

Abstract

Several mobility services have emerged in recent decades to compete with private cars and better meet citizens' needs. While microtransit research has largely focused on operational performance—such as modal shift, routing, cost efficiency, and user satisfaction—limited attention has been given to how user insights can inform early service design, particularly for adolescents. This study, part of the metaCCAIZE project, presents a user-centric methodology for designing an on-demand microtransit service for adolescents. The approach integrates three iterative stages: focus groups to identify needs and barriers, questionnaire surveys to assess preferences and willingness to use the service, and real-world testing of the proposed service and mobile application. The participatory process involved 120 parents in Limassol (Cyprus) and enabled continuous incorporation of user feedback from concept development to pre-implementation evaluation. Results indicate strong interest in the service, with around 70% of parents willing to adopt it, while key concerns relate to safety, affordability, and travel times. The insights obtained informed key operational decisions, app refinements, and communication strategies ahead of the service launch. This study contributes to the microtransit literature by providing evidence-based practical recommendations for operators, app developers, and urban planners.

Keywords: Microtransit, on-demand mobility, Adolescent mobility, User-centred design, New mobility services

Introduction

Microtransit, also known as demand-responsive transport, shows strong potential to address adolescents' mobility needs, especially in contexts where parents express strong safety concerns that limit their willingness to allow adolescents to travel alone. Beyond reducing traffic congestion and environmental impacts, such services can also ease the considerable pressure parents face in balancing work schedules with their children's travel needs, while helping to counteract car-dependency culture in future generations.

The likelihood of successful adoption of new mobility services improves when user needs are integrated into the design. Participatory methods, such as surveys and focus groups, help capture user preferences and attitudes. For adolescent-focused microtransit, existing research shows that flexibility and safety are key drivers, while competitiveness with private cars depends on addressing concerns related to safety, waiting times, and travel times.

This study advances the current state of the art by developing a multi-phase methodology for designing a user-centric microtransit service for adolescents' after-school trips, integrating qualitative and quantitative participatory methods from initial analysis to service testing. This study aims to:

- Explore parents' needs, concerns, and expectations regarding adolescents' mobility
- Evaluate perceptions of a proposed microtransit service and its features
- Assess how user insights can inform service design and pre-implementation

Methodology

The design of the microtransit service for adolescents' after-school trips includes three participatory phases (see Figure 1).

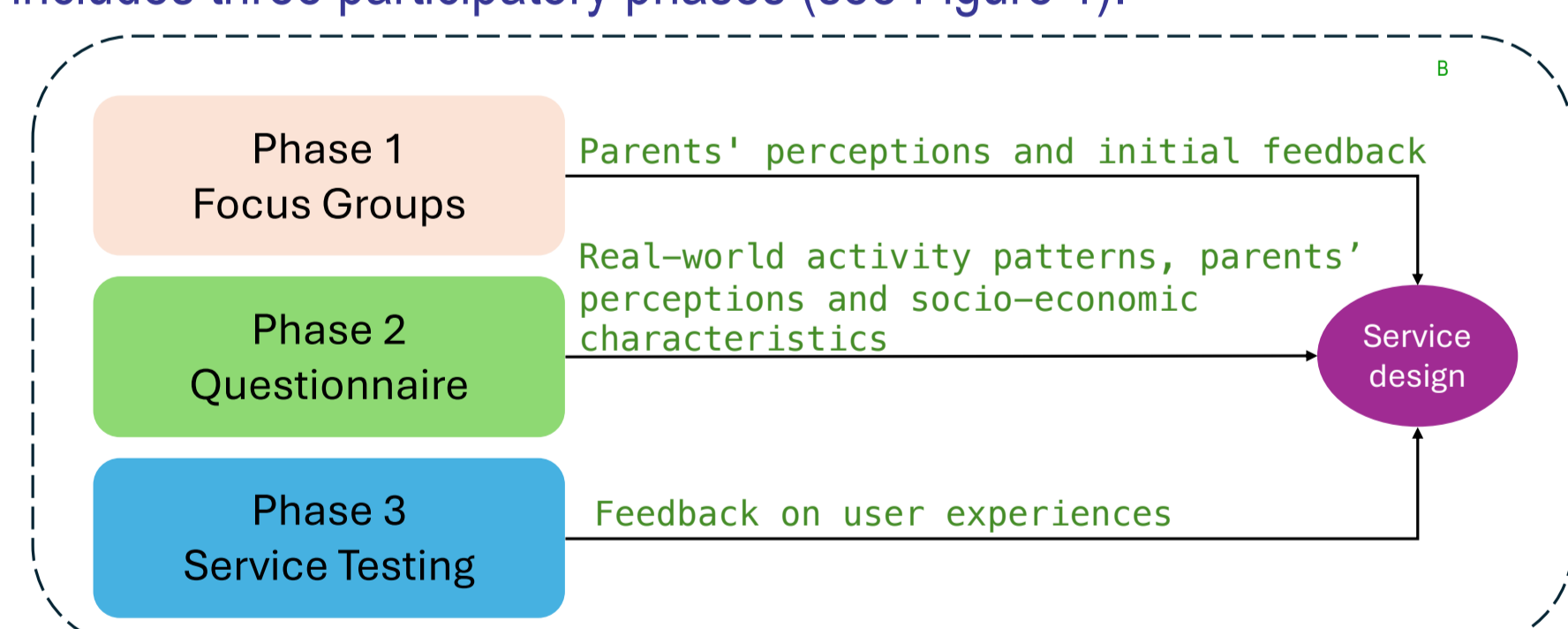


Figure 1. Overview of participatory phases.

Focus groups were conducted in an interactive circle format to encourage dialogue. Sessions began with participants sharing their experiences managing children's after-school activities, followed by an introduction to the microtransit service. Parents then discussed perceptions of the service, its potential impact on quality of life, expectations regarding congestion reduction, willingness to pay, and essential adoption features.

Questionnaires included three sections: (1) socio-economic and household characteristics (age, education, occupation, income, housing, vehicle ownership, family size, residential area); (2) children's characteristics and current travel patterns for activities; and (3) parents' agreement with statements about their current transport experiences, service expectations, willingness to pay, perceived benefits, and potential adoption barriers.

Service testing covered the full user experience—app installation, account creation, reservations, and trips. Researchers accompanied parents to document experiences, identify difficulties, and gather insights into potential adoption barriers.

Parents of adolescents (12–17) were recruited via schools and local networks. Focus groups, questionnaires, and a pilot service trial captured perceptions, experiences, and feedback in a structured, consistent manner.

Results

This section reports the results of the focus groups, questionnaires, and service testing undertaken within the first six months of 2025 in Limassol, Cyprus. Overall, 120 parents participated in these activities, offering critical insights into their perceptions, expectations, and experiences concerning the service.

Focus groups

Focus groups (2 sessions, 6–7 parents each) revealed that parents feel burdened by daily school and activity transport, describing themselves as “taxi drivers” reliant on private cars. After learning about the microtransit service, they were optimistic about its potential to reduce stress and improve quality of life. When ranking service attributes, parents prioritized safety (driver checks, GPS tracking, in-vehicle cameras), followed by quality of life and time efficiency (reliable schedules, optimized routes). Cost was less critical, with tiered subscriptions seen as a flexible option. Overall, parents emphasized the need for a service that is safe, reliable, efficient, and adaptable to family needs (see main suggestions in Figure 2).

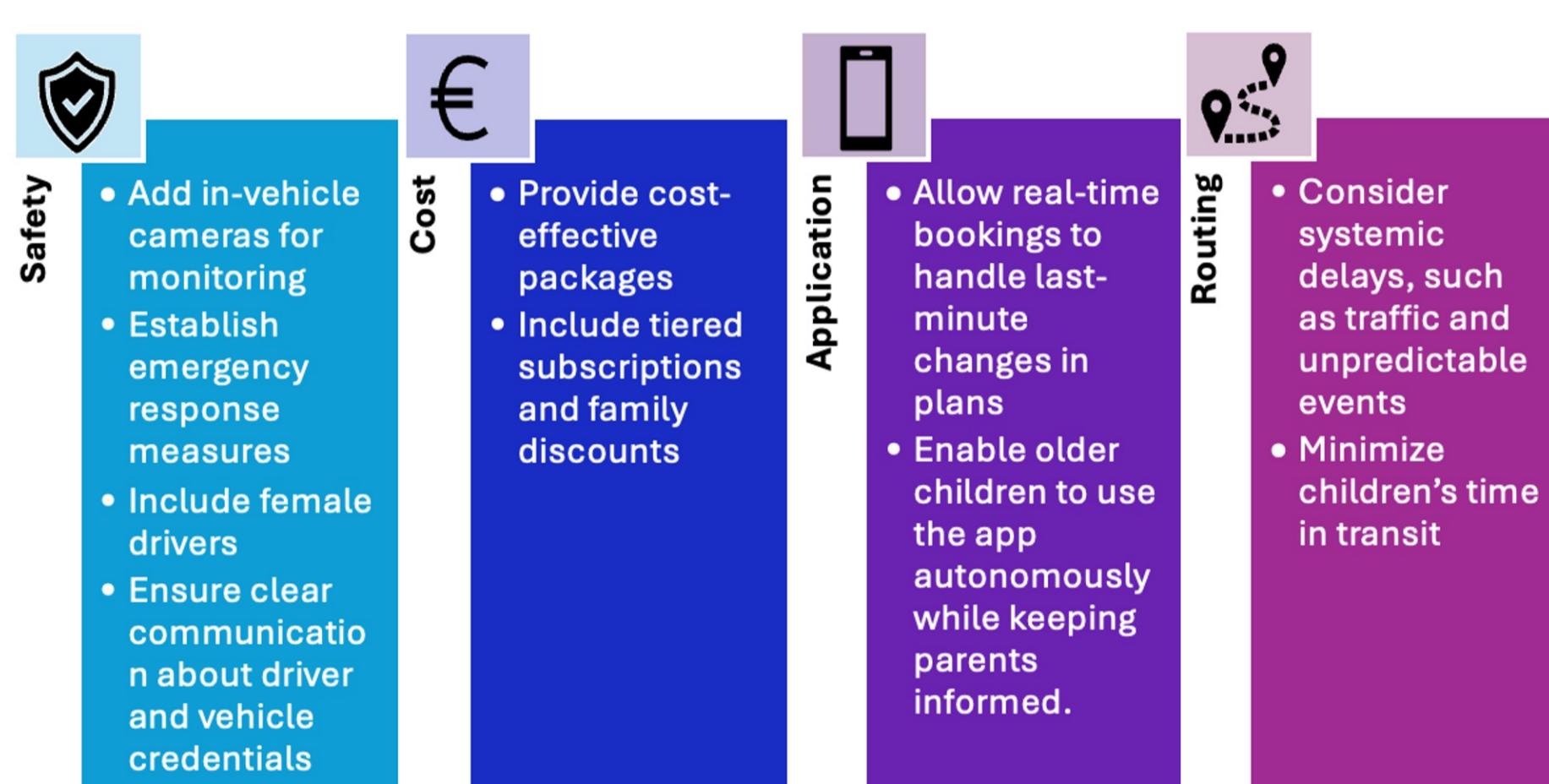


Figure 2. Main suggestions for the microtransit service.

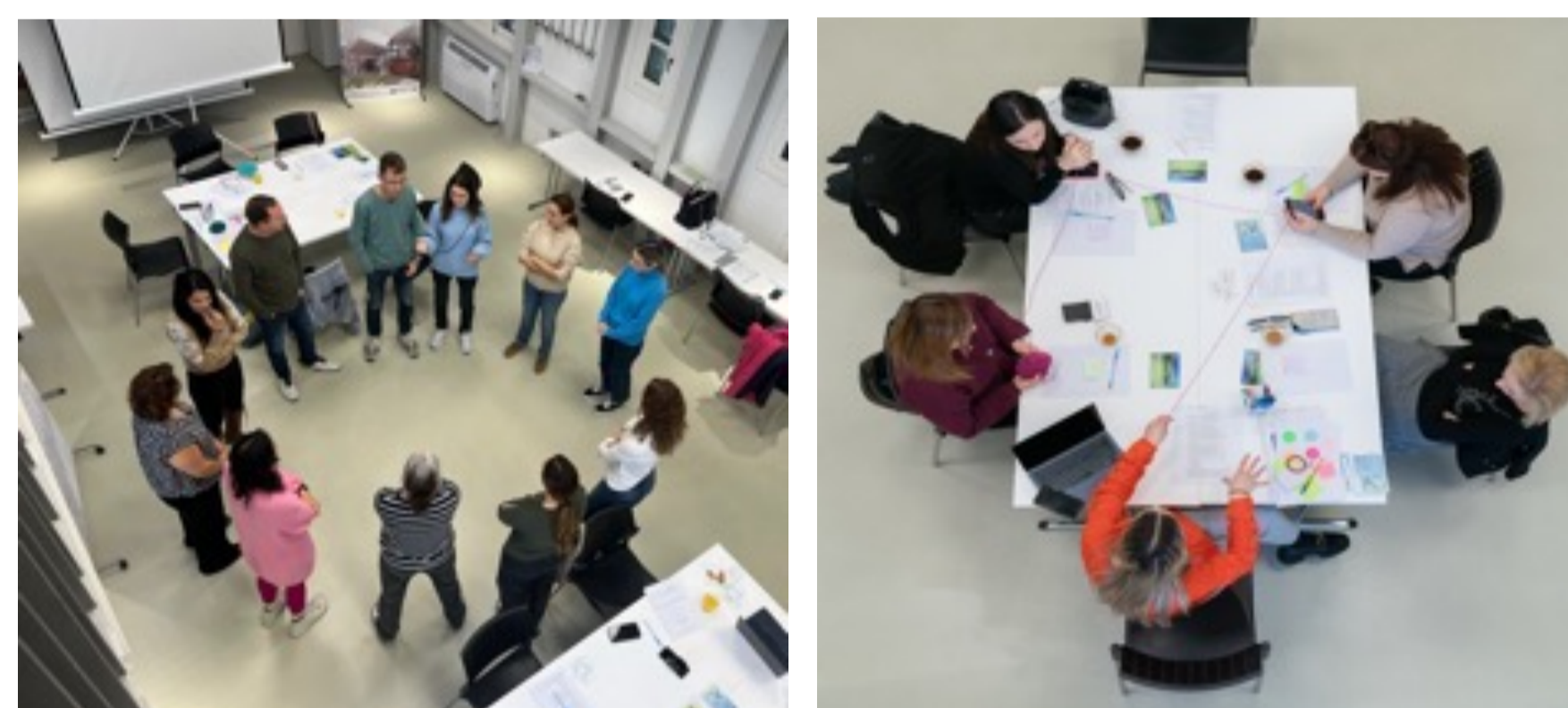


Figure 3. Participants during focus groups.

Questionnaires

Questionnaires (n = 108, 98 complete) showed parents are primarily responsible for escorting children (all using private cars), with an average of 1.4 children attending 5.3 activities per week. About 70% were willing to pay at least €5 per trip for the microtransit service, citing benefits such as reduced stress, more personal time, and improved quality of life. Figure 4 illustrates parents' level of agreement with 11 statements regarding parent perceptions on their children after-school trips and the microtransit service. Safety remained the main concern (only ~40% felt secure), while over 90% agreed the service could reduce traffic and benefit the environment. Other concerns included travel time, cost, and schedule reliability, whereas fostering children's independence was noted as a benefit.

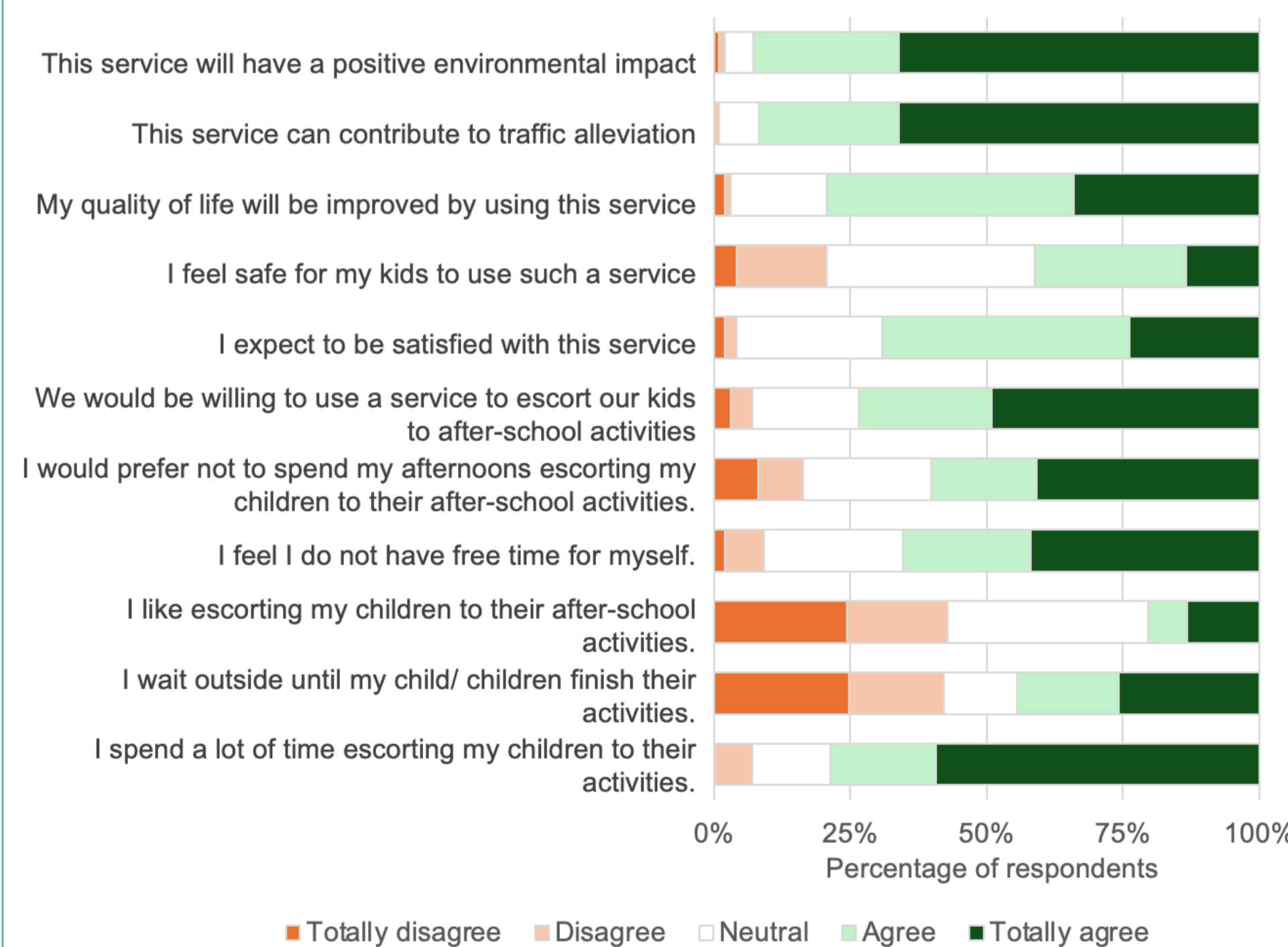


Figure 4. Parents' level of agreement regarding statements on the microtransit services.

Parents highlighted several perceived benefits and concerns regarding the use of the service. On the benefits side, the most frequently mentioned were related to improving parents' quality of life, particularly by reducing stress, freeing up personal time, and avoiding traffic congestion. Some parents also emphasized the potential for their children to gain greater autonomy and independence, as well as the environmental and traffic-reduction benefits of the service. On the concerns side, safety clearly emerged as the main barrier to adoption. Other concerns, mentioned to a lesser extent, included service longer travel times for children, costs, and potential delays affecting schedules. The least mentioned concern was the possibility of losing quality time with their children.

Results

Service testing

Service testing (July 2025) involved 9 families using two minibuses and a demo mobile app. Participants completed the full process—downloading the app, creating accounts, inviting children, making reservations, and riding the bus—allowing identification of bugs and gathering feedback on interface and user flows. Parents helped define routing parameters, including maximum waiting times and acceptable detours. The feature most appreciated was real-time notifications on children's locations, pickups, and drop-offs. The feature most appreciated by parents was to be able to receive notifications on their kids' locations, pickups and drop-offs. Parents were excited for the implementation. “The bus came on time, it was comfortable, I have no worries about this.”, “Everyday I have to leave for about 30 minutes from my job in order to go to the school pick up my child and move to the activity. As a result, the 30 minutes break from my job which is usually spent for eating etc, I have to spend it in the car! Now I will enjoy my break and the child will be safely transported to the activity and everyone will be happy”.



Figure 5. Participants during service testing.

Discussion and conclusions

This study examines parents' perceptions of a microtransit service for adolescents' after-school mobility in Limassol, Cyprus, combining focus groups, questionnaires, and real-world testing with 120 participants. Results show strong interest, with around 70% willing to adopt the service, mainly due to its potential to reduce parental burden. However, adoption depends on safety and reliability, including punctuality, travel times, and vehicle conditions, highlighting the role of both emotional (trust) and operational (efficiency) factors. Service testing further revealed the importance of intuitive app design, real-time communication, and clear expectations regarding waiting times and detours.

The findings provide direct implications for practice:

Operators: Priority should be given to ensuring high levels of reliability and predictability. This includes ensuring punctuality, reducing waiting times, and maintaining acceptable travel times within economically viable conditions. In parallel, operators should implement visible and verifiable safety measures, such as driver background checks, on-board monitoring systems, and clear operational protocols. These features should not only be in place but also actively communicated to users. Communication and marketing strategies should focus explicitly on reliability, predictability, and child-centred safety features. Emphasizing these aspects can directly address the main concerns identified by parents and improve service acceptance.

App Developers: The design of the digital interface should support transparency and real-time control. Essential functionalities include GPS tracking, real-time notifications, and clear identification of drivers. Interfaces should be simple and intuitive, allowing parents to easily monitor trips and receive timely updates. These elements are critical in reducing uncertainty and increasing user confidence.

Policymakers: Supporting the deployment of such services requires creating enabling conditions for safe and reliable operations. This may include facilitating pilot implementations, integrating microtransit into existing mobility systems, and providing targeted subsidies to support service viability and affordability.

Future research should use inferential and comparative methods to examine how demographic and attitudinal factors influence parental adoption of adolescent microtransit services, and explore strategies to scale services beyond pilot contexts while supporting long-term user retention.

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