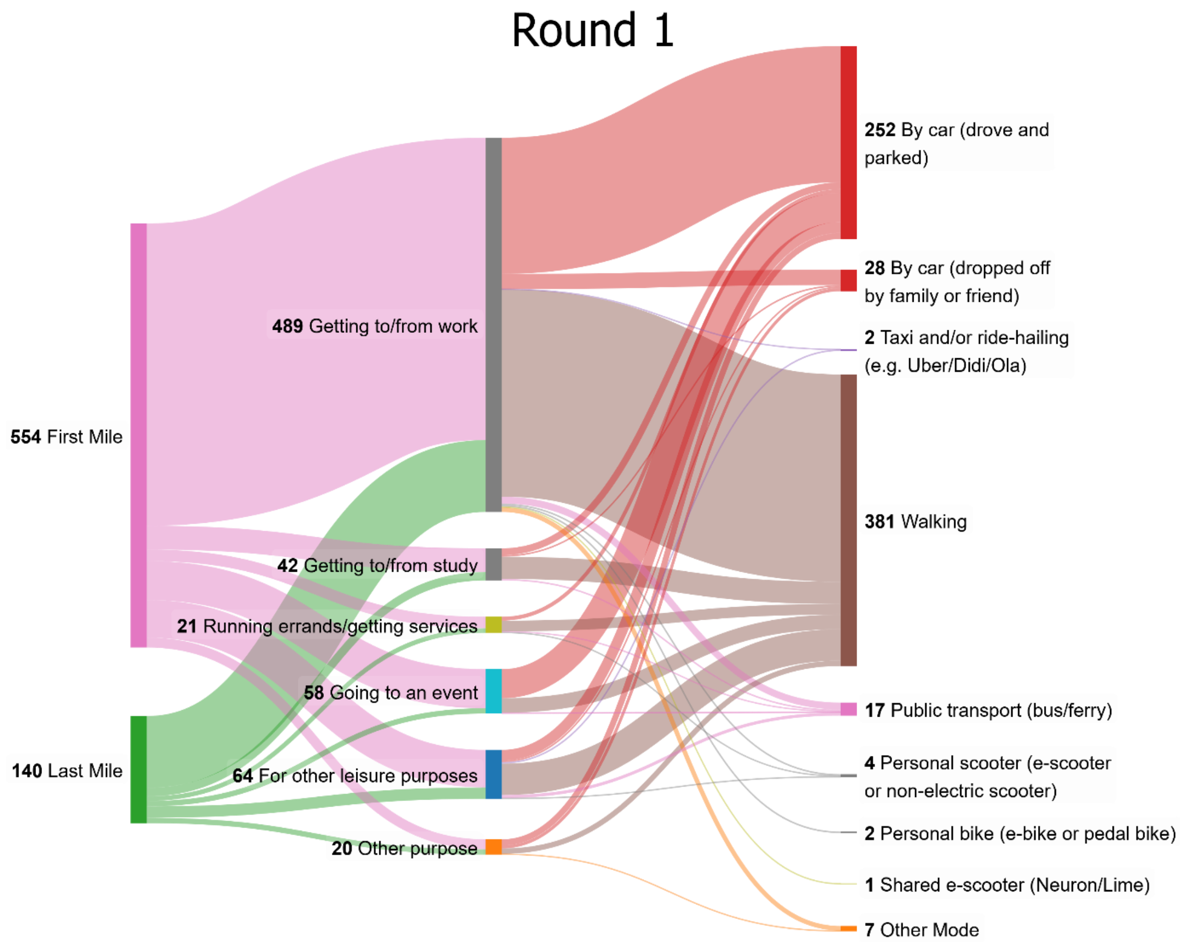


Figure 5.4: Trip purposes and travel modes for first- and last-mile trips (Round 1)

Across all rounds, first-mile trips were overwhelmingly work-related. In Round 1, approximately 88% of first-mile journeys were associated with getting to or from work, compared with 73% in Round 2 and 82% in Round 3. Trips related to study, leisure, errands, or other purposes consistently accounted for a relatively small share, indicating that Albion Station's primary function remained commuter-focused throughout the study period.

Mode choice patterns were similarly stable across rounds. Private modes dominated first-mile access, with driving and parking near the station accounting for roughly 40–45% of first-mile trips in each round. Walking was the dominant last-mile mode in all surveys, reflecting the short distances between Albion Station and surrounding inner-city destinations. Other modes, including public transport and personal micromobility devices, played only a minor role.

Shared e-mobility use accounted for a small share of trips reported in the intercept surveys across all three rounds, representing less than 1% of observed first- and last-mile journeys. Given the intercept-based nature of the survey, these figures should be interpreted as indicative of relative mode shares among surveyed station users rather than as a measure of overall shared e-mobility uptake. The persistence of low observed shares therefore reflects the dominance of walking and car-based access among respondents captured at the station, rather than the absence of broader usage or growth elsewhere in the system. As such, these results point to stable access patterns at Albion Station, while system-wide uptake trends were more appropriately assessed using complementary data sources such as GPS trip records.

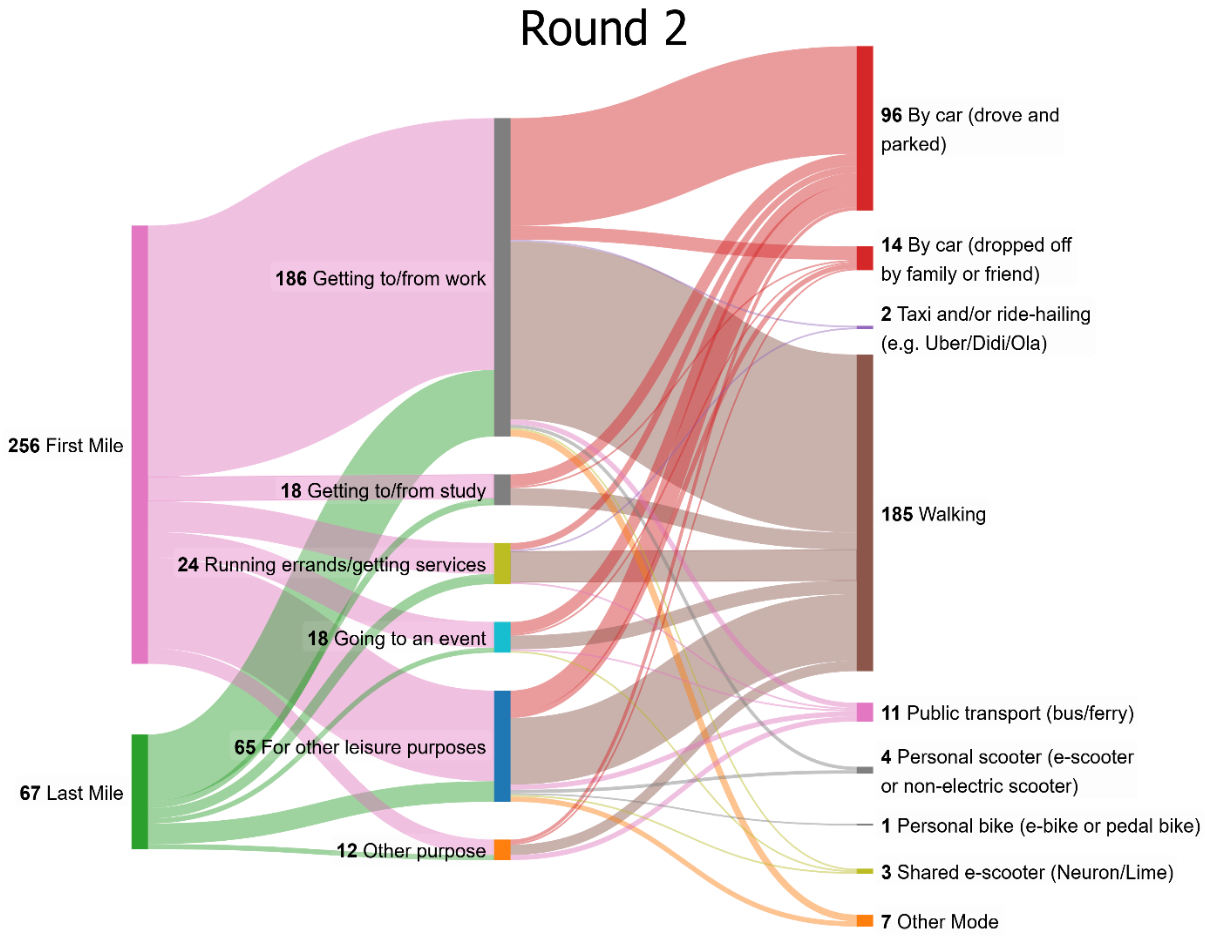


Figure 5.5: Trip purposes and travel modes for first- and last-mile trips (Round 2)

Overall, the close alignment of trip purposes and travel modes across rounds highlights the entrenched nature of commuter travel behaviour at Albion Station and provides a stable baseline for interpreting willingness and barrier-related findings in subsequent sections.

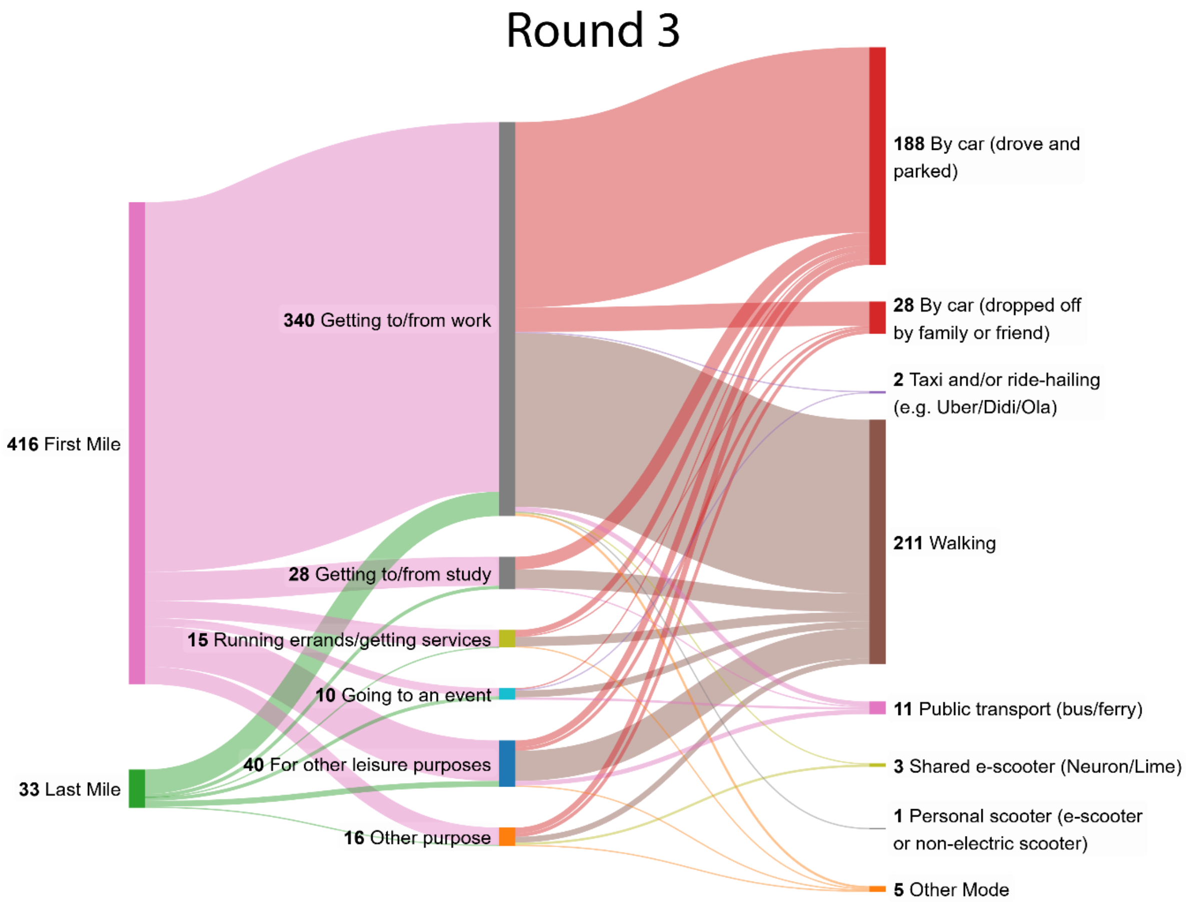


Figure 5.6: Trip purposes and travel modes for first- and last-mile trips (Round 3)

Figure 5.7 summarises respondents' primary travel modes across the three survey rounds, highlighting the continued dominance of walking and private car use in accessing Albion Station. In Round 1, 63.2% of respondents accessed the station on foot, compared with 28.6% who drove and parked; a similar pattern was observed in Round 2 (57.3% walking and 29.7% driving). In Round 3, however, the share of respondents driving and parking increased markedly to 41.9%, while walking declined to 47.0%. Other modes, including public transport, personal micromobility, and shared e-mobility devices, remained marginal across all rounds. The increased reliance on driving in Round 3 is likely influenced by seasonal conditions, as the survey was conducted during summer, when higher temperatures and humidity may discourage walking and favour car-based access.

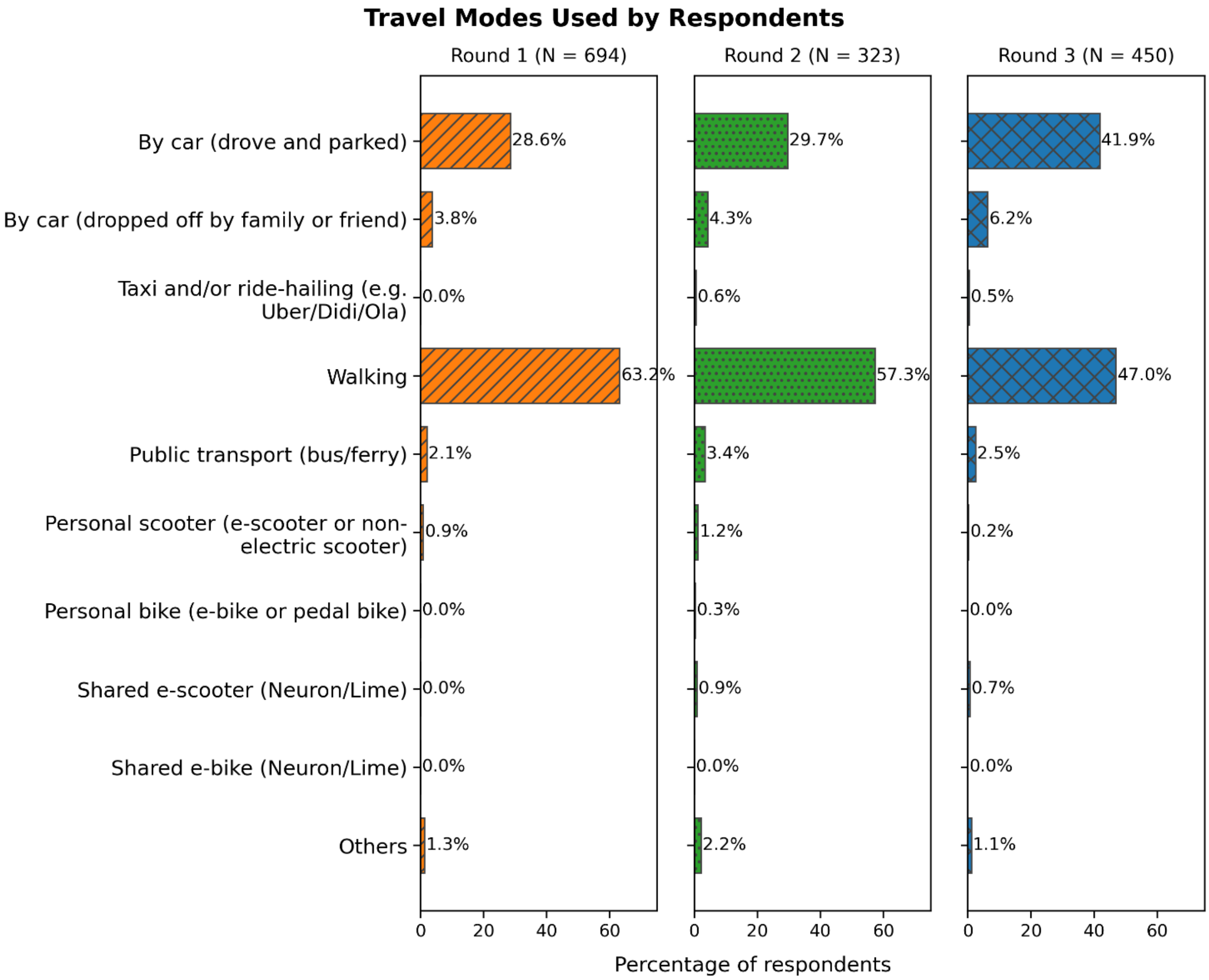


Figure 5.7: Travel modes used by respondents to access Albion Station

Headline Findings	Key Implications for Industry & Policy
Work-related trips accounted for most first-mile journeys across all rounds (≈73–88%)	Albion Station primarily serves routine commuter travel; first/last-mile interventions should be designed around peak-period work trips
Mode choice distributions were highly consistent across rounds	Access patterns at the station are structurally stable, suggesting limited short-term responsiveness to isolated interventions
Shared e-mobility represented a very small share of trips in the intercept surveys	Low observed shares reflect the characteristics of intercepted station users and should not be interpreted as overall system uptake

5.4. Micromobility use in daily life

Observed first- and last-mile behaviours at Albion Station can be better understood by situating them within respondents' broader everyday travel habits. Figures 5.8 and 5.9 therefore examine respondents' general use of active travel devices and their frequency of shared e-scooter and e-bike use in daily life.

Across all three survey rounds, the majority of respondents reported not using any active travel device in their everyday travel (Figure 5.8). In Round 1, 76% of respondents indicated no regular use of personal or shared scooters or bikes. This proportion remained highly stable in Round 2 (79%) and Round 3 (77%), underscoring the persistence of car- and walking-oriented mobility habits among the surveyed population. Overall, these results indicate that widespread micromobility adoption had not occurred within respondents' daily travel routines during the study period.

Among respondents who did report using active travel devices, personal bicycles or e-bikes were consistently the most common option, accounting for approximately 14-18% of responses across all rounds. In contrast, shared micromobility use remained minimal, with shared e-scooters and e-bikes each reported by only 0-3% of respondents in any round. These proportions showed little variation over time, suggesting stable patterns of limited habitual engagement with shared systems.

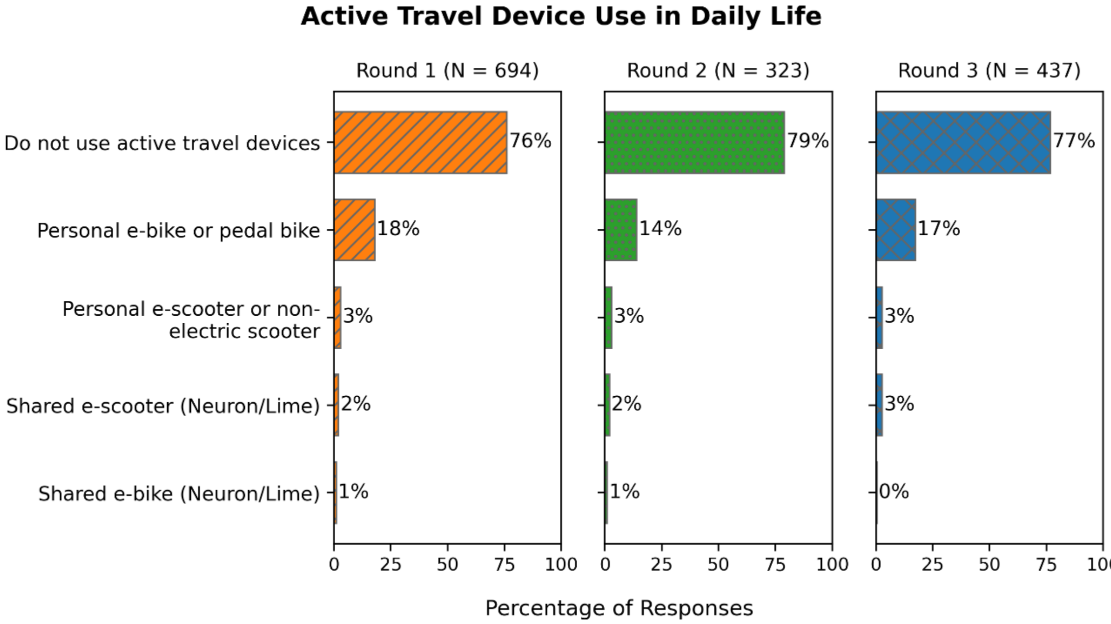


Figure 5.8: Active travel device use in daily life

Figure 5.9 further shows that regular use of shared e-scooters or e-bikes was rare. Across all rounds, around 73-76% of respondents reported never using shared micromobility, while a further 17-21% used it less than once per month. Frequent use (weekly or more) consistently accounted for 1-2% or less of responses. This pattern remained effectively unchanged in Round 3.

Taken together, these findings indicate that the limited role of shared micromobility observed in first- and last-mile trips at Albion Station reflected broader everyday travel practices rather than station-specific conditions alone. The stability of these patterns provides important context for interpreting respondents' stated willingness and perceived barriers to using shared e-mobility, which are examined in the following section.

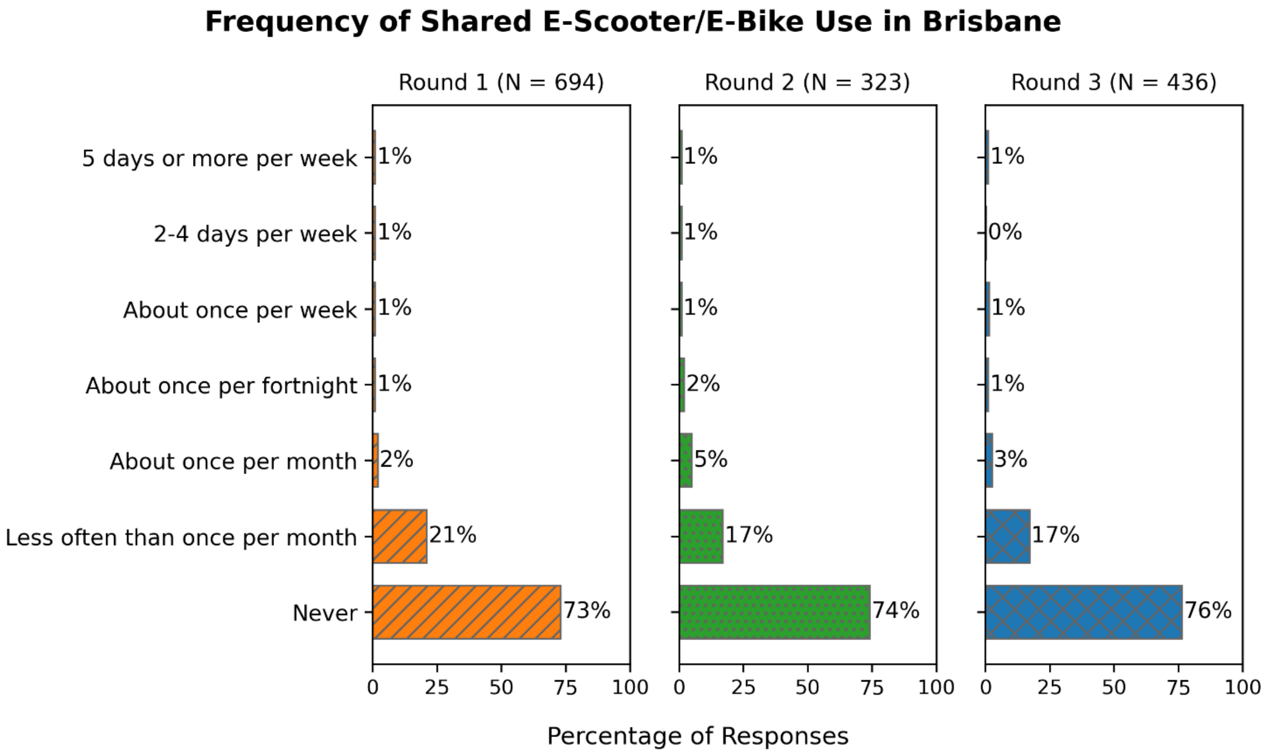


Figure 5.9: Frequency of shared e-mobility use in Brisbane

Headline Findings	Key Implications for Industry & Policy
Around three-quarters of respondents reported no regular use of active travel devices in all rounds	First-/last-mile micromobility uptake is constrained by broader, entrenched travel habits
Shared e-scooter and e-bike use remained very low (0–3%) across all rounds	Low habitual use reflects limited integration of shared micromobility into daily routines
Most respondents had either never used shared micromobility or used it very infrequently	Occasional exposure exists, but sustained behavioural change has not occurred

5.5. Barriers to shared e-mobility usage

The survey results reveal a range of perceived barriers that discouraged the use of shared e-scooters and e-bikes for accessing Albion Station (Figure 5.10). These barriers were shaped less by infrastructure constraints and more by individual preferences, perceptions, and attitudes towards micromobility.

Across all three rounds, the most commonly reported barrier was a preference for an existing transport mode. Approximately 33-35% of respondents indicated that their chosen mode of transport was better than shared e-mobility, a proportion that remained highly stable over time. This suggests that many commuters felt adequately served by established modes, most notably driving and walking, and saw limited added value in switching for first- or last-mile travel.

Identity- and perception-based barriers were also prominent. Between 24% and 31% of respondents across rounds reported that they did not see themselves as e-scooter or e-bike riders. Although this share declined somewhat in Round 3, it remained one of the most frequently cited barriers, highlighting the role of cultural norms, comfort, and self-identification in shaping micromobility adoption.

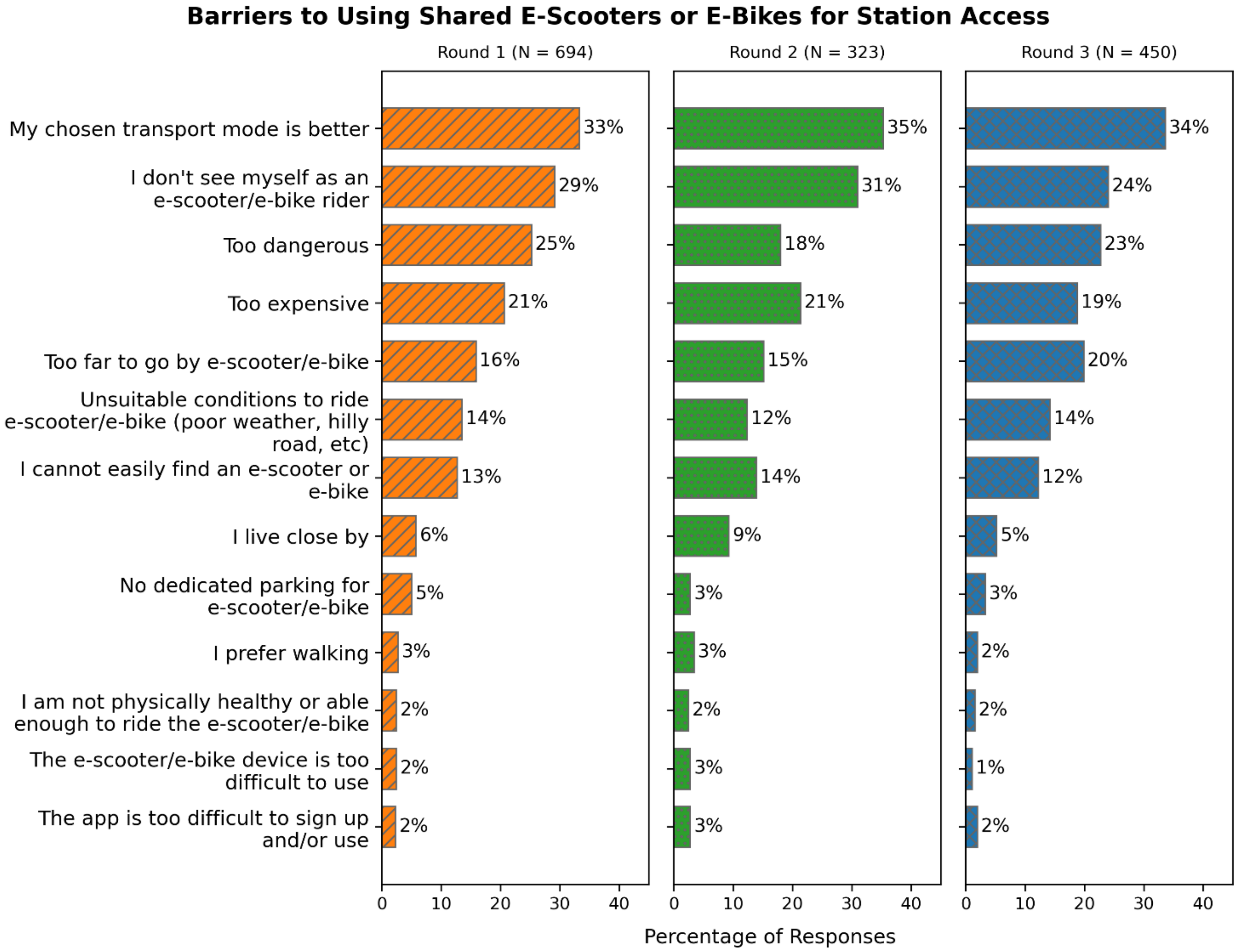


Figure 5.10: Barriers to using shared e-mobility for station access

Safety concerns were another major deterrent. Around 18-25% of respondents across rounds perceived shared e-scooters or e-bikes as too dangerous. While the prominence of safety concerns fluctuated slightly between rounds, they consistently ranked among the top reported barriers, underscoring the importance of perceived risk in influencing uptake.

Cost-related and distance-related barriers were cited by a smaller but still notable share of respondents. Approximately 19-21% identified cost as a deterrent, while 15-20% reported that shared e-mobility was too far or unsuitable for their travel distance. These responses suggest that pricing and trip suitability continued to constrain adoption alongside attitudinal factors.

By contrast, practical and operational barriers, such as difficulty finding a device, unsuitable riding conditions, lack of dedicated parking, or app usability issues, were reported by fewer respondents, generally below 15% in each round. This pattern indicates that while infrastructure and service design matter, they were secondary to broader preferences and perceptions at this stage of adoption.

Taken together, the results suggest that further investment in infrastructure alone is unlikely to produce substantial shifts in behaviour. Instead, policies that address perceived safety, personal relevance, and value, alongside pricing strategies, are likely to be more effective in encouraging broader uptake of shared e-mobility for station access.

Headline Findings	Key Implications for Industry & Policy
Preference for existing transport modes was the most common barrier (≈33–35%)	Shared e-mobility competes with well-established habits; mode shift requires clear added value
Identity-based barriers ("not an e-scooter/e-bike rider") were widely reported	Normalisation and targeted messaging may be as important as infrastructure provision
Cost and trip suitability were moderate but persistent barriers	Pricing strategies and clearer use-case targeting could support uptake
Operational barriers were less frequently cited than attitudinal ones	Behavioural and perceptual constraints currently outweigh technical or access issues

5.6. Awareness of, and willingness to use, shared e-mobility devices

The survey asked respondents whether they were aware of shared e-scooters and e-bikes serving Albion Station, and how likely they would be to use such services in the future. Together, Figures 5.11 and 5.12 capture whether increased visibility over time was accompanied by shifts in stated intent.

Awareness of shared e-mobility services increased substantially across the three survey rounds (Figure 5.11). In Round 1, only 27% of respondents reported being aware of shared e-scooters or e-bikes serving Albion Station. This rose to 39% in Round 2 and further to 52% in Round 3. The steady upward trend suggests that shared e-mobility services became progressively more visible over time, likely reflecting their continued presence and integration within the station environment rather than a single discrete intervention.

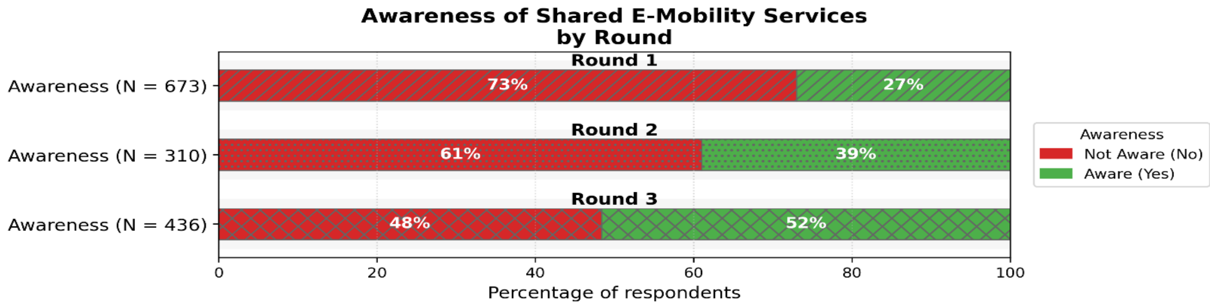


Figure 5.11: Awareness of shared e-mobility services at Albion Station

In contrast, willingness to use shared e-mobility devices remained relatively stable across rounds (Figure 5.12). In all three surveys, most respondents described themselves as either "extremely unlikely" or "somewhat unlikely" to use shared e-scooters or e-bikes in the future. While the share of respondents reporting "extremely unlikely" declined modestly between Round 1 (58%) and Round 3 (53%), this change was largely offset by increases in neutral responses rather than a strong shift toward positive willingness. The proportion of respondents expressing "somewhat likely" or "extremely likely" intentions remained comparatively small in every round.

The results indicate a clear divergence between awareness and willingness. Although awareness of shared e-mobility services increased markedly over time, this did not translate into a corresponding rise in stated intention to use. This pattern suggests that limited uptake was not primarily driven by lack of awareness, but rather by deeper attitudinal, perceptual, and practical considerations, consistent with the barriers identified in the previous subsection.

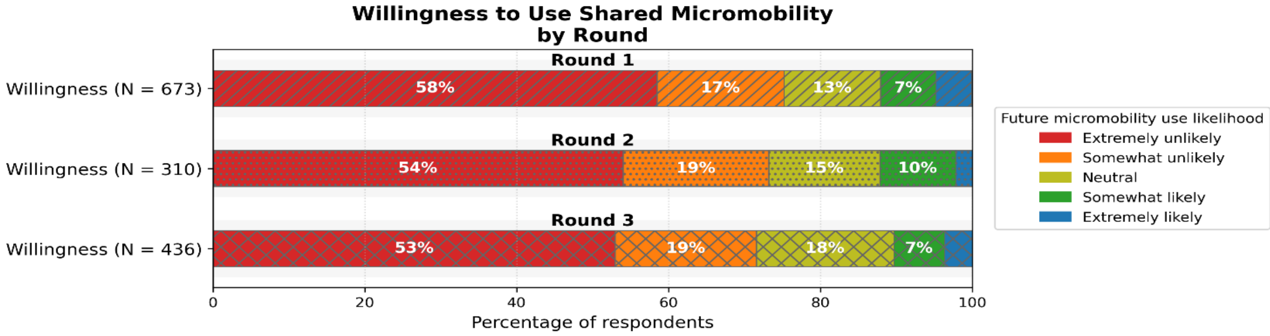


Figure 5.12: Willingness to use shared e-mobility serving Albion Station

Headline Findings	Key Implications for Industry & Policy
Awareness of shared e-mobility increased substantially across survey rounds	Continued visibility and presence are effective for awareness-building, but insufficient on their own to drive uptake
Willingness to use shared e-mobility remained consistently low despite rising awareness	Policy interventions must go beyond information provision to address underlying resistance

5.6.1. Willingness to use shared e-mobility by travel modes

Figure 5.13 disaggregates willingness to use shared micromobility by respondents' travel mode, grouping travel behaviour into driving, walking, and other modes. Clear and persistent differences emerged across all three survey rounds, indicating that willingness was strongly conditioned by existing travel habits.

Across rounds, respondents who drive and park at the station consistently exhibited the lowest willingness. In Round 1, 64% of drivers reported being extremely unlikely to use shared micromobility, a pattern that remained stable in Round 2 (60%) and intensified slightly in Round 3 (65%). Positive willingness among drivers remained very limited, with somewhat or extremely likely responses accounting for 12% or less in every round. This reinforces earlier findings that car-based access was associated with entrenched resistance to alternative first- or last-mile modes.

By contrast, respondents who walk to or from the station showed comparatively higher openness. While reluctance remained dominant, the share reporting extremely unlikely declined from 56% in Round 1 to 44% in Round 3, alongside a rise in neutral and somewhat likely responses. A similar pattern was observed for other modes, where unwillingness remained high but was less pronounced than among drivers. Notably, in Round 3, neutral responses among walkers (23%) and other-mode users (24%) exceeded those observed among drivers (11%), suggesting greater latent openness.

Overall, the figure confirms that willingness to use shared e-mobility was not uniform across users but closely aligned with existing access behaviour. While general willingness remained low across all groups, drivers were consistently the most resistant, whereas walkers and users of other modes exhibited relatively higher, though still limited, openness.

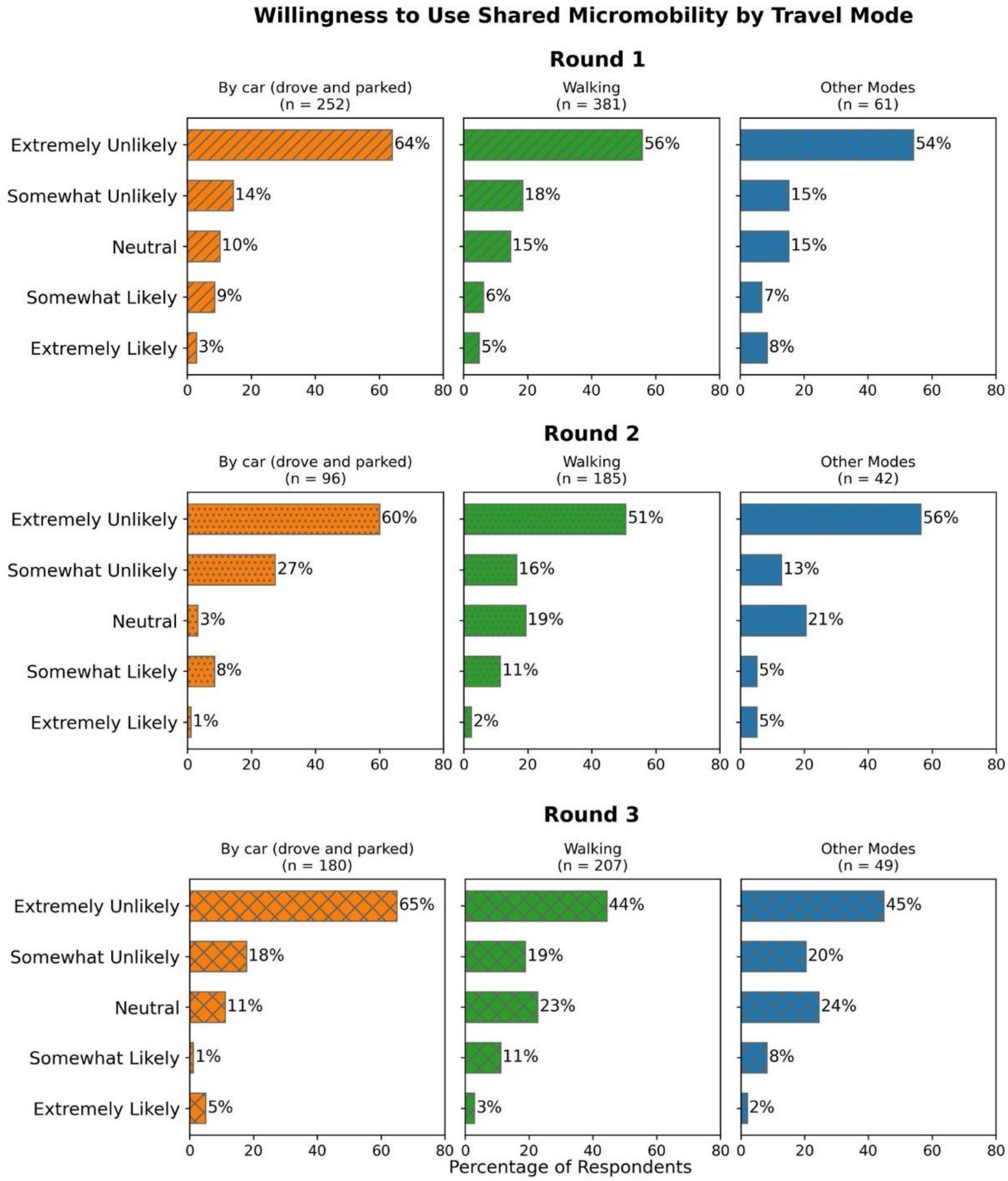


Figure 5.13: Travel mode to/from Albion Station by willingness to use shared e-mobility

Headline Findings	Key Implications for Industry & Policy
Willingness to use shared micromobility was consistently lowest among respondents who drive to the station	Policies targeting drivers are unlikely to yield large uptake without broader changes to access conditions or incentives
Walkers and users of other modes showed comparatively higher openness	Shared micromobility is more behaviourally compatible with non-car access modes

5.6.2. Willingness to use shared e-mobility by barriers

Figures 5.14 – 5.16 show how perceived barriers differed systematically across willingness categories, revealing that the nature of constraints changed as openness to shared e-mobility increased. Across all three rounds, respondents who were extremely or somewhat unlikely to use shared devices were primarily constrained by attitudinal and modal preference barriers, whereas those with higher willingness reported more practical and conditional constraints.

Among respondents who were extremely unlikely, the dominant barriers were consistently “my chosen transport mode is better” and identity-based resistance. In Round 1, both were cited by 35%, alongside high safety concerns (32%). This pattern remained stable in Round 2 (chosen mode 36%, identity 39 %) and Round 3 (chosen mode 36%, identity 32%). Safety (25–30%) and distance (17–23%) also remained salient for this group, indicating entrenched resistance grounded in perceived risk, self-identity, and satisfaction with existing travel modes.

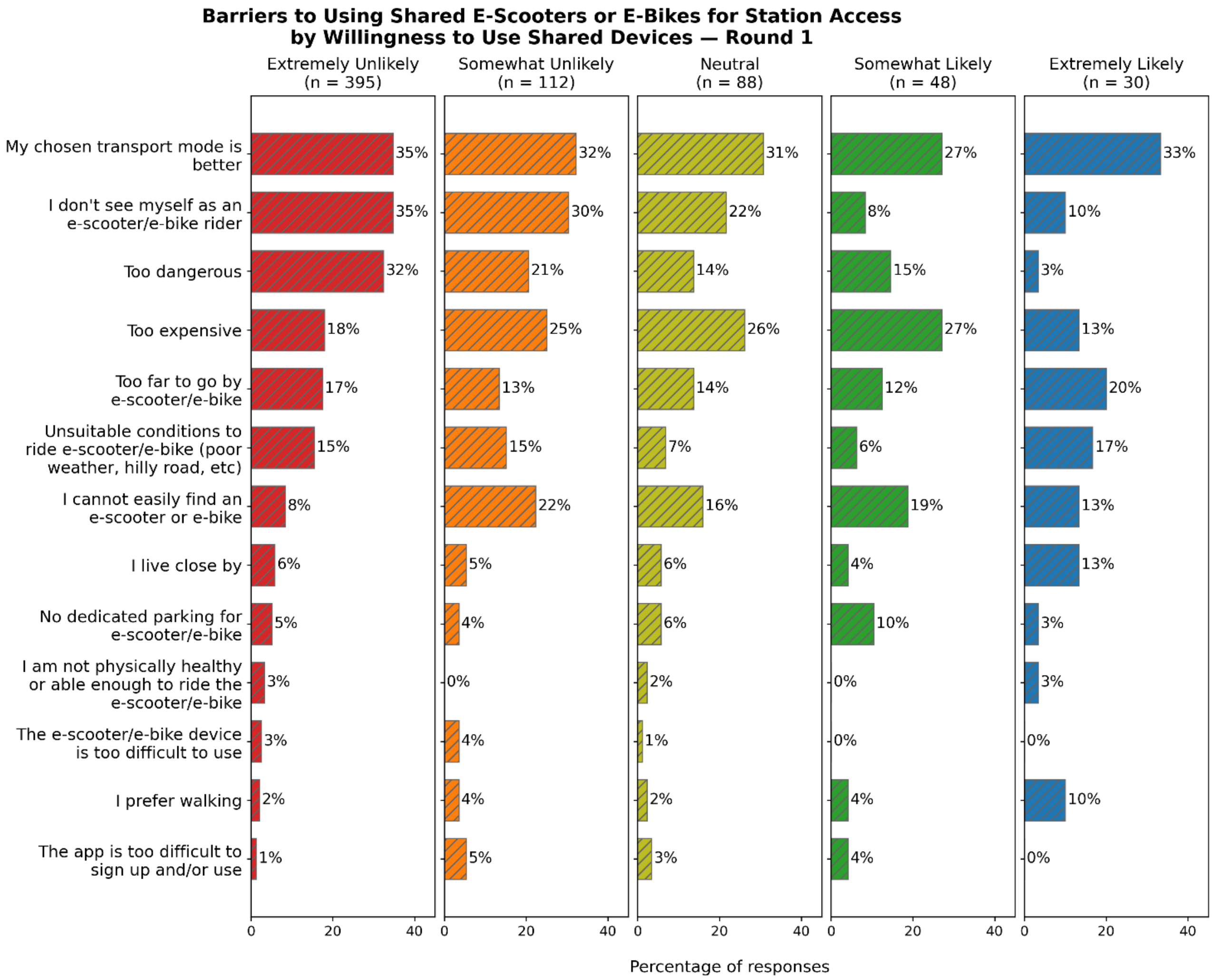


Figure 5.14: Barriers to using shared e-mobility by willingness to use (Rounds 1)

In contrast, respondents who were somewhat likely or extremely likely to use shared micromobility reported a markedly different barrier profile. Cost became the most prominent constraint among these groups. For example, “too expensive” was cited by 27% of somewhat likely respondents in Round 1, 17% in Round 2, and rising sharply to 38% in Round 3. Similarly, among the extremely likely group, cost remained non-trivial (e.g., 19% in Round 3). This pattern is notable given that subsidised pricing was introduced in Round 3. Availability-related barriers, such as difficulty finding a device, were also more common among higher-willingness respondents (e.g., 21% among somewhat likely users in Round 3), suggesting unmet demand rather than rejection.

Neutral respondents consistently occupied an intermediate position. Across rounds, they reported a mix of attitudinal and practical barriers, with cost (20-26%), chosen mode preference (30-36%), and distance (11-15%) all featuring prominently. This group appeared neither fundamentally opposed nor fully convinced, but sensitive to service conditions and perceived value.

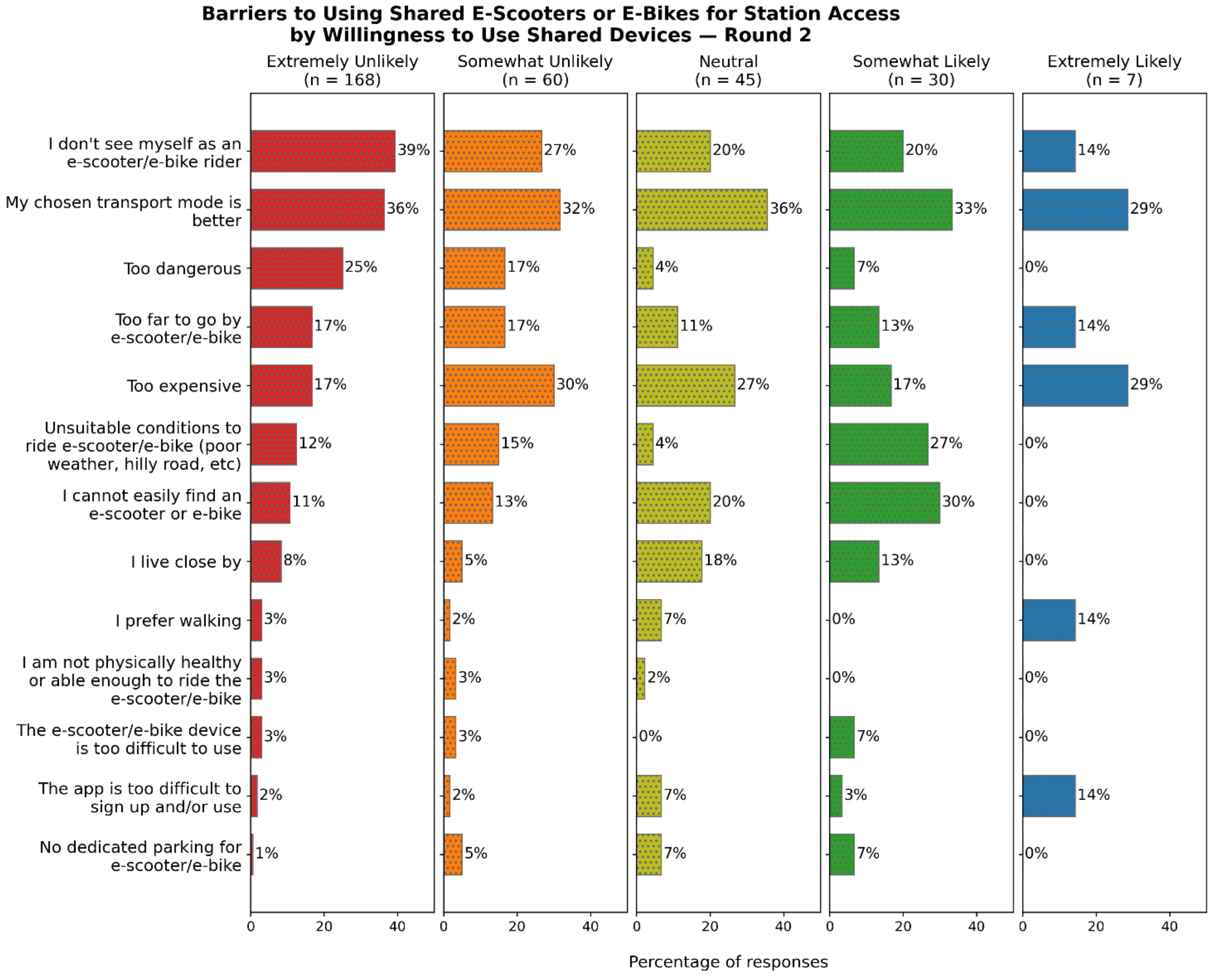


Figure 5.15: Barriers to using shared e-mobility by willingness to use (Rounds 2)

Overall, these patterns indicate that low willingness was anchored in identity, safety, and modal satisfaction, whereas higher willingness was constrained by price, availability, and situational factors. This distinction suggests that while resistant users are unlikely to be influenced by marginal service improvements, more willing users may respond to targeted interventions addressing cost, access, and convenience.

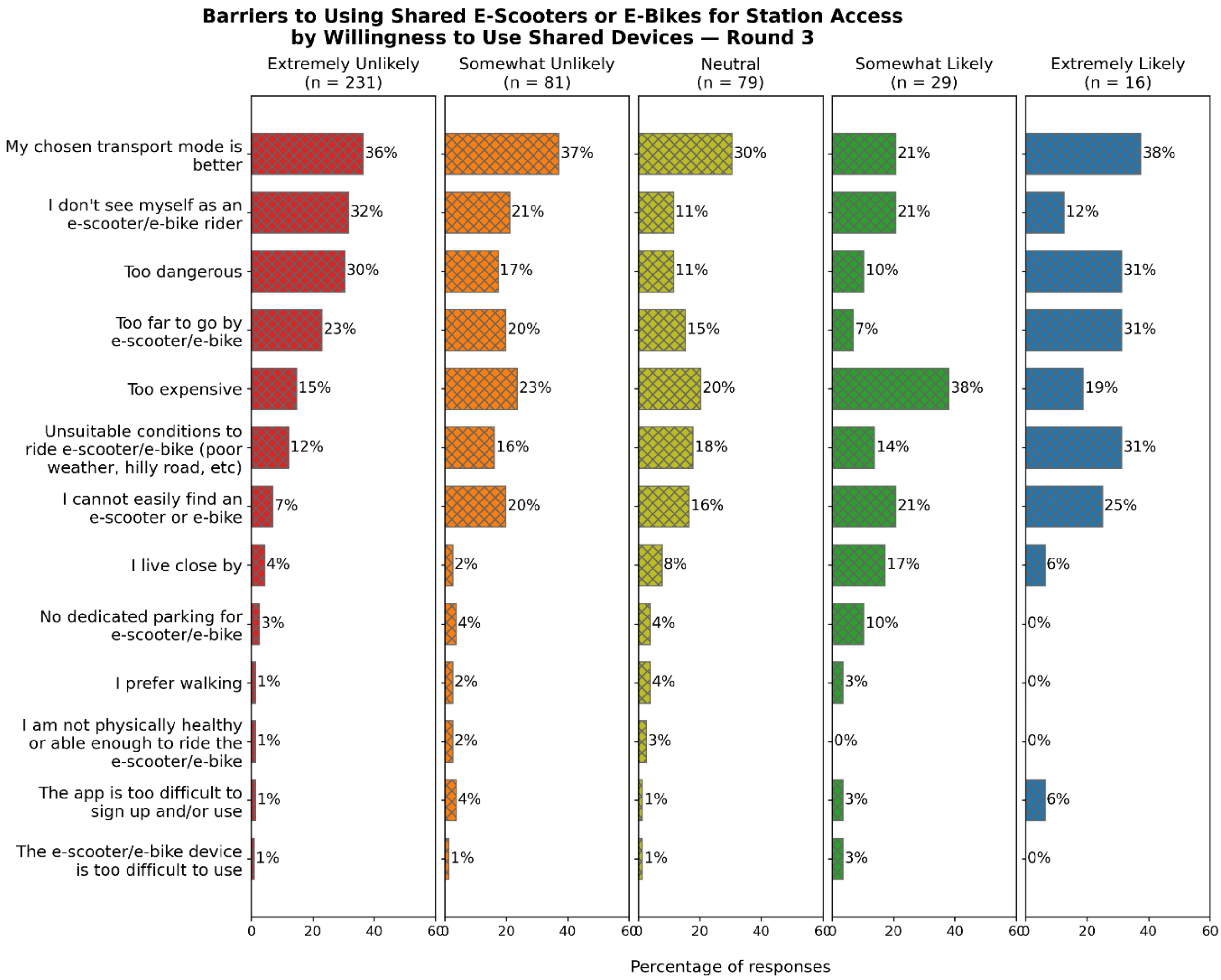


Figure 5.16: Barriers to using shared e-mobility by willingness to use (Rounds 3)

Headline Findings	Key Implications for Industry & Policy
Strong resistance to shared micromobility is driven primarily by attitudinal and identity-based barriers	Interventions focused solely on infrastructure or pricing are unlikely to shift behaviour among unwilling users
Safety concerns, distance, and satisfaction with existing modes dominate among extremely unlikely respondents	Addressing safety perception and perceived suitability is a prerequisite for any behavioural change
Cost is the most salient barrier among respondents who are otherwise willing to use shared micromobility	Pricing remains a key determinant of uptake; subsidies may increase price awareness but do not fully remove cost sensitivity

5.6.3. Willingness to use shared e-mobility by prior experience

Figure 5.17 demonstrates a strong and consistent relationship between prior experience with shared micromobility and stated willingness to use shared e-scooters or e-bikes across all survey rounds. Respondents who had never used shared devices showed the lowest willingness throughout, with around 60-67% reporting they were extremely unlikely to use shared micromobility in each round. Positive willingness in this group was minimal, with fewer than 5% indicating they were extremely likely at any point.

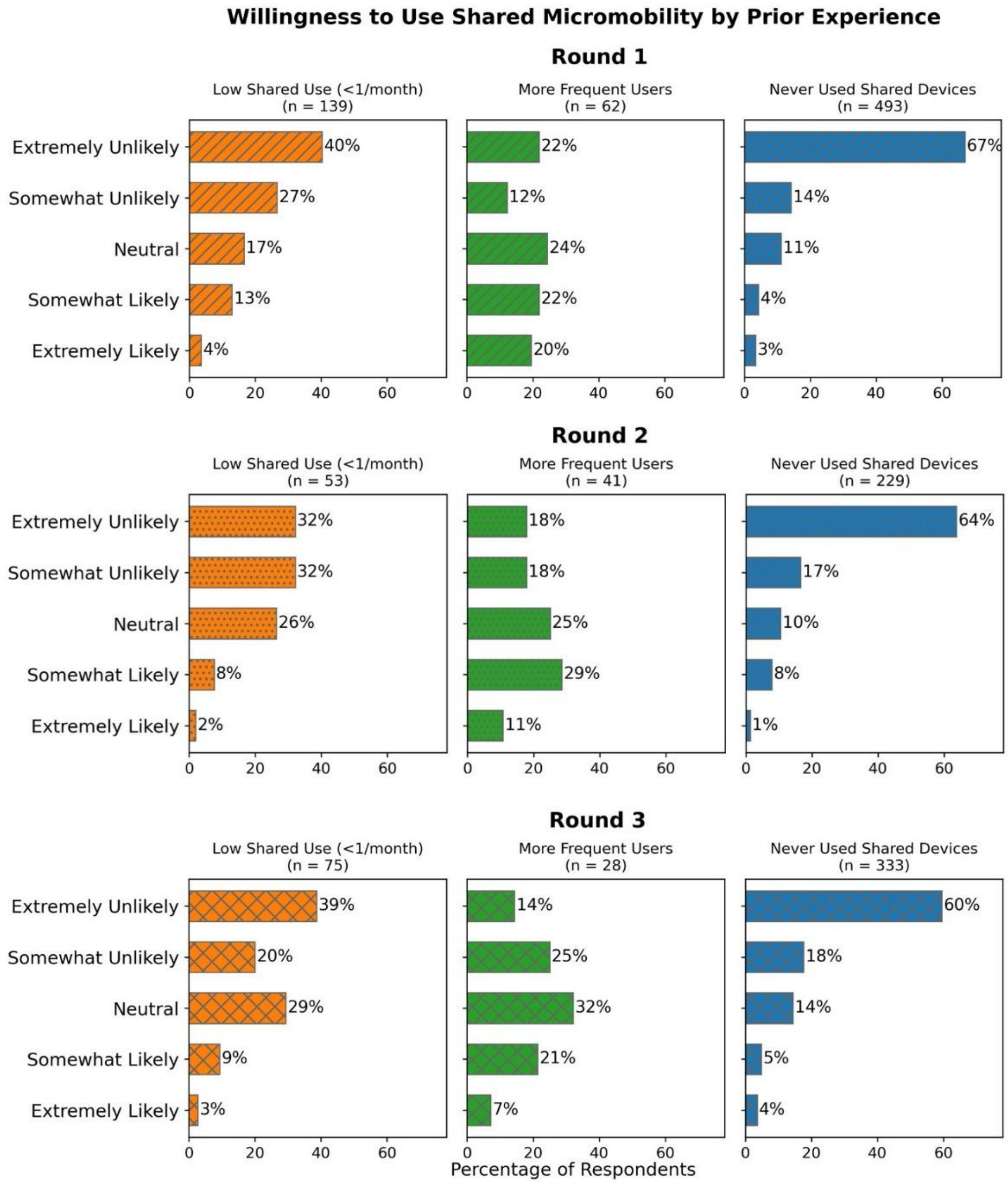


Figure 5.17: Willingness to use shared e-mobility by prior experience

In contrast, respondents with more frequent prior use were substantially more open. In Round 1, only 22% of frequent users were extremely unlikely, while around 42% report being somewhat or extremely likely. Similar patterns were observed in Round 2 (approximately 39% positive willingness) and persisted in Round 3, where close to 30% remained positively inclined despite some softening. Frequent users were also more likely to occupy neutral or moderate willingness categories rather than expressing outright resistance.

Respondents with low but non-zero shared use (< once per month) sat between these extremes. Around 40% of this group remained extremely unlikely in Rounds 1 and 3, while fewer than 15% reported positive willingness in any round, indicating that limited exposure alone does not substantially shift attitudes.

Overall, the figure reveals a clear experiential gradient. Willingness increased sharply with prior use, while lack of experience was associated with persistent reluctance. This pattern remained stable across survey rounds, suggesting that experiential engagement, rather than timing alone, plays a central role in shaping stated willingness.

Headline Findings	Key Implications for Industry & Policy
Willingness to use shared micromobility was strongly stratified by prior experience	Exposure and trial are central mechanisms for increasing acceptance; willingness does not emerge organically among non-users
The experience-willingness relationship remained stable over time and across survey rounds	Structural differences in experience, rather than short-term interventions, underpin willingness gaps
More frequent users consistently reported much higher willingness, including substantially lower extreme unwillingness	Policies that encourage repeat use (e.g., free trials, loyalty incentives) are likely to have the greatest behavioural impact

5.7. Regression results: Willingness to use shared e-mobility

Respondents' willingness to use shared e-scooters or e-bikes was analysed using a statistical approach suited to responses that follow a clear order, in this case a five-point scale from extremely unlikely to extremely likely. Instead of estimating a single complex model, the analysis was conducted in a step-by-step way, allowing different types of influences to be added gradually and their effects to be examined in turn.

Five models were estimated in total. Each model builds on the previous one, making it possible to see how the explanation improved as additional factors were included. Model performance was compared using standard statistical measures that indicate how well each model fits the data while accounting for complexity, with improvements reflected in better overall fit as more behavioural, contextual, and attitudinal factors are taken into account.

Model 1: Baseline temporal effects

The first model examines whether willingness to use shared e-mobility changed across survey rounds, controlling only for basic socio-demographics (age, gender) and trip stage (first vs last mile).

Results show a significant increase in willingness in Round 3 relative to Round 1, while the difference between Round 2 and Round 1 was positive but not statistically significant. This suggests that meaningful changes in stated willingness emerged only by the third survey wave, rather than immediately after earlier interventions.

Women were initially less willing than men to use shared e-mobility, although this effect weakened and eventually disappeared in later models. Age had no meaningful association with willingness. Importantly, respondents undertaking last-mile trips were consistently more willing to use shared devices than those on first-mile trips, indicating that shared e-mobility is more readily accepted as a destination-side access solution.

Model 2: Station usage context

Model 2 introduces station frequency, station day, and trip purpose, capturing how regularity and context of station use shape willingness.

Frequent station users (particularly those visiting multiple times per week) were significantly more willing to use shared e-mobility than infrequent users, highlighting the role of familiarity and repeated exposure to the station environment. In contrast, users who primarily access the station on weekdays were substantially less willing than weekend users, suggesting that time pressure, crowding, or commuting routines may reduce openness to alternative access modes.

Trip purpose also matters; respondents travelling for study purposes exhibited markedly higher willingness compared to those travelling for work, a pattern that remained robust across all subsequent models. Other trip purposes show no consistent differences.

Table 5.2: Ordered logistic regression results for willingness to use shared e-scooters or e-bikes

Category	Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Survey round (ref: Round 1)	Round 2	0.148	0.104	0.126	0.120	0.064
	Round 3	0.257**	0.237*	0.377***	0.417***	0.351**
Age	Age (standardised)	0.012	0.002	-0.007	0.005	-0.001
Gender (ref: male)	Female	-0.221**	-0.208*	-0.002	0.001	0.040
	Other	0.131	-0.040	0.104	-0.018	0.099
Trip stage (ref: first mile)	Last mile	0.308**	0.261*	0.327**	0.284*	0.347**
Station usage frequency (ref: < once per month)	2-4 days per week		0.515**	0.475**	0.420*	0.475*
	5 days or more per week		0.590**	0.559**	0.439*	0.532**
	About once per fortnight		0.421	0.329	0.364	0.270
	About once per month		-0.052	-0.200	-0.159	-0.350
	About once per week		0.354	0.243	0.291	0.411
Station visit day preference (ref: weekends)	Both		-0.249	-0.221	-0.206	-0.201
	No preference		0.142	0.032	0.044	0.093
	Weekdays		-0.916***	-0.964***	-0.842***	-0.827***
Trip purpose (ref: Getting to/from work)	Running errands /getting services		0.035	0.068	-0.025	0.231
	Going to an event		-0.070	-0.155	-0.161	-0.106
	For other leisure purposes		0.023	0.069	-0.046	0.064
	Other purposes		0.364	0.221	0.191	0.159
	Getting to/from study		0.931***	0.954***	0.971***	0.994***
Micromobility awareness (ref: not aware)	Aware of the service			-0.497***	-0.531***	-0.531***
Micromobility usage frequency (ref: never):	2-4 days per week			2.908***	2.863***	2.506***
	5 days or more per week			0.915*	0.900	0.837
	Less often than once per month			0.962***	1.033***	0.885***
	About once per fortnight			2.017***	2.067***	1.793***
	About once per month			1.981***	1.975***	1.870***
	About once per week			1.793***	1.759***	1.436***

Active travel device use	Personal scooter			-0.067	-0.010	-0.200
	Personal bike			-0.249	-0.267	-0.241
	Shared e-scooter			0.258	0.118	0.237
	Shared e-bike			0.638	0.762	0.410
	None			-0.273	-0.291	-0.261
Travel mode (ref: walking)	By car (dropped off by family or friend)				-0.638**	-0.436
	By car (drove and parked)				-0.547***	-0.393**
	Other modes				0.278	0.529
	Personal bike				1.392	1.384
	Personal scooter				-0.733	-0.975
	Public transport (bus/ferry)				0.702**	0.777**
	Shared e-scooter				0.386	0.224
	Taxi and/or ride-hailing (e.g. Uber/Didi/Ola)				0.431	0.102
Driver travel time (ref: >10 min)	Driver travel time_0 to 5 min				0.353	0.169
	Driver travel time_5 to 10 min				0.055	-0.015
Barriers	I cannot easily find an e-scooter or e-bike					0.636***
	The app is too difficult to sign up and/or use					0.335
	The e-scooter/e-bike device is too difficult to use					0.038
	No dedicated parking for e-scooter/e-bike					0.091
	Unsuitable conditions to ride e-scooter/e-bike					-0.059
	Too expensive					-0.203
	Too dangerous					-0.841***
	Too far to go by e-scooter/e-bike					-0.382**
	I am not physically healthy or able					-0.012
	I don't see myself as an e-scooter/e-bike rider					-0.537***
	My chosen transport mode is better					-0.275**
	I prefer walking					0.369
	I live close by					-0.276
Cost × Round 3 subsidy	Too expensive x Round 3					0.079
Model fit	N (Observations)	1405	1405	1405	1405	1405
	Log-Likelihood	-1721.16	-1683.49	-1607.35	-1592.42	-1551.81
	AIC	3462.321	3412.973	3284.701	3274.839	3221.613
	BIC	3514.799	3533.672	3468.374	3510.99	3531.233

Notes: Coefficients reported. Reference categories are shown in parentheses. Models are estimated using a nested specification. Statistical significance: *** p < 0.01, ** p < 0.05, * p < 0.10.

Model 3: Micromobility exposure and experience

Model 3 adds variables capturing micromobility awareness, prior micromobility use frequency, and active travel device use in daily life.

Prior micromobility experience emerged as the single strongest predictor of willingness. Any level of previous use, whether frequent or occasional, was associated with substantially higher willingness relative to never-users, underscoring the importance of experiential learning and habit formation.

Interestingly, awareness alone had a negative association with willingness, suggesting that knowledge of shared micromobility does not translate directly into acceptance and may instead coincide with heightened risk perceptions or critical attitudes. In contrast, general use of active travel devices (e.g., personal bikes or scooters) showed no statistically significant relationship with willingness, indicating that shared micromobility adoption is not simply an extension of broader active travel behaviour.

The inclusion of these exposure variables largely explains away the earlier gender difference observed in Model 1, suggesting that gender gaps in willingness are mediated by differences in experience rather than intrinsic preferences.

Model 4: Travel mode mechanisms

Model 4 introduces current access mode and driver-specific travel time, testing whether existing travel behaviour constrains openness to shared micromobility.

Relative to walking, respondents who drive to the station or are dropped off by car were significantly less willing to use shared devices, highlighting the difficulty of shifting established car-based access habits. By contrast, respondents using public transport for station access were more willing to use shared e-mobility, indicating behavioural compatibility between transit use and micromobility adoption.

Among drivers, shorter access distances were associated with higher willingness, but these effects were not statistically significant. This suggests that while distance may matter substantively, it does not independently explain willingness once broader behavioural patterns are accounted for.

Overall, this model reinforces the idea that current travel mode structures willingness, with car dependence acting as a strong barrier to behavioural change.

Model 5: Barriers to use

The final model incorporates a comprehensive set of self-reported barriers, alongside an interaction between cost concerns and Round 3 (when subsidised pricing was introduced).

Results show a clear distinction between barriers associated with higher willingness and those associated with resistance. Respondents who reported difficulty finding a device were more willing overall, indicating that availability constraints primarily affected already-interested users. In contrast, safety concerns, perceived distance, identity-based resistance (“not seeing oneself as a scooter rider”), and preference for other modes were all strongly and negatively associated with willingness, characterising structural and attitudinal barriers among unwilling users.

Cost concerns were negatively associated with willingness, but the effect was not statistically significant once other barriers were controlled for. Moreover, the interaction between cost and Round 3 was also insignificant, suggesting that the introduction of subsidised pricing did not meaningfully alter the role of cost perceptions in shaping willingness.

The inclusion of barriers substantially improved model fit, as reflected in the sharp reduction in AIC and increase in log-likelihood, confirming that perceived constraints play a central role in explaining stated willingness.

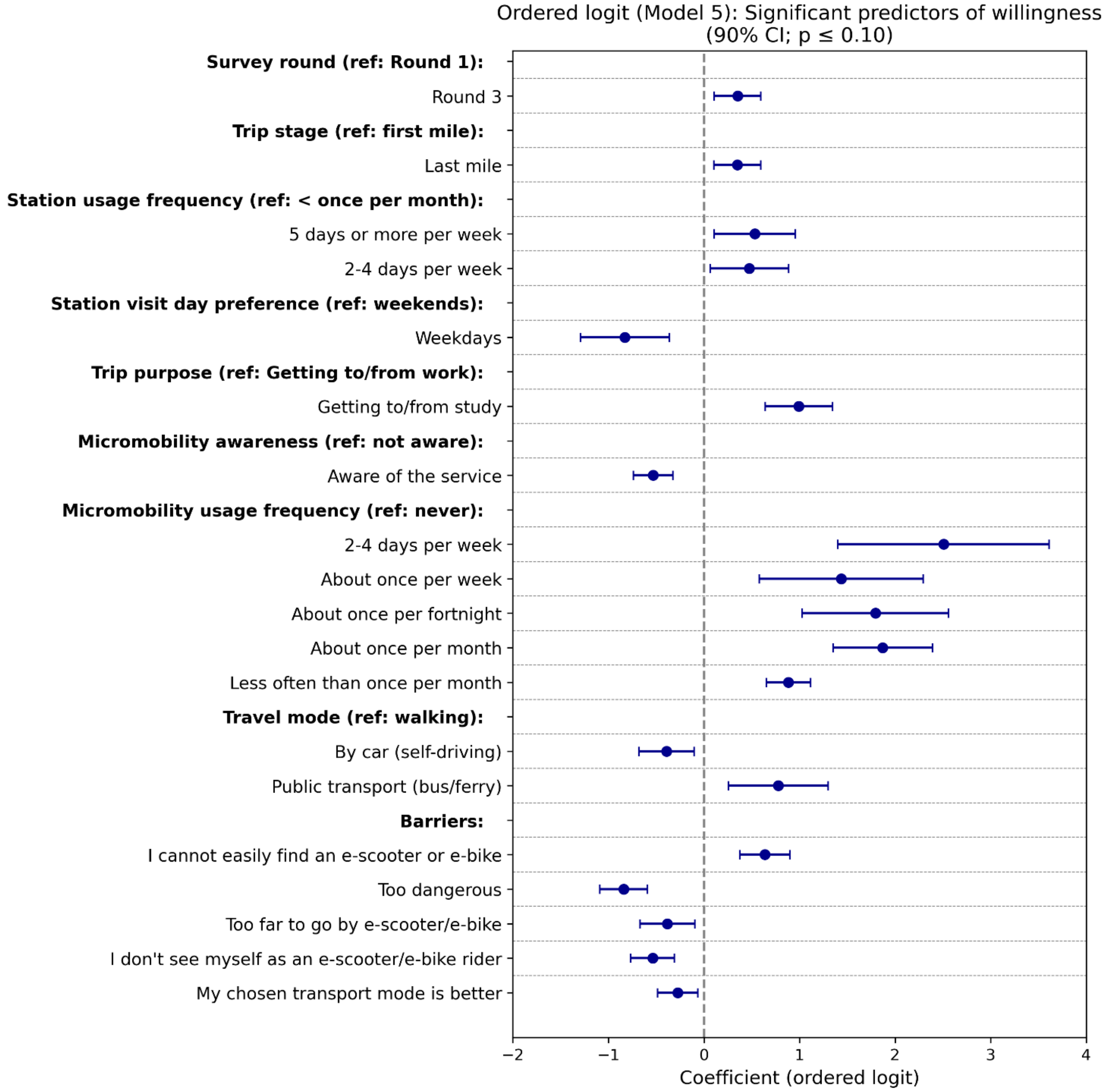


Figure 5.18: Estimated coefficients from Model 5 (barriers-inclusive specification).

Notes: Points represent coefficient estimates from the ordered logit model; horizontal lines indicate 90% confidence intervals. Positive values indicate higher willingness to use shared micromobility, while negative values indicate lower willingness.

Figure 5.18 clarifies that willingness to use shared micromobility was primarily structured by behavioural exposure and perceived barriers rather than marginal frictions. The largest positive effects were associated with prior micromobility use and last-mile travel, indicating that willingness increased where shared devices were behaviourally compatible with existing travel routines. In contrast, the strongest negative effects related to safety concerns, identity-based resistance, and reliance on private car access, suggesting that unwillingness was anchored in perceptions and habits rather than availability or cost. The asymmetry visible in the figure, where experience-based variables dominated positive willingness while perceptual barriers dominated resistance, reinforces the conclusion that policy interventions must address both trial opportunities and perceived safety to shift behaviour meaningfully.

Taken together, the ordered logit models show that willingness to use shared micromobility was shaped far more by experience, behavioural context, and entrenched travel habits than by demographics or awareness alone. While willingness increased in Round 3 relative to Round 1, this temporal effect was modest once behavioural mechanisms were introduced.

Across all specifications, prior micromobility use emerged as the dominant predictor of willingness, dwarfing demographic effects and reinforcing the importance of experiential exposure. Trip context also matters; respondents undertaking last-mile trips, travelling for study, and using the station frequently were consistently more willing to use shared devices. In contrast, car-based access strongly suppressed willingness, while public transport users were comparatively more open.

The final model highlights a clear separation between latent demand and structural resistance. Availability-related barriers (e.g., difficulty finding a device) were associated with higher willingness, indicating constraints among otherwise willing users. Conversely, safety concerns, identity-based resistance, distance perceptions, and preference for existing modes were the primary anchors of unwillingness. Importantly, cost played a secondary role once these factors were accounted for, and subsidised pricing in Round 3 did not materially alter willingness.

Overall, the results indicate that policies focused solely on awareness or price incentives are unlikely to generate substantial behavioural change. Instead, strategies that enable trial, improve perceived safety, and integrate micromobility with public transport, particularly for last-mile access, are most likely to shift willingness and, ultimately, behaviour.

Headline Findings	Key Implications for Industry & Policy
Prior micromobility experience was the strongest and most consistent predictor of willingness	Enabling trial and first-use opportunities is critical to building acceptance
Car-based access strongly suppressed willingness, while public transport users were more open	Car dependence represents a major structural barrier; integration with public transport offers greater potential
Last-mile trips and frequent station use were associated with higher willingness	Shared micromobility aligns best with flexible, destination-side access travel contexts
Barriers differentiated latent demand from resistance: availability constrained the willing, while safety and identity anchored unwillingness	Policy responses should be segmented, addressing service reliability for willing users and safety perception for resistant groups

Section 6: Qualitative Findings from Intercept Survey

To complement the quantitative and trip data, the intercept survey included open-ended questions asking respondents to describe their perceptions towards shared e-mobility using three words/short phrases. Out of 1,467 survey respondents across the three survey rounds, 1,193 (81%) provided a total of 3,237 words/short phrases. Sentiment analysis and thematic analysis were carried out to investigate these perceptions.

6.1. Sentiment analysis

To examine the overall attitudes of the public towards shared e-mobility, the open-ended responses were categorised as negative perceptions, positive perceptions, neutral perceptions, or suggestions. The category of negative perceptions encompassed responses expressing clear opposition or unfavourable views towards e-mobility, such as concerns about safety, high pricing, public nuisance, and inappropriate user behaviour. By contrast, responses classified as positive perceptions reflected approval or enthusiasm for e-mobility, highlighting advantages such as convenience, enjoyment, environmental sustainability, and improved transport alternatives. The neutral perceptions category included responses presenting factual observations (neither positive nor negative), mixed sentiments (both positive and negative), or no opinion. Finally, the suggestions category captured comments that offered ideas or recommendations for improvement. Table 6.1 presents the proportion of responses across the four sentiment categories.

Table 6.1: Sentiment analysis of public perceptions towards shared e-mobility across three survey rounds

	Survey Round 1		Survey Round 2		Survey Round 3		TOTAL	
	Count	%	Count	%	Count	%	Count	%
Negative perceptions	916	60%	393	56%	553	54%	1,862	58%
Positive perceptions	492	32%	265	38%	392	38%	1,149	35%
Neutral perceptions	82	6%	35	5%	61	7%	178	6%
Suggestions	30	2%	7	1%	11	1%	48	1%
TOTAL	1,520	100%	700	100%	1,017	100%	3,237	100%

The analysis revealed that public perceptions of shared e-mobility were predominantly negative across all three survey rounds, although this negativity appeared to have moderated over time. In Round 1, negative perceptions accounted for 60% of open-ended responses, declining to 56% in Round 2 and 54% in Round 3. Meanwhile, positive perceptions increased from 32% in the first round to 38% in the two later rounds. This shift suggested a gradual improvement in public sentiments towards shared e-scooters and e-bikes, potentially reflecting growing familiarity with these modes in the surrounding neighbourhoods or increased recognition of their benefits as alternative transport options.

Despite this positive trend, negative perceptions remained the dominant sentiment overall, comprising 58% of all responses across the three survey rounds. This highlighted the persistence of key concerns – particularly around safety, pricing and public nuisance – that continued to shape public opinion. Neutral perceptions as well as suggestions remained relatively low and stable, indicating that most respondents held a clear stance rather than an ambivalent or constructive view.

Headline Findings	Key Implications for Industry & Policy
Clear tendency towards negative sentiments in public perceptions of shared e-mobility, though positive perceptions appeared to gradually increase over time	There is a pressing need for targeted engagement and communication to address underlying concerns and shift public sentiment towards more favourable views of shared e-mobility

6.2. Thematic analysis

To gain deeper insights into public perceptions of shared e-mobility, thematic analysis was conducted following the initial sentiment analysis. Responses in each sentiment category were coded inductively to identify **key themes** emerging from the data, which are elaborated in the subsequent sections (with supporting quotes in *'italics'*).

6.2.1. Negative perceptions

Safety concerns (i.e., viewing e-mobility as *'dangerous'*, *'unsafe'*, *'hazardous'*) clearly dominated public sentiments, mentioned in nearly 20% of all open-ended responses. Other most frequently cited issues included **high pricing** (*'expensive'*, *'overpriced'*, *'not cost effective'*) and perceptions of e-mobility as ***'public nuisance'*** interfering with the general public and surrounding environment (*'block footpaths'*, *'messy'*, *'clutter'*, *'annoying'*, *'in the way'*, *'menace'*, *'eyesore'*). Several respondents criticised the design and usability of the devices and apps as ***'difficult to use'***, citing issues such as *'heavy'* or *'clunky'* devices, not suitable for certain attire or for carrying bags, helmets not available, requiring apps to use, apps not working properly, subject to weather, and so on. Frustration was also evident with **inappropriate behaviour of other users** (*'inconsiderate'*, *'incompetent'*, *'people use them recklessly'*) as well as with the **limited and unreliable availability** of devices (*'hard to find'*, *'only available in certain areas'*, *'cannot find one when needed'*, *'not near my home'*). Many respondents explicitly stated a **lack of interest or willingness to use**, or felt it was personally unsuitable, suggesting some challenges in public acceptance and broader adoption of shared e-mobility.

'Not for me' / 'Not my thing'

'Not great for my age' / 'I'm too old'

'No use to me' / 'Would not use'

Concerns regarding governance and the broader urban context also emerged. Several respondents highlighted a perceived **lack of regulation and enforcement**, describing shared e-mobility as *'unlicensed'*, *'poorly managed'*, *'not regulated enough to prevent careless operation'*. **Parking issues** were another recurring theme, with complaints about inappropriate parking, the absence of dedicated parking areas, and the difficulty of parking devices without obstructing footpaths. **Infrastructure-related concerns** further compounded negative perceptions, particularly the lack of dedicated or safe pathways for e-mobility which exacerbates conflicts with pedestrians and other road users.

'Not enough safe place to ride on road'

Some additional, less frequently mentioned issues included **hygiene concerns**, as well as **broader societal considerations** such as insurance and public liability, e-waste, the occupation of public space for private profit, and perceptions that e-mobility does not promote healthy commuting. Together, these findings illustrate that negative sentiments extended beyond immediate user experience to encompass regulatory, infrastructural, and normative concerns about the role of shared e-mobility in urban transport systems.

It is worth noting that this research directly related to, thus could test potential solutions for, several of these key issues. The implementation of designated e-mobility parking areas at the train station, where providers regularly deploy and rebalance devices, may help address concerns about unreliable availability, particularly for last-mile passengers travelling from the station to their home/next destination. These dedicated parking spaces could also partially alleviate issues of inappropriate parking, thereby reducing the perception of shared e-mobility as public nuisance. In addition, the offer of reduced e-mobility fares for trips connected to the train station directly targeted affordability – the second most cited issue, which might encourage greater public uptake of shared e-mobility in conjunction with public transport. Furthermore, though not as part of the research trial, the e-mobility providers (Lime and Neuron) conducted some activation and safety training activities onsite at the Albion Station during the study period, which could help educate the public about safe usage of e-mobility and reduce inappropriate user behaviour.

6.2.2. Positive perceptions

Convenience (*'convenient'*, *'handy'*, *'practical'*), **efficiency** (*'save time'*, *'quicker than walking'*), and **ease of use** (*'user friendly'*, *'comfortable'*, *'simple'*) were the most frequently mentioned benefits, emphasising ease of access and time saving. Many respondents also highlighted **enjoyment**, describing e-scooters and e-bikes as *'fun'* and *'enjoyable'* to use, with additional compliments reflecting **general approval** of the service (*'great'*, *'good idea'*, *'excellent modes of transport'*). Other prominent themes included appreciation for e-mobility's **environmental sustainability** (*'environmentally friendly'*, *'energy efficient'*, *'low emissions'*) and **suitability for specific purposes** (inner-city use, short-distance trips, casual/leisure trips) **and users** (young people, holiday-makers, people without cars or having to walk further). Shared e-mobility was acknowledged as an affordable, accessible and novel **alternative** that would help broaden travel options. This reinforced the appeal of e-mobility as a modern and flexible addition to urban transport networks.

6.2.3. Neutral perceptions and suggestions

While accounting for a small proportion of comments, some neutral perceptions of shared e-mobility reflected a more balanced view rather than strong endorsement or criticism. Some respondents acknowledged that e-scooters and e-bikes are fun and efficient, yet **only suitable in certain contexts**.

"Fun but impractical for commuting"

"Efficient but only in certain scenarios"

Others saw them as **good options for other people but not personally appealing**, citing factors like travel distance, preference for walking, or not viewing e-mobility as a necessity.

"I guess they're good if they work for you, but I personally don't see the point"

"Fun but I travel too far and enjoy health of walking"

"Good to have but not a necessity for me"

A few participants expressed **conditional approval**, noting that shared e-mobility is acceptable if safely used, well maintained and properly managed.

'As long as it's safe for people around the user'

'I like that they are an available option but they need to be better managed'

Suggestions from respondents mostly focused on **improving safety, regulation, and infrastructure** surrounding shared e-mobility. Some advocated for **user licensing/registration** or stronger enforcement to ensure responsible use, while others took a stricter stance suggesting e-mobility should be banned or limited. Several practical recommendations emerged, such as **more dedicated parking areas**, **reducing costs**, and **expanding e-mobility service** to outer suburbs. Respondents also highlighted the need for **expanding cycling infrastructure**, and some proposed integrating shared e-mobility with existing transport systems – such as making it accessible via go-card – to enhance uptake and rideability.

Headline Findings	Key Implications for Industry & Policy
Safety, cost, and public nuisance concerns dominated negative perceptions of shared e-mobility	Improving safety outcomes and public acceptance requires stronger regulation, enforcement, and user education, alongside infrastructure investment (e.g., dedicated lanes and parking) and targeted pricing strategies to address affordability.
Main perceived benefits included convenience, usability, and enjoyment, particularly for short trips and specific user groups	These benefits suggest shared e-mobility is best suited as a complementary, short-trip mode, particularly when integrated with public transport and deployed in urban environments.
Public acceptance is conditional on effective management and appropriate infrastructure	Public confidence can be strengthened through better infrastructure design, reliable device availability, clearer rules, and expansion beyond city centres where demand exists.

Section 7: Discussion & Implications

Respondent profile and station access context

- The spatial distribution of respondents' home suburbs confirms that Albion Station serves a **broad northern catchment**, particularly for first-mile commuters travelling from Brisbane's northern suburbs, alongside a smaller group of last-mile users residing closer to the inner city.
- Respondents were predominantly **regular weekday station users**, with access to the station primarily occurring by **walking and driving**, providing a stable behavioural context across the three rounds.
- This spatial pattern remained consistent across rounds, reinforcing Albion Station's role as a **regional commuter access point** rather than a purely local station.
- These patterns provide an appropriate context for assessing shared e-mobility as a **first- and last-mile connector**, rather than a general-purpose travel mode.

Awareness and willingness to use shared e-mobility

- Awareness of shared e-scooters and e-bikes increased substantially across the three rounds, indicating that the interventions improved **visibility and salience** of e-mobility at the station.
- Despite increased awareness, overall willingness to use shared e-mobility remained low, suggesting that awareness alone is **not sufficient** to drive adoption. However, the distribution of responses shows a **gradual shift toward greater openness**, with an increasing share of respondents expressing **neutral** attitudes as the rounds progressed from Round 1 to Round 3.
- This gap highlights the importance of distinguishing between **exposure** to e-mobility and deeper behavioural readiness to adopt it for regular commuting.

Barriers to using shared e-micromobility

- The most frequently reported barriers across all rounds were **preference for existing travel modes**, **safety concerns**, and **identity-related factors** (e.g., not seeing oneself as an e-scooter/e-bike user).
- Cost was identified as a barrier by a smaller share of respondents relative to these factors, suggesting that **perceptual and behavioural barriers dominate** at this station.
- These barriers were persistent across rounds, indicating that short-term availability and pricing interventions alone might not resolve them.

Differences in willingness by respondent profile

- Willingness to use shared e-mobility is consistently higher among respondents with **prior micromobility experience**, indicating that familiarity with e-scooters or e-bikes is associated with greater openness to use.
- Willingness also varies by **station access mode**, with respondents who access the station by car expressing notably lower willingness compared to those who walk or use other non-car modes.These descriptive patterns suggest that willingness to adopt shared e-mobility is **not evenly distributed across station users**, and that existing travel habits and experience play an important role in shaping openness to use.The regression analysis confirms that **prior micromobility experience** is the strongest predictor of willingness to use shared e-scooters or e-bikes.
- Travel context also matters. Last-mile trips are associated with higher willingness, while car-based station access is strongly associated with lower willingness.
- **Safety concerns and identity-related barriers** remain significant negative predictors of willingness in the full model, even after controlling for travel behaviour and experience.
- **Cost-related concerns** do not emerge as a dominant predictor of willingness once behavioural, contextual, and perceptual factors are accounted for, indicating that pricing plays a **supporting rather than primary role**.

- The inclusion of behavioural and perceptual variables substantially improves model fit, suggesting that **willingness is shaped more by habits and perceptions than by sociodemographic characteristics alone**.
- Taken together, the results indicate that **structural and experiential factors** play a stronger role in shaping willingness than short-term policy interventions in isolation.

GPS-based e-scooter trip activity and uptake

- GPS data from Lime and Neuron show a **steady increase in total trips and daily trip rates** across the three rounds, indicating that both improved availability and subsidised pricing led to **real increases in e-scooter use**.
- Trip characteristics remained highly stable over time. Average trip distance, trip duration, inbound–outbound balance, and the split between one-time and repeat users showed little change.
- The majority of trips were short (around 1–4 km) and concentrated near Albion Station, consistent with **first- and last-mile travel**.
- Higher trip rates during **weekday peak periods** further indicate that e-scooters were used primarily for commuting-related purposes.
- Together, these findings suggest that the interventions **intensified existing first- and last-mile use patterns**, increasing overall uptake without altering how or why e-scooters are used.

Overall implications

- Taken together, the survey and GPS analyses indicate that shared e-mobility can play a **meaningful supporting role** in first- and last-mile access when availability is improved and pricing barriers are reduced.
- However, ongoing behavioural and perception-related barriers mean that growth in use is likely to be gradual and uneven, rather than a rapid or widespread shift in the short term.
- The findings suggest that efforts to expand first- and last-mile micromobility should focus on better station integration, improved safety and confidence, and targeted engagement, with pricing support playing a supporting role rather than being the main driver.
- Shifting broader station access patterns requires addressing **perceived safety, identity, and entrenched car/walk routines**, not just awareness or price.
- The stability of trip characteristics alongside rising usage suggests that shared e-mobility interventions are most effective when framed as **scaling an existing, well-defined first/last-mile function**, rather than attempting to redefine travel behaviour.
- The results also highlight the value of **combining behavioural survey data with observed GPS trip data**, as each captures different aspects of uptake and together provide a more complete picture of intervention impacts.

Limitations

- While intercept surveys are well suited to capturing perceptions and stated willingness, they may **under-represent actual micromobility users**, particularly if these users are less likely to be intercepted at the station.
- Seasonal conditions appear to influence reported access behaviour, with the higher share of car-based access observed in Round 3 likely reflecting **hot weather conditions**, which may mask or offset short-term shifts toward active or micromobility access in intercept samples.
- The GPS analysis draws on data from two providers with differing data structures and sampling characteristics; although the routing approach reduces positional noise, reconstructed routes remain an **inferred representation** of actual travel paths.
- Some survey rounds coincided with holiday periods or seasonal variation, and changes in mode share or willingness should therefore be interpreted with **appropriate contextual caution**.

References

Ahmad, M., Mohiuddin, H., Wang, K., Broaddus, A., Fortier, M., & Circella, G. (2025). E-scooters and public transit: unveiling the conditions for a connection using trip and survey data. Travel Behaviour and Society, 41, 101090.

An, C., & Shen, J. (2025). Assessing the impact of Mobility-as-a-Service (MaaS) on sustainable urban travel behaviors: a systematic literature review. Frontiers in Sustainable Cities, 7, 1645488.

Bieliński, T., Kwapisz, A., & Ważna, A. (2021). Electric bike-sharing services mode substitution for driving, public transit, and cycling. Transportation Research Part D: Transport and Environment, 96, 102883.

Brown, A., & Howell, A. (2024). Mobility for the people: Equity requirements in US shared micromobility programs. Journal of Cycling and Micromobility Research, 2, 100020.

Chen, J., & Huang, L. (2024). Causes of transportation inequality: The case of bike sharing in the US. Case studies on transport policy, 16, 101199.

Chen, T., Chen, Y., Mu, Z., & Yu, X. (2025). The Game Relationship of Metro station Connection Mode: the Competition and Complementarity of Bike-sharing and Bus. IEEE Access.

Delbosc, A., & Thigpen, C. (2024). Who uses subsidized micromobility, and why? Understanding low-income riders in three countries. Journal of Cycling and Micromobility Research, 2, 100016.

Fearnley, N., & Veisten, K. (2025). What proportions of different transport modes do e-scooters replace? A meta-analysis. Journal of Cycling and Micromobility Research, 100082.

Fishman, E., Washington, S., & Haworth, N. (2014). Bike share's impact on car use: Evidence from the United States, Great Britain, and Australia. Transportation Research Part D: Transport and Environment, 31, 13-20.

Fishman, E., Washington, S., Haworth, N., & Watson, A. (2015). Factors influencing bike share membership: An analysis of Melbourne and Brisbane. Transportation Research Part A: Policy and Practice, 71, 17-30.

Fukushige, T., Fitch, D. T., & Handy, S. (2021). Factors influencing dock-less E-bike-share mode substitution: Evidence from Sacramento, California. Transportation Research Part D: Transport and Environment, 99, 102990.

Guidon, S., Wicki, M., Bernauer, T., & Axhausen, K. (2020). Transportation service bundling–For whose benefit? Consumer valuation of pure bundling in the passenger transportation market. Transportation Research Part A: Policy and Practice, 131, 91-106.

Jayawardhena, M., Delbosc, A., Currie, G., & Rose, G. (2025). When do shared e-scooters complement or compete with public transport? A mixed-method review and comparison with bike sharing. Journal of Cycling and Micromobility Research, 100057.

Kriswardhana, W., & Esztergár-Kiss, D. (2025). Generational disparities in MaaS bundle uptake. Transportation Research Procedia, 86, 121-127.

Liouta, G., Saibene, G., van Oort, N., Cats, O., & Schulte, F. (2024). Can shared mobility compensate for public transport disruptions? The case of Milan's Bike Sharing System during the COVID-19 pandemic. Transportation research record, 2678(12), 367-380.

Ma, X., Yuan, Y., Van Oort, N., & Hoogendoorn, S. (2020). Bike-sharing systems' impact on modal shift: A case study in Delft, the Netherlands. Journal of cleaner production, 259, 120846.

Meng, S., Brown, A., & Schlossberg, M. (2025). Purchase process, travel behavior, and equity implications of e-bike rebates in Eugene, Oregon. Case studies on transport policy, 101594.

Moura, F., Valença, G., Félix, R., & Vale, D. S. (2023). The impact of public bike-sharing systems on mobility patterns: Generating or replacing trips? International Journal of Sustainable Transportation, 17(11), 1254-1263.

Narayanan, S., Arango, J. P. R., Tympakianaki, A., Frederix, R., & Antoniou, C. (2025). Can emerging mobility solutions complement public transport and lead to a sustainable future?: A case study on Regensburg, Germany. Case studies on transport policy, 19, 101338.

Nikitas, A. (2018). Understanding bike-sharing acceptability and expected usage patterns in the context of a small city novel to the concept: A story of 'Greek Drama'. Transportation research part F: traffic psychology and behaviour, 56, 306-321.

Oeschger, G., Carroll, P., & Caulfield, B. (2020). Micromobility and public transport integration: The current state of knowledge. Transportation Research Part D: Transport and Environment, 89, 102628.

Sanders, R. L., Branion-Calles, M., & Nelson, T. A. (2020). To scoot or not to scoot: Findings from a recent survey about the benefits and barriers of using E-scooters for riders and non-riders. Transportation Research Part A: Policy and Practice, 139, 217-227.

Sundfør, H. B., Berntsen, S., Bere, E. T., & Fyhri, A. (2024). The effects of subsidising e-bikes on mode share and physical activity-A natural experiment. Journal of Transport & Health, 35, 101752.

Teixeira, J. F., Diogo, V., Bernát, A., Lukasiewicz, A., Vaiciukynaite, E., & Sanna, V. S. (2023). Barriers to bike and e-scooter sharing usage: An analysis of non-users from five European capital cities. Case studies on transport policy, 13, 101045.

Tsouros, I., Polydoropoulou, A., Tsirimpa, A., Karakikes, I., Tahmasseby, S., Mohammed, A., & Alhajyaseen, W. (2025). Unlocking Multimodality: E-Scooters as First/Last Mile Connectors and Multimodal Hub Exploration in Doha. Journal of Cycling and Micromobility Research, 100076.

van Kuijk, R. J., de Almeida Correia, G. H., van Oort, N., & Van Arem, B. (2022). Preferences for first and last mile shared mobility between stops and activity locations: A case study of local public transport users in Utrecht, the Netherlands. Transportation Research Part A: Policy and Practice, 166, 285-306.

Zheng, Z., Wang, J., Liu, W., & Yang, H. (2025). Competition in complementary transport services: Integrating bike-sharing with public transit. Transportation Research Part E: Logistics and Transportation Review, 203, 104364.

Appendices

Appendix 1 – Intercept survey questionnaire

Closing the Loop on First/Last Mile Transportation in Brisbane

Do you consent to participate in this survey?
- ○ Yes
- ○ No

Are you 18 years of age or older?
- ○ Yes
- ○ No

Are you using Albion train station as part of your trip today? *(select one answer)*
- ○ Yes, **I've just arrived** to take the train to my destination
- ○ Yes, but I'm just transferring between two train lines at Albion station
- ○ Yes, **I've just got off the train** to go home/to my destination
- ○ No, I'm not using Albion train station today

Q1.1. If you've just arrived to take the train, how did you travel to this train station today? OR if you've just got off the train, how will you travel to your next destination from this train station today? *(select your main mode)*
- ○ By car (self-driving)
- ○ Personal scooter (e-scooter or non-electric scooter)
- ○ By car (dropped off/picked up by family or friend, e.g. kiss 'n' ride)
- ○ Personal bike (e-bike or pedal bike)
- ○ Taxi and/or ride-hailing (e.g. Uber/Didi/Ola)
- ○ Shared e-scooter (Neuron/Lime)
- ○ Walking
- ○ Shared e-bike (Neuron/Lime)
- ○ Public transport (bus/ferry)
- ○ Other (please specify) ____________

Q1.2. Why did you choose to travel by shared e-scooter or e-bike to/from the station today? *(select up to 3 reasons)* ***please SKIP this question if you DID NOT travel by Neuron/Lime e-scooter or e-bike***
- ☐ Too far to walk
- ☐ E-scooter/e-bike is fun to ride
- ☐ No public transport options that suit me
- ☐ E-scooter/e-bike is cheaper than other options
- ☐ Car parking is difficult
- ☐ E-scooter/e-bike is more convenient than other options
- ☐ I do not have a car and/or driver's license
- ☐ E-scooter/e-bike is good for the environment
- ☐ The new e-scooter/e-bike parking hub at the station is convenient
- ☐ I feel safer when riding an e-scooter/e-bike
- ☐ I want to take advantage of the reduced e-scooter/e-bike fare
- ☐ Other (please specify) ____________

Q1.3. What prevented you from using a shared e-scooter or e-bike to/from the station today? *(select up to 3 reasons)* ***please SKIP this question if you already answered Q1.2***
- ☐ I cannot easily find an e-scooter or e-bike
- ☐ Too expensive
- ☐ The app is too difficult to sign up and/or use
- ☐ Too dangerous
- ☐ The e-scooter/e-bike is too difficult to use
- ☐ Too far to go by e-scooter/e-bike
- ☐ No dedicated parking for e-scooter/e-bike
- ☐ I am not physically healthy or able enough to ride the e-scooter/e-bike
- ☐ Unsuitable conditions to ride e-scooter/e-bike
- ☐ I don't see myself as an e-scooter/e-bike rider
- ☐ My chosen transport mode is better
- ☐ Other (please specify) ____________

1

Q2.1. What is the main purpose of your trip today? *(select one answer)*
- ○ Getting to/from work
- ○ Going to an event (e.g. a concert, sport match)
- ○ Getting to/from study (e.g. school, TAFE, university)
- ○ For other leisure purposes (e.g. meeting friends, getting food & drink, getting to the gym)
- ○ Running errands/getting services (e.g. grocery shopping, GP visit, getting a haircut)
- ○ Other (please specify) ____________

Q3.1. How often do you use Albion train station? *(select one answer)*
- ○ 5 days or more per week
- ○ About once per fortnight
- ○ 2-4 days per week
- ○ About once per month
- ○ About once per week
- ○ Less often than once per month

Q3.2. Are you more likely to use Albion train station during weekdays or weekends? *(select one answer)*
- ○ Weekdays (Monday – Friday)
- ○ Both
- ○ Weekends (Saturday & Sunday)
- ○ I do not have a preference

Q3.3. Approximately how long did it take you to travel to/from Albion train station today?
In minutes ____________

Q4.1. How often do you use Neuron or Lime shared e-scooters/e-bikes within Brisbane? *(select one answer)*
- ○ 5 days or more per week
- ○ About once per month
- ○ 2-4 days per week
- ○ Less often than once per month
- ○ About once per week
- ○ Never
- ○ About once per fortnight

Q4.2. Did you know that Neuron and Lime shared e-scooters now service this train station?
- ○ Yes
- ○ No

Q4.3. Knowing that Neuron and Lime now service this train station, how likely are you to use their shared e-scooters/e-bikes to travel to/from this station in the future? *(select one answer)*
- ○ Extremely unlikely
- ○ Somewhat unlikely
- ○ Neutral
- ○ Somewhat likely
- ○ Extremely likely

Q4.4. Using three words or short phrases, what do you think about shared e-scooters and e-bikes (e.g. Neuron/Lime)?
1. ____________
2. ____________
3. ____________

2

We would like to understand a little more about you. These questions help ensure our survey sample represents the broader population and help us understand transport usage patterns. Your answers are used solely for research purposes.

Q5.1. What is your age? ___________________

Q5.2. If you are comfortable, how do you identify?

- O Man or male
- O Woman or female
- O Non-binary
- O I/They use a different term
- O Prefer not to answer

Q5.3. Which suburb do you live in?

- O Albion
- O Ascot
- O Clayfield
- O Hamilton
- O Kelvin Grove – Herston
- O Newmarket
- O Newstead - Bowen Hills
- O Wilston
- O Windsor
- O Wooloowin - Lutwyche
- O Other _________________

Q5.4. In your daily life, do you use any of the following devices? *(select all that apply)*

- ☐ Personal scooter (e-scooter and/or non-electric scooter)
- ☐ Personal bike (e-bike and/or pedal bike)
- ☐ Shared e-scooter (Neuron/Lime)
- ☐ Shared e-bike (Neuron/Lime)
- ☐ I don't use any of these devices

Q6. Do you have any final comments you would like to share with us about transport connections in general or about e-scooters/e-bikes in particular?

____
____

Q7. Do you agree to be contacted by the research team for a follow-up interview at a later stage? You will be reimbursed with a $50 gift card for your interview time.

O Yes – *please provide your email* ____________________________ O No

Thank you! We appreciate your time participating in this survey. The information you provided will help to improve transport access in Brisbane. The University of Queensland survey team wishes you safe travels. **Would you like to enter the prize draw to win a $100 e-gift card?**

O Yes – *please fill in the contact form* O No

This research is approved by the University of Queensland Human Research Ethics Committee. All information you provide will be confidential and anonymous, and will only be used for the purposes of this study and future related research. More information about our research project is provided in the Participant Information Sheet. For any question, please contact the chief investigator Dr Richard Buning at r.buning@business.uq.edu.au.This research Ethics ID number: 2025/HE001424

3

Closing the Loop on First/Last Mile Transportation in Brisbane

Thank you for completing our survey. As a token of our appreciation, you have the opportunity to enter a prize draw to win a Prezze e-gift card valued at AUD 100, redeemable at more than 400 brands. Please read the Terms and Conditions of Entry.

To enter the prize draw, please provide your contact details below. Please double-check your information carefully. If we cannot reach you, you will be unable to claim your prize.

Privacy and data protection:
Your contact information will be:

- Used only to notify you about the prize draw and any follow-up survey
- Kept completely confidential and accessible only to the research team
- Stored separately from your survey responses to maintain anonymity
- Permanently deleted after the follow-up survey is completed and all prizes have been distributed

Your privacy is protected:

- Your survey responses will remain completely anonymous
- Contact details are stored in a separate, secure file
- No connection can be made between your responses and your identity

If you do not wish to be contacted for the prize draw and/or the follow-up survey, please leave the spaces below empty.

Please provide your best contact details below

Email: ____
Phone number: ______________________________________
Preferred name: _____________________________________

The University of Queensland
Brisbane QLD 4072 Australia

ABN: 63 942 912 684
CRICOS Provider 00025B

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA
CREATE CHANGE

Appendix 2 – Ethics approval

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA
CREATE CHANGE
Research Ethics and Integrity

Human Research Ethics Approval

Project Number:	2025/HE001424
Project Title:	Closing the Loop on First/Last Mile Transportation in Brisbane: Assessing the Connection between Micromobility and 50-cent Public Transport Fares
Version:	0.01
Chief Investigator:	Dr Richard Buning School of Business
Co-Investigator(s)	Dr Dorina Pojani Professor Jonathan Corcoran Dr Wendy Pham Dr Scott Lieske Dr Thomas Sigler Dr Frank Zou
Funding Body (UQ ref#):	
Approving Committee:	BEL LNR
Approval End Date:	31 Jul 2026
Date of Approval:	Thursday, 31 July, 2025

BEL LNR confirms that this project meets the requirements of the National Statement on Ethical Conduct in Human Research (2023). The University's human research ethics committees are organised and operate in accordance with the National Statement on Ethical Conduct in Human Research (2023).

Approved Documents

Document Type	File Name	Document Tile	Application Version	Document Version	Last Modified
Project Protocol	2025_HE001424 - Project Description - Closing the Loop.docx	2025_HE001424 - Project Description - Closing the Loop.docx	0.01	1	7/07/2025 11:49:51 AM
Application	Output Form.pdf	Output Form	0.01	1	7/07/2025 11:49:51 AM
Application Attachment	2025_HE001424 - PIS - Closing the Loop.docx	Particpant Information Sheet	0.01	1	7/07/2025 11:49:51 AM
Application Attachment	2025_HE001424 - Questionaire.docx	Questionaire	0.01	1	7/07/2025 11:49:51 AM

Appendix 3 – Research assistant protocols

iMOVE Project – Closing the loop on First/Last Mile transportation in Brisbane:
Assessing the connection between micro-mobility and 50-cent public transport fares

RESEARCH ASSISTANT SURVEY PROTOCOL

RA Name: ____

Date: ______________________ **Shift End Time:** ________________

Shift Start Time: ________________ **Location** (e.g. platform number): _______

1. **POSITION**
   - Stand at either end of the platform
   - Choose a safe spot (away from platform edges, not blocking crowd movement)

2. **APPROACH**
   - To ensure randomisation, approach every fourth person that goes pass you
   - Approach passengers respectfully in open spaces
   - Do not follow or persist with declining participants

3. **SCRIPT**
   - *"Hi, we're researchers from the University of Queensland. Would you like to take part in our 5-min survey for a chance to win a $100 gift card? The survey explores your transport options for commuting."*
   - *"Your answer will help Brisbane improve transport connections in the future. Thank you very much for your time!"*

4. **ADDITIONAL COMMENTS**
   - If the participant is willing to engage in a conversation with you and/or make additional comments about the survey, please ask for their consent to include their comments in the research. ***"That is a great comment, thank you! Would you be happy for us to include that in our final report?"***
   - When relevant, ask the participant these questions:
     - ***(for non-users of e-scooter) What could possibly make you change the way you travel to/from the station?***
     - ***(OR for car drivers) What could possibly make you choose another transport mode other than driving to/from the station?***
   - Then record participants' comments in the RA shift report

5. **PARTICIPANT TALLY**

Number of people approached	
Number of people saying yes	
Number of people saying no	

**** Please keep a record for every survey shift that you do***

iMOVE Project – Closing the loop on First/Last Mile transportation in Brisbane:
Assessing the connection between micro-mobility and 50-cent public transport fares

Health and Safety Protocol

Random Intercept Surveys at Albion Railway Station

CORE PRINCIPLE: Personal safety takes priority over data collection. If unsafe, stop and leave immediately.

TEAM REQUIREMENTS

- Never work alone – minimum 2 research assistants at all times
- Maintain visual contact between team members, have a predetermined signal among the team
- Check-in with Wendy [0434 518 157] before & after each surveying session

EQUIPMENT & IDENTIFICATION

- Visible UQ polo shirt & ID badge to be worn at all times when surveying
- Mobile phone with emergency contacts
- Clipboard with all printed materials – (1) survey protocol, (2) health & safety protocol, (3) survey QR code, (4) printed survey copies

POSITIONING & RECRUITMENT APPROACH

- Work in well-lit, populated station areas
- Stay away from platform edges and isolated areas
- Approach passengers respectfully in open spaces
- Do not follow or persist with declining participants
- Avoid approaching intoxicated individuals

TIME-SPECIFIC PROTOCOLS

- Peak hours: Extra vigilance due to crowds
- Evening/off-peak: Enhanced lighting, earlier finish if passenger numbers drop, extra vigilance
- Weekends: Modified approach due to different passenger demographics, extra vigilance

ENVIRONMENTAL HAZARDS

- Be aware of moving trains and platform safety
- Watch for wet surfaces and crowd movements
- Take regular breaks to avoid fatigue
- Suspend operations during severe weather
- Relocate if station disruptions affect safety
- Adjust protocols during special events

iMOVE Project – Closing the loop on First/Last Mile transportation in Brisbane:
Assessing the connection between micro-mobility and 50-cent public transport fares

EMERGENCY PROCEDURES

- Medical emergency: Call 000 and/or notify train station staff
- Aggressive individual: De-escalate, withdraw, notify security/train station staff

INCIDENT REPORTING

- Notify Rick & Wendy of any incidents or concerns (including near-misses) immediately when safe to do so

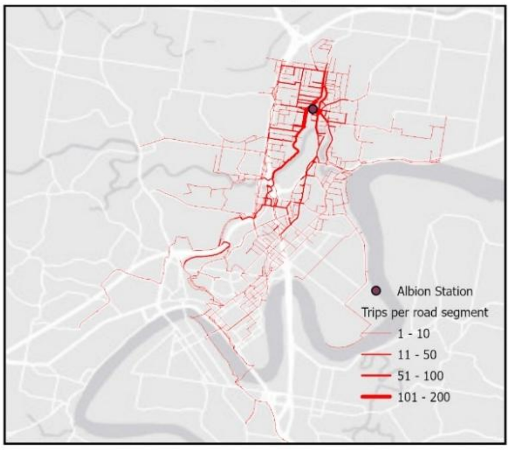
ACKNOWLEDGMENT: Research Assistants must read, understand, and agree to follow all safety procedures before participating in data collection.

Research Assistant's name & signature ____

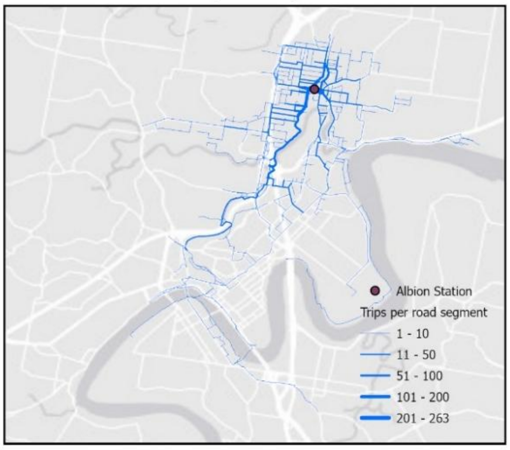
Date: ____

Appendix 4 – Spatial patterns of e-mobility trips across rounds

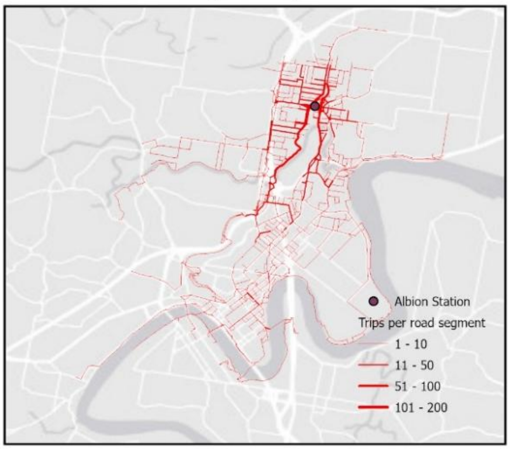
Inbound Trip Counts per Road Segment — Round 1
(n = 404)



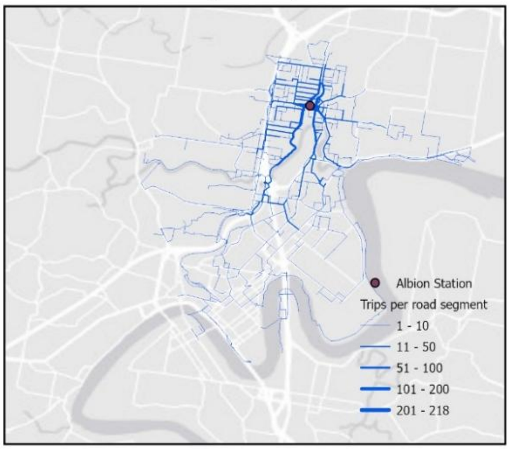
Outbound Trip Counts per Road Segment — Round 1
(n = 540)



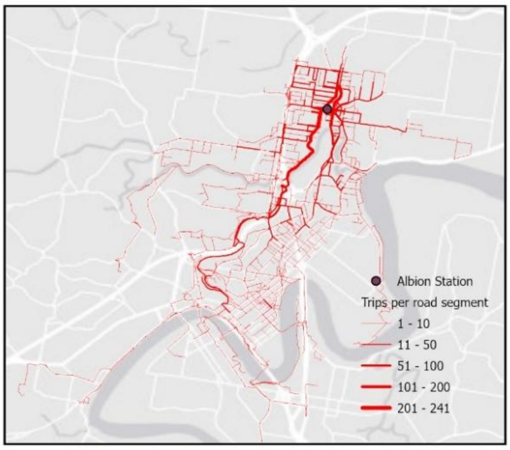
Inbound Trip Counts per Road Segment — Round 2
(n = 448)



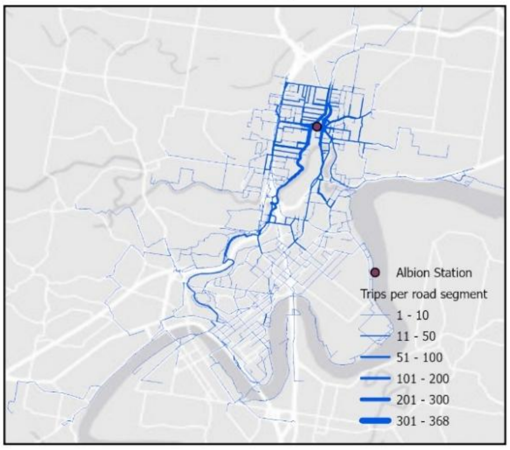
Outbound Trip Counts per Road Segment — Round 2
(n = 521)



Inbound Trip Counts per Road Segment — Round 3
(n = 677)



Outbound Trip Counts per Road Segment — Round 3
(n = 864)



Contact details

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