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D7.1: Report on needs of users for on-demand shared mobility in rural areas and co-creation discussions

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List of participants

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11	Gjesdal Kommune	GJESDAL

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Abstract

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Abstract of the deliverable

This deliverable provides an analysis of mobility needs and barriers to a Demand-Responsive transport service in the rural municipality of Gjesdal, Norway, as part of the STORCITO project. It focuses on vulnerable groups including seniors, low-income families, and children, who face limited access to private vehicles and public transport. Using a mixed-methods approach comprising literature review, qualitative interviews, workshops, and surveys, the study investigates mobility preferences, digital readiness, and behavioural patterns. The findings highlight the complex interplay of social, economic, and technological factors that shape the adoption of Demand-Responsive Transport (DRT) in rural communities. They reveal that while convenience, sustainability, and social inclusion are key motivators—especially for seniors, low-income families, and children—barriers such as high car ownership, cost sensitivity, and digital exclusion can significantly hinder uptake. The results underscore the need for inclusive service design, flexible booking options, and affordability to ensure DRT solutions truly meet the needs of vulnerable groups and support broader goals of equitable mobility and rural revitalization. These insights will inform the design of a user-friendly DRT service and app, contributing to inclusive, climate-neutral mobility strategies that promote social inclusion, environmental sustainability, and digital equity in rural areas.

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Executive Summary

This deliverable presents the findings from Task 7.1 of the STORCITO project, which focuses on understanding the mobility needs of stakeholders in rural areas. It presents insights from the project's exploration of user needs for shared Demand-Responsive Transport (DRT), with a particular focus on the municipality of Gjesdal, Norway. The study aims to inform the development of inclusive DRT solutions that address mobility challenges faced by vulnerable groups—particularly children and youth, seniors, and low-income families.

Using a mixed-methods approach that includes literature review, qualitative workshops, and quantitative surveys in Norway and Spain, the report identifies key drivers and barriers to DRT adoption. Convenience, reduced car dependency, and improved access to leisure activities emerged as strong motivators, while cost sensitivity, digital exclusion, and high car ownership were notable barriers. Trust, reliability, and ease of booking were found to be critical for uptake, especially among parents and seniors.

The findings highlight the importance of tailoring DRT services to local conditions, offering flexible booking options, and ensuring affordability. The report also underscores the need for inclusive design features such as multilingual interfaces and non-digital booking alternatives to avoid excluding digitally or economically marginalised users.

Insights from this study will guide the design of a user-friendly DRT service and app, contributing to climate-neutral mobility strategies that promote social inclusion, environmental sustainability, and digital equity in rural communities.

This deliverable contributes to Horizon Europe's goals by:

- Promoting inclusive mobility for underserved populations.
- Supporting digital transformation in rural transport.
- Enhancing social cohesion through equitable access to services.
- Encouraging environmentally sustainable transport solutions.

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1. Introduction

Transport remains one of the most challenging sectors for decarbonization in the EU, with road vehicles contributing the majority of emissions. While urban areas benefit from a wide range of mobility options, rural regions continue to face significant accessibility challenges, often relying heavily on private cars. This car dependency not only contributes to environmental degradation but also exacerbates social inequalities, particularly for vulnerable groups such as seniors, low-income families, and children. These populations frequently experience mobility poverty, limited access to public transport, and a growing digital divide—factors that hinder their ability to participate fully in society.

The STORCITO project aims to address these challenges by developing inclusive, climate-neutral mobility solutions tailored to rural contexts. Central to this effort is the enhancement of a demand-responsive transport (DRT) solution provided by the Norwegian company Nimmo, originally piloted for transporting children to leisure activities, and now being scaled to serve broader vulnerable groups and more diverse mobility needs. By examining the opportunities and barriers to integrating DRT into existing public transport systems and promoting public-private collaboration, the project seeks to move beyond traditional automobility regimes and contribute to fostering a more sustainable, equitable transport system.

This deliverable contributes to the STORCITO case study in Norway, more specifically in Gjesdal municipality, by investigating the mobility needs, preferences, and digital readiness of rural residents with limited access to private cars. Through a combination of a literature review, qualitative interviews, workshops, and surveys, the study explores the drivers and barriers to adopting shared mobility solutions, the role of digital skills, and the behavioural patterns of target groups. The findings will inform the design of a user-friendly DRT-service and app and support the development of inclusive mobility strategies that promote social inclusion, environmental sustainability, and digital equity in rural areas.

1.2 Shared mobility solutions

Over the past decades, a variety of new transport services have emerged, all built around the concept of sharing. However, these services differ significantly in terms of organization, user interaction, and integration with public transport systems (Sörensen et al., 2021).

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Car-sharing is one of the earliest forms of shared mobility, where vehicles—either privately owned or commercially operated—are shared among multiple users. Once a vehicle is booked, it is used similarly to a private car, with no obligation to share available seats with others.

Ride-sharing typically involves private individuals offering others a seat in their vehicle when travel time and destination align. These trips are often coordinated through digital platforms that facilitate matching, communication, and payment. Ride-sharing is usually non-profit and informally organized.

Ride-hailing resembles traditional taxi services but is organized differently - often involving private drivers and app-based booking. These trips are typically not shared with other passengers.

Ride-pooling represents a more dynamic and structured version of ride-sharing. It actively plans routes, vehicles, and passengers to optimize shared trips, and can involve both private and commercial vehicles. Ride-pooling forms the conceptual basis for many demand-responsive transport (DRT) schemes, such as the Nimmo bus service, which aims to combine the flexibility of taxis or ride-hailing with the affordability and accessibility of public buses.

Demand-Responsive Transport (DRT) integrates technological innovations from shared mobility. According to Wang et al. (2015), DRT is defined as a service "available to the general public, served by low-capacity road vehicles such as small buses, vans or taxis, responds to changes in demand by altering its route and/or its timetable, charged on a per passenger and not a per vehicle basis." DRT is often positioned between conventional bus services and taxis, offering flexible routing and scheduling, particularly suited for rural areas or specific travel needs in urban settings (Takeuchi et al., 2003; Laws, 2009; Koffman, 2004).

DRT services vary widely in terms of provider type, operational area, target groups, and technological setup. Public providers may offer DRT to fulfil legal transport obligations, while private operators often target densely populated areas to achieve profitability. Services may range from door-to-door transport to virtual stops or fixed routes and may cater to the general population or specific groups such as the elderly or disabled. Technological solutions span from call centres to advanced app-based algorithms (Mounce et al., 2018; Archetti et al., 2015).

While all these shared mobility solutions are part of today's transport landscape, their presence is still limited. In most regions, they remain niche services—except for ride-

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hailing, which has become widespread in many large cities. Nevertheless, they represent a crucial step toward more flexible, inclusive, and sustainable mobility systems.

Prior experiences with Shared, Demand-Responsive Transport in Norway

There is limited research on activity-based and collective shared mobility services, particularly those resembling closely the DRT pilot explored in this project (Karlsson and Ryghaug 2024). Two notable exceptions are:

(1) A set of pilots conducted by Ruter AS (2019), the public transport provider, in Oslo and Akershus, providing age-friendly transport and activity-based transport. These pilots aimed to better understand individual mobility needs and to offer more tailored public transport services. The pilot for age-friendly transport demonstrated positive social and health impacts, as users became more mobile and socially active. The service was later expanded to other districts. This activity-based pilot, developed in collaboration with Stabæk Football and Bærum Municipality, provided transport for children between school and football training. Results showed reduced car usage and high user satisfaction as 99% of parents reported being satisfied, and 93% would have otherwise used private cars. The pilot was later extended to other regions (Ruter AS, 2019).

(2) A project called ´Kjørestopp´ (Stop driving) conducted in Bærum between 2019-2024 to target parents driving children to and from leisure activities and developing measures to reduce such driving. Three different measures were piloted in order to reduce this type of driving, but only one of them (bus to cross-country ski training) was considered to be successful. The pilots revealed that the main reasons for parents in Bærum to drive was lack of time, long distances and poor infrastructure for pedestrians and cyclists. (Nordbakke et al. 2023).

Overall, the pilots contributed to reducing car dependency and addressing time constraints for families. Safety and trust were also critical, especially for services involving children. However, financial sustainability remained a challenge: The services were discontinued, partly due to these cost concerns. Although Ruter is not currently a MaaS provider, its integrated mobility offerings suggest potential for future development in this direction (Wold et al., 2022).

Other pilots with similarities to the Nimmo concept include “HentMeg” a DRT service in Bø, Telemark. The “HentMeg” service was well received by students, but less so by senior users due to app-based booking and the lack of fixed timetables (Gjertsen et al., 2022). Other youth-focused DRT initiatives include “Hjem for en 50-lapp,” (“Home for

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€5") offering safe weekend transport for teenagers via pre-booked taxis at a subsidized fare. The service promoted ridesharing and was funded by Oppdal Municipality and Trøndelag County (Lervåg et al., 2021).

1.3 The Demand-Responsive solution in STORCITO

In the STORCITO project the DRT solution will represent a system of one or several small busses with a capacity of up to 16 passengers that are organized according to a computer-based algorithm developed by the project partner Nimmo. It differs from most previous experiences and implementations of DRT services in Norway described in the previous section: Firstly, the booking process is fully automated and app-based, making it more resource-efficient, user-friendly, and less prone to human errors compared to traditional call-based systems. Bookings can be made either by the adults/parents or by the children themselves. An important challenge is to address the needs of user groups with limited digital experience, which will be considered in the pilot solution for Gjesdal, developed in the STORCITO project. Secondly, the software optimizes routes based on pick-up and drop-off times for each stop, aiming to reduce traffic and minimize emissions. Thirdly, the solution features the ability to track children traveling alone—often for the first time—so that both parents and activity providers can monitor their location and feel reassured. While the solution is primarily funded through user payments, individuals from low-income households receiving public support can be included without having to pay for tickets. If so, this is done discreetly to protect their privacy and prevent social exclusion or marginalization.

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2. Objectives and research questions

The objective of this deliverable is to identify the mobility needs and barriers experienced by different groups in the rural area of Gjesdal municipality. It will have a particular focus on seniors, low-income families, and children. It aims to inform the development of a demand-responsive transport (DRT) solution that is tailored to the specific requirements of these groups, ensuring that the solution promotes inclusive, sustainable, and digitally enabled mobility. Furthermore, the deliverable seeks to understand the needs of both current and potential users of shared demand-responsive transport services, contributing to the design of equitable and accessible transport systems in rural contexts.

Research questions

RQ1: What are the key drivers and barriers influencing the adoption of demand-responsive transport (DRT) among seniors, low-income families, and children in rural areas?

RQ2: How do digital skills and access to technology affect the willingness and ability of vulnerable rural residents to use a DRT app?

RQ3: What are the mobility preferences and behavioural patterns of seniors, low-income families, and children in Gjesdal, and how can these inform the design of inclusive DRT services?

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3. Methodology

3.1 Literature review

The scope of this review was limited to peer-reviewed review articles published in the last five years, with a European regional focus. This selection was made to ensure relevance to the political, institutional, and cultural context of the STORCITO pilot areas. Articles with a geographic focus on Europe were prioritized. Studies centred on transport systems significantly different from the one under development in the STORCITO project were sought to be excluded, however, due to the limited number of articles in the field, some exceptions were made.

The literature search was conducted using the Web of Science Core Collection, refined to include only review articles addressing drivers, barriers, and user needs in shared mobility. Eight relevant documents were identified, with one article—Carsharing: A Systematic Literature Review and Research Agenda (Nansubuga & Kowalkowski, 2021)—providing a comprehensive synthesis of carsharing research up to 2020. This supports our focus on post-2020 developments for the rest of the search.

3.2 Qualitative interviews and workshop

To gain a deeper understanding of the mobility needs, preferences, and perceptions of rural residents, a qualitative workshop design was chosen and conducted in Gjesdal municipality, Norway. The workshop was designed to include a diverse range of stakeholders who are potential users of a demand-responsive transport (DRT) and for whom such a solution would be a great asset increasing their accessibility.

Participants were invited by Gjesdal municipality and represented key community groups, including elementary, middle and high school students, representatives from local volunteer activity providers, seniors, parents and a group on non-Norwegian adults participating in adult education programs. The seniors who participated in the workshops were active individuals involved in various activities in Gjesdal municipality and currently able to drive themselves. They lived in or near the municipal centre, Ålgård, and therefore were not among those most in need of a DRT service at present. However, they also reflected on the needs of other seniors in the municipality, particularly those living in villages and more remote areas. In total, 35 participants attended the three workshops.

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The session was facilitated by two researchers from SINTEF and began with a short presentation outlining the purpose of the session and introducing the main discussion themes. The main discussion themes were:

- **Mobility needs**: When and for what purposes do participants need transport?
- **Service attractiveness**: What features would make a shared transport service appealing and user friendly enough to use?
- **Local impact**: What would such a service mean for Gjesdal?
- **Financing**: How could the service be funded?

A representative from Nimmo participated to describe the main features of the transport service. To ensure a shared understanding of the concept under the discussions, the DRT service was explained as a transport solution that could either follow a fixed timetable related to certain activities (for example gymnastics sessions for children) or dynamic routes where the route has a defined opening time in which people freely can order a trip within a certain geographical area within the opening hours. Payment, if applicable, would also be handled through the app.

The first workshop included parents, children and activity providers. Participants were then divided into four groups during the discussions—one group of children/youth and two groups of adults and one group with activity providers. The second workshop was conducted as an open discussion in a classroom setting, involving immigrants enrolled in a Norwegian language course for adults. These participants are new to Norway and might experience barriers to mobility and digital access due to limited local knowledge, language proficiency, and social support systems. The third workshop was with seniors, and they were divided into two groups during the discussions.

Splitting the participants in smaller groups was done to foster open and comfortable dialogue within peer groups. Each group discussed the four main questions for approximately 10–15 minutes per topic. Key insights from each group were then shared in a plenary session to facilitate collective reflection and synthesis.

This participatory method enabled the collection of rich, context-specific data on mobility needs, digital readiness, and attitudes toward shared transport solutions. It also provided a platform for co-creation and community engagement, essential for designing inclusive and user-centred mobility services in rural areas.

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3.3 Quantitative survey

To compare user needs in Norway and Spain and evaluate the qualitative results from the workshops, a survey was developed and distributed in both countries. In Norway, Gjesdal municipality shared the survey through its local network to reach children, adults, and seniors. In Spain, the University of Vigo (UVIGO), together with INORDE and CTA, partners in the STORCITO project, was responsible for distributing the survey. The survey was shared via the project's social media channels, including LinkedIn. INORDE also distributed the survey directly to seniors and adults at their offices.

The survey focused on the same four themes as the workshops: 1) Mobility needs, 2) Service attractiveness, 3) Local impact and 4) Financing of the service.

In addition, the survey included questions about access to different modes of transport and current travel habits for leisure activities. This information will be used in Deliverable *D8.2 Feedback integrated on the functionalities of NIMMO's mobility app* of the project (due in Month 24) which will estimate the potential reductions in car use and emissions

The survey was created in *Netigate*. Questions were slightly adapted for each target group (children, adults/parents, and seniors). For instance, questions related to smartphone use and digital competence were directed exclusively to adult and senior participants.

In the Spanish version, certain questions and response options were adapted to better reflect the local context—for instance, adjustments were made to service cost references and the age classification of seniors. Additionally, questions regarding the location of leisure activities were simplified to focus solely on distance rather than specifying the municipality.

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4.4 Gjesdal - the pilot area

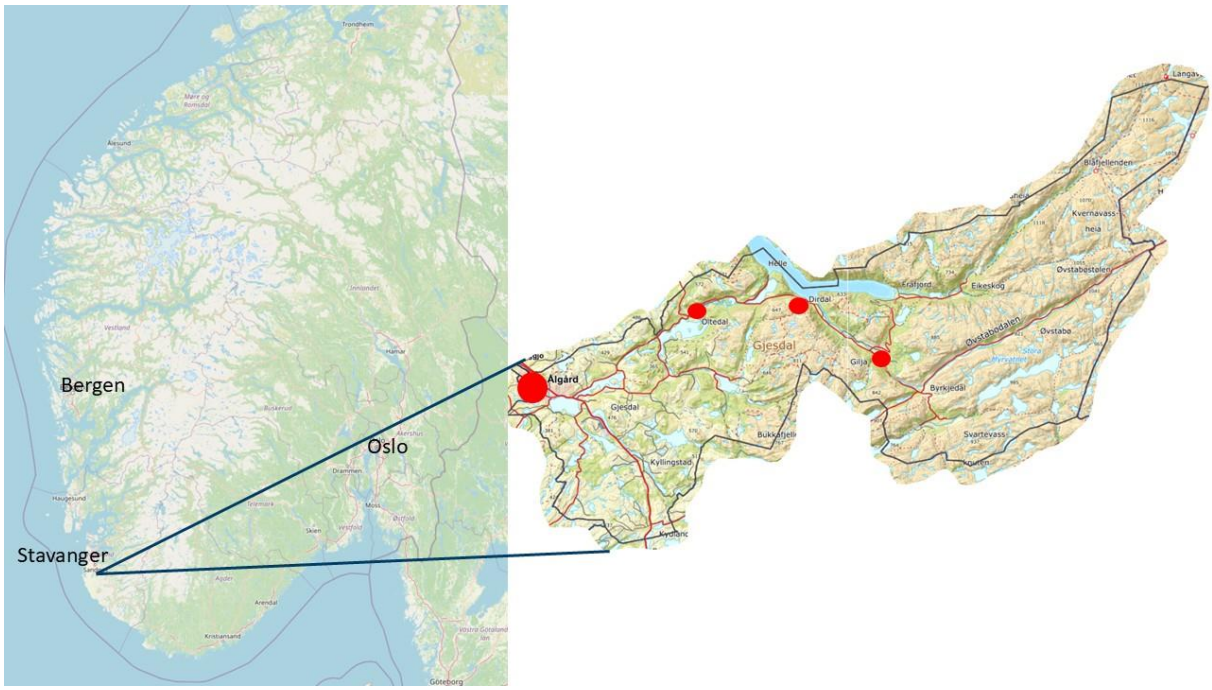

Figure 1: Location of the case area Gjesdal municipality

Gjesdal Municipality is in Rogaland County in the southwestern part of Norway and has a population of approximately 12,000 residents. The municipality is characterized by varied topography, which pose challenges for mobility and infrastructure development. The geographical context, combined with a dispersed settlement pattern, means that most areas outside the municipal centre of Ålgård have limited access to public transport and are largely dependent on private cars. Gjesdal lies in close proximity to Stavanger, Norway's fourth largest city and a hub for the country's energy sector, as well as to Sandnes, another major urban centre. This proximity offers both opportunities and challenges for regional connectivity and commuting.

The European route E39 and the Figgjo river run through the centre of Ålgård and form a physical barrier between the two sides of the village. At the same time, many leisure activities for children and youth are in the outskirt of Ålgård on the east side, creating accessibility challenges for younger residents on the west side who do not have access to private transport.

Public transport services in Gjesdal are limited, especially outside the central area of Ålgård. While bus routes cover Ålgård centre and east parts, there are few options and long distances between bus stops in the villages (Oltedal, Dirdal, and Gilja). Bus

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frequency is relatively good in rush hour between Ålgård centre and Sandnes/Stavanger. However, in the villages, there are very few bus departures, and departures are poorly coordinated with buses from Ålgård towards Sandnes/Stavanger.

Taken together, these conditions make Gjesdal Municipality—with its remote villages and the mobility challenges they represent—a relevant case for research on demand-responsive transport planning. The area exemplifies key issues such as distance, low population density, and the need for flexible mobility solutions.

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4. Results

The results chapter is organized into three sections corresponding data collection method. It begins with an introduction to user needs based on the literature review. This is followed by a presentation of local user needs revealed during the workshops in Gjesdal. Finally, the results from the surveys conducted in Norway and Spain are presented. Due to the limited number of responses from children and seniors in Spain, these findings are discussed more as reflections rather than definitive conclusions.

4.1 Literature review

There is limited research specifically addressing demand-responsive transport (DRT) solutions that closely resemble the one piloted by Nimmo in Gjesdal, particularly those targeting children, the elderly, and other vulnerable groups in rural areas. To contribute to a more robust knowledge base on user needs—as well as the drivers and barriers influencing adoption among these user groups—we begin by briefly exploring the broader landscape of shared mobility. This provides important context before narrowing our focus to DRT solutions.

Shared mobility

A Systematic Literature Review and Research Agenda published in 2021 provides a comprehensive synthesis of carsharing research up to 2021 (see, Nansubuga & Kowalkowski, 2021). This review identifies the following barriers to shared mobility adoption, highlighting both functional and psychological factors:

- *Functional barriers* include service complexity, reliability issues, and limited vehicle availability.
- *Psychological barriers* involve discomfort with shared use (e.g., perceived contamination), concerns about damage responsibility, and trust issues—especially in peer-to-peer (P2P) models.

The review further demonstrates that low public awareness and unfamiliarity with carsharing services hinder further uptake, particularly among first-time users. For providers, challenges include high investment costs, operational difficulties (e.g., vehicle balancing), and attracting users in P2P platforms. For drivers of shared mobility adoption, key identified drivers are:

1) Convenience, cost savings, and environmental consciousness.

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2) Technological innovation, such as mobile apps, smart locks, and GPS tracking, which enhance user experience and scalability.
3) Sociodemographic factors—younger, male, highly educated individuals in smaller households are more likely to adopt shared mobility.
4) For service providers, motivations include profit generation, market expansion, and asset utilization.

With regards to user needs and equity considerations, users require services that are:

- Accessible, reliable, and easy to use.
- Offer high vehicle availability, proximity to pick-up points, flexible pricing, and integration with other transport modes.
- Ensure trust and safety, especially in P2P models.
- Provide flexibility in trip types and vehicle options and align with users' lifestyle and travel patterns.

Thus, equity concerns are identified as being central to user needs. Carsharing tends to favour younger, more affluent, and digitally literate users, potentially excluding older adults, women, and low-income groups. Consequently, addressing digital and social exclusion is essential when developing the type of shared mobility services that STORCITO focus on.

Given these findings in the literature, it is key to develop the mobility solutions with respect to inclusive design. This involves considering a) *non-digital access options*, b) *geographic coverage beyond urban centres* and c) *financial incentives or support mechanisms*, as noted as important factors for inclusive design in the literature (Nansubuga & Kowalkowski, 2021).

Distinguishing Public Transport-Based Shared Mobility from Carsharing: A Call for Focused Review

While the literature on carsharing has extensively mapped the drivers, barriers, and user needs associated with private vehicle-based shared mobility, particularly business-to-consumer (B2C) and peer-to-peer (P2P) models, these insights cannot be uncritically transferred to "pooled services" such as public transport-related shared mobility services and demand-responsive transport services. Solutions such as demand-responsive minibuses or vans with designated drivers (e.g., the Nimmo model) operate under fundamentally different service logics and user expectations. As such, they require a distinct analytical lens.

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This is evident as exemplified by the systematic review by Nansubuga and Kowalkowski (2021) that identifies the desire to avoid the burdens of ownership, cost savings, and convenience as key drivers of carsharing adoption. Some of these motivations are closely tied to the individualization and flexibility of carsharing, where users access vehicles on demand and often drive themselves. In contrast, public transport-based or public transport-related shared mobility services are typically structured, scheduled, and driver-operated. They are more akin to public transport solutions than to individualized access-based consumption. Consequently, the appeal of such services may rest less on ownership avoidance and more on reliability, accessibility, and integration with broader transport networks, rather than typical traits driving (individualized) carsharing.

Similarly, the barriers identified in the carsharing literature—such as psychological discomfort with sharing, concerns about vehicle cleanliness, and trust in unknown users—are less salient in public transport-based models. This needs to be taken into consideration when developing shared DRT solutions such as the Nimmo pilot in Gjesdal. In services with designated drivers and standardized operations, users are not responsible for vehicle maintenance or interactions with other users in the same way. Instead, barriers may include limited-service coverage, inflexible routing, or lack of real-time information—issues more aligned with traditional public transport challenges than with those of carsharing.

Moreover, the equity implications differ significantly. Carsharing, particularly in its P2P form, often excludes users without access to digital platforms, credit cards, or private vehicles to share. Publicly oriented transport-based shared mobility, by contrast, has the potential to serve a broader demographic, including those who are digitally or economically marginalized. This makes equity not only a more central concern but also a more attainable goal in the design and implementation of such services.

In light of these distinctions, it is imperative that literature reviews and research agendas differentiate between private vehicle-based carsharing and public transport-oriented shared mobility. The latter warrants focused investigation, as it presents unique operational models, user expectations, and policy implications. Without this differentiation, there is a risk of misapplying insights and overlooking critical factors that shape the success and inclusivity of public transport-based or oriented shared mobility solutions.

These insights will guide the qualitative and quantitative investigations of user experiences in the pilot areas, helping to shape a mobility solution that is equitable,

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inclusive, and responsive to diverse user needs. It has also made the scope of the literature review much more focused, leaving us with only a handful of available articles. This is natural as experiences with demand-responsive shared mobility services as the one we focus on in STORCITO and for the user groups we are investigating are still very few.

Understanding Demand-**Responsive transportation**

Demand-responsive transportation (DRT) has evolved significantly since its inception in the 1960s, transitioning from flexible, non-scheduled services to sophisticated systems powered by mobile platforms and dynamic routing algorithms. These systems offer tailored mobility solutions, particularly in areas underserved by traditional public transport (Pak et al., 2023; Sörensen et al 2021). Despite its potential, DRT has faced challenges in public acceptance, often due to misalignment with user needs and insufficient market analysis (Pak et al., 2023). Understanding the behavioural and social dimensions of DRT adoption is therefore critical for successful implementation.

Shared mobility services have emerged as a promising solution to address contemporary transportation challenges, particularly in urban areas. Extensive research highlights their potential to reduce congestion, enhance accessibility, and promote environmental sustainability by decreasing single-occupancy vehicle trips (Gkartzonikas & Dimitriou, 2023; La Delfa & Han, 2025; Shaheen & Cohen, 2021). These services offer flexible and cost-effective alternatives that appeal especially to urban dwellers seeking sustainable mobility options (Chan & Shaheen, 2012; Si et al., 2023).

However, *the adoption and relevance of shared mobility in rural contexts remain underexplored*. Understanding the needs, preferences, and barriers faced by users—especially in underserved areas—is essential for designing inclusive and effective mobility solutions. This is particularly relevant for demand-responsive transport (DRT) systems, which adapt to dynamic travel patterns and offer flexible routing (Matyas, 2020; Melo et al., 2024). DRT services have gained traction as a viable alternative in areas with limited public transport infrastructure (Butler et al., 2020; Sörensen et al 2021).

In the STORCITO project, where the Nimmo DRT solution will be piloted in Gjesdal, these considerations are central. Early workshops and surveys have revealed the importance of tailoring services to local conditions—such as topography, travel distances, and existing mobility gaps. Unlike some DRT models that allow users to act as both drivers and passengers (e.g., Gkartzonikas et al., 2025), Nimmo functions more like a flexible

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bus service, offering rides only to passengers. This distinction is crucial when evaluating user needs and adoption potential in rural settings.

Recent research emphasizes that DRT adoption is influenced by a complex interplay of factors including trust, service quality, and user experience. Pak et al. (2023) identify key determinants such as *performance expectancy*, *social influence*, and *perceived safety*, which shape initial trust and usage intention. Recent findings by Hu et al. (2025) highlight *trust* and s*ervice quality* as key drivers of DRT adoption. Their study shows that trust has the strongest influence on usage intention, while service quality contributes indirectly by shaping user perceptions. These insights reinforce the importance of designing reliable and user-centred DRT systems—particularly relevant for rural pilots like Nimmo, where initial trust and perceived service performance may be decisive for uptake. It is also important to note that while these findings offer valuable insights, these studies were conducted in non-European, non-rural environments that may differ significantly from rural areas in Europe, such as Gjesdal, where mobility needs, trust dynamics, and adoption patterns are shaped by distinct social and geographic conditions.

Moreover, demographic groups such as low-income, elderly, and mobility-limited individuals are more likely to benefit from DRT services, highlighting the need for inclusive design (TCRP, 1995). The studies above also underscores that social context and peer influence significantly affecting adoption decisions, especially in early stages of service diffusion. To enhance acceptability, DRT operators must therefore tailor its services to diverse user needs, ensuring reliability, accessibility, and user-friendly interfaces.

A focused review: **User Needs and Barriers in DRT Adoption**

User Characteristics and Adoption Patterns

Sociodemographic factors play a significant role in shaping the adoption of DRT and ride-matching services. Young adults, often seen as early adopters due to their technological fluency and openness to new mobility solutions, are more inclined to use these services according to the literature (Alemi et al., 2018; Alogdianakis et al., 2024; Neoh et al., 2017). However, recent studies have also cautioned against treating youth as a homogeneous group, as this may obscure important differences in motivations and barriers (Gkartzonikas et al., 2025).

Some prior studies highlight females, unemployed individuals, and those living in smaller households or without access to private vehicles are more likely to use DRT services as passengers compared to others (Jevinger & Svensson, 2024; Golbabaei et al., 2023). Moreover, individuals who already engage in shared micromobility—such as

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bikes and e-scooters— have traditionally tend to be more receptive to DRT services (Becker et al., 2017; Ye et al., 2019). This has made researchers suggests that multimodality, or the use of multiple transport modes, is positively associated with openness to emerging mobility solutions, and conversely, those who rely exclusively on private vehicles are less likely to change their mobility behaviour (Ho & Tirachini, 2024). It is, however, difficult to assess the relevance of this research without taking the urban-rural dimension into consideration.

Urban Bias in Existing Research and the Need for Rural-Specific Insights

A critical limitation in the current literature on demand-responsive transport is its predominant focus on urban environments. Many studies of DRT solutions also assume the presence of infrastructure such as bike lanes, frequent public transport, and walkable neighbourhoods—conditions that are often absent in rural areas. For example, findings that link satisfaction with bus services to increased use of shared mobility (e.g., Gkartzonikas et al., 2025) may not apply in rural contexts like Gjesdal, where dissatisfaction with existing public transport is likely to be a key motivator for exploring DRT alternatives.

Recent literature on demand-responsive transport (DRT) in rural and low-density areas highlights a complex interplay of user needs, service design, and contextual factors that shape adoption patterns. While DRT is often positioned as a solution to declining public transport (PT) provision and increasing car dependency in rural regions (Sörensen et al., 2021), its success depends on how well it addresses the specific requirements of diverse user groups.

Elderly users are frequently identified as a core target group for rural DRT schemes, given their increasing reliance on private cars in the face of limited PT and growing distances to essential services such as healthcare (Sörensen et al., 2021). Studies show that elderly users value door-to-door service and reduced walking distances, which directly address mobility limitations (Dauer et al., 2024; Mageean & Nelson, 2003). Call-based booking and human support are also important, as many elderly users are less comfortable with app-based systems (Dauer et al., 2024). Fare discounts and fixed pricing can further improve affordability (Dauer et al., 2024). However, barriers persist: digital exclusion remains a significant obstacle, and complex booking procedures or lack of human interaction can reduce satisfaction (Mageean & Nelson, 2003). Limited-service hours and infrequent departures also restrict usability, while high car dependency persists where DRT is perceived as less flexible or reliable than private vehicles (Sörensen et al., 2021; König & Grippenkoven, 2020).

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For mobility-impaired and disabled users, accessible vehicles and flexible routing are essential features (Dauer et al., 2024; Mageean & Nelson, 2003). Dedicated services, such as Special Transport Services (STS), have been shown to increase satisfaction (Mageean & Nelson, 2003). Nevertheless, limited vehicle capacity and the need for advance booking can reduce spontaneity and accessibility (Dauer et al., 2024). Technical challenges with booking systems and high operating costs or funding constraints may also threaten service continuity (Mageean & Nelson, 2003).

Children, youth, and students benefit from DRT solutions that offer flexible and informal use, such as the ability to access services without strict pre-booking (Mageean & Nelson, 2003). Direct connections to schools and leisure activities are particularly valued in areas where conventional PT is lacking. However, rigid booking systems may not accommodate spontaneous travel needs, and some DRT models lack tailored inclusion for young users (Mageean & Nelson, 2003).

Socially vulnerable and excluded groups—including low-income households and those at risk of social exclusion—are another key focus in the literature. Targeted service design and rural coverage can help address social exclusion, while fixed fares and subsidies improve affordability (Dauer et al., 2024; Mageean & Nelson, 2003). Policy support and integration with social services can further enhance uptake. Yet, sparse service coverage, limited fleet size, complex fare structures, and booking limitations can be exclusionary. Regulatory and funding constraints may also limit service provision (Mageean & Nelson, 2003).

For the general public, DRT schemes that offer app-based booking and integration with urban mobility networks appeal to more tech-savvy users (Dauer et al., 2024). DRT is also positioned as an alternative to private car use, with potential environmental benefits (Sörensen et al., 2021). However, lack of tailored features for specific needs may reduce relevance for vulnerable groups, and low awareness or poor information dissemination can hinder adoption (König & Grippenkoven, 2020). Many users also perceive DRT as inferior to private cars in terms of flexibility and speed (Sörensen et al., 2021; König & Grippenkoven, 2020).

Across all groups, the literature emphasizes the importance of inclusive DRT design—with multiple booking options, accessible vehicles, clear information, and affordable fares. Barriers such as digital exclusion, complex procedures, and limited-service coverage must be addressed to ensure equitable access. Enhancing perceived usefulness, integrating DRT with existing PT, and providing clear, accessible information are recommended strategies (König & Grippenkoven, 2020). Competing with the

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flexibility of private cars, increasing service responsiveness, and reducing waiting times are also highlighted as critical for broader adoption.

A recent peer-reviewed study by Ryghaug and Karlsson (2025) offers detailed insights into the development and piloting of the Nimmo demand-responsive transport (DRT) service in Norway. Although the study focused on earlier implementations in Molde and Ålesund—primarily targeting urban and peri-urban contexts—it is directly relevant to the current pilot in Gjesdal, as it builds on the same service model and digital platform. The article highlights several findings that inform the present report's focus on user needs and co-creation in rural areas.

Key user-related insights include the importance of trust and safety, particularly for children traveling without parents. The study found that driver behaviour and direct communication with parents were essential for building confidence in the service. It also emphasized the role of digital access and booking flexibility, noting that the requirement to book a day in advance and use a smartphone posed barriers for some families—issues that are echoed in the Gjesdal workshops and survey. Furthermore, the service was found to support social inclusion, enabling children from low-income households or car-less families to participate in leisure activities, and freeing up time for parents.

The article also discusses the role of activity providers as co-creators and promoters of the service, and the need for clear guidelines and coordination between stakeholders. These findings reinforce the importance of stakeholder engagement and participatory design in rural DRT implementation.

While the article also explores broader themes such as governance, policy alignment, and scaling potential, those aspects will be addressed in Deliverable *D7.3 Report on the co-creation of an on-demand shared mobility solution with rural stakeholders and local authorities in Norway*, which focus on institutional integration and long-term viability. For the current report, the study provides a valuable empirical foundation for understanding how shared mobility services can be designed to meet the needs of diverse user groups in rural settings.

Building on the literature review described above the following table (Table 1) integrates findings from the focused literature review summarizing key drivers and barriers for DRT adoption by user group.

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Table 1: Drivers and Barriers for DRT Adoption by User Group

User Group	Key Drivers	Key Barriers	References
Elderly	Door-to-door service, phone booking, fare discounts, perceived usefulness, reliability	Digital exclusion, complex booking, limited service hours, car competition	Sörensen et al., 2021; Dauer et al., 2024; König & Grippenkoven, 2020; Mageean & Nelson, 2003
Mobility-impaired	Wheelchair access, flexible routing, dedicated services, tailored accessibility	Limited capacity, advance booking, tech challenges, funding constraints	Dauer et al., 2024; Mageean & Nelson, 2003
Children/Parents	Sense of security, freed up family time, flexible use, direct school/activity links, reliability, positive child experience, trust in drivers	Rigid booking systems, lack of tailored inclusion, cost sensitivity, trust, digital access barriers, limited capacity	Ryghaug & Karlsson 2025; Mageean & Nelson, 2003
Youth/Young Adults	Technological fluency, openness to new mobility, multimodality, performance expectancy	Urban bias in research, lack of rural alternatives, digital divide	Alemi et al., 2018; Alogdianakis et al., 2024; Gkartzonikas et al., 2025; Ho & Tirachini, 2024
Socially Excluded/Low-income	Targeted design, rural coverage, fixed fares, policy support, affordability	Sparse coverage, fare complexity, booking limitations, regulatory hurdles, cost sensitivity	Dauer et al., 2024; Mageean & Nelson, 2003
General Public	App booking, urban integration, car alternative, social influence, perceived safety	Not tailored to specific needs, low awareness, perceived inferiority to cars, trust, service quality	Dauer et al., 2024; Sörensen et al., 2021; König & Grippenkoven, 2020; Pak et al., 2023; Hu et al., 2025
Women, Unemployed, Car-less	Higher likelihood of adoption, openness to shared mobility	Socioeconomic barriers, digital exclusion	Jevinger & Svensson, 2024; Golbabaei et al., 2023
Cross-cutting	Performance expectancy, perceived safety, social influence, trust, service quality	Costs (especially for families and low-income users)	Pak et al., 2023; Hu et al., 2025

4.2 Workshops in Focus: Uncovering Mobility Needs

The mobility needs in rural areas do not necessarily differ from those in urban areas. However, access to different modes of transport and level of public transport service is often limited compared to urban areas. The mobility needs and expectations regarding a demand-responsive transport solution in Gjesdal municipality are mapped from three different perspectives. Pupils under 18, parents and adults without children (including low-income groups) and seniors.

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Identified mobility needs among youth, adults and seniors in Gjesdal, Norway

Youth and children

From the perspective of the younger participants, all mention access to leisure activities as demanding when not living near the sports field or the youth club. For most of those living in the community centre of Gjesdal; Ålgård, it was manageable to participate in leisure activities. However, older children living in the more remote villages every day activities were demanding because of lack of proper transport solutions as they are of course too young to drive themselves. For this group, access to transport, when parents could not drive, limited their ability to participate in regular leisure activities and special events such as concerts in the weekends. The most significant transport challenge for this group was the daily commute to and from upper secondary school/high school. Limited number of buses combined with long travel times forced them to spend an inappropriately long time on transport each week.

Adults and parents

The mobility needs of young people were also reflected in the responses from adults. Adults with children living in the villages or rural areas reported demanding situations in the afternoons, especially when their children's activities occurred at different times and locations. Living in such areas made them reliant on car access; however, when work schedules were inflexible or combined with farming responsibilities, they had to depend on support from others. This required extensive planning and communication, contributing to stress and time pressure within already tight daily routines.

This group also encountered transport-related challenges with travel to and from the school. For example, when their children invited friends' home after school, current school bus arrangement in Gjesdal did not permit friends to ride along, thereby limiting opportunities for social interaction. Consequently, this seemingly minor operational transport constraint contributed to unequal opportunities, as parents found it challenging to offer their homes as social spaces for their children's friends to the same extent as those residing near the school.

Parents residing in the municipal centre, Ålgård, emphasized the importance of prioritizing families with children living in more remote areas. They argued that seats on a DRT service should not be occupied by children who live within walking or cycling distance - unless they have a disability or other mobility limitations - so that those with fewer transport alternatives are given priority.

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Among the adult and parent groups, several participants represented newly arrived immigrants to Norway, who had enrolled in adult education program to learn Norwegian. While they faced similar mobility challenges as other adults, they also experienced additional layers of mobility needs. Those without access to a car struggled not only with participating in leisure activities, but also with managing daily routines such as dropping off and picking up children from kindergarten while attending scheduled education sessions. For this group, reliance on public transport significantly constrained their housing choices - whether buying or renting - and limited their employment opportunities. One participant in this group described a challenging situation related to their children's leisure activities at the public sports field on the outskirts of Ålgård. Due to limited transport options, they were currently dependent on informal private ridesharing arrangements.

Seniors

Many of the seniors who attended the workshop owned their own cars and were still healthy, able to drive, and move around independently. However, this reflects an inherent selection bias in the representativeness of the elderly population, as participation in such workshops is more accessible to those who are mobile and in good physical condition. While these participants currently experienced few mobility limitations, they acknowledged that maintaining their active lifestyle could become challenging in the future if they were no longer able to drive or walk to a public transport stop.

They also noted that a DRT service could help alleviate parking issues at popular senior activities, where parking was often limited. However, they emphasized that the most important function of such a service would be to provide mobility options for those who were currently homebound or immobile due to a lack of transportation - particularly in villages and other remote areas of the municipality.

What makes a Demand-Responsive solution attractive?

The young people in Gjesdal identified several factors that could reduce the attractiveness of such a service. They were already familiar with public transport and viewed DRT as a similar, but potentially more user-friendly, solution. The most important aspects for them were reliability and ease of use. It was considered crucial that the service was well-developed at launch to avoid issues that could undermine trust in the solution. They needed assurance that they would arrive on time and be guaranteed a return journey, especially since no alternative options existed in the more remote areas.

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Participants at the workshops also pointed out that, despite being a small and rural municipality, Gjesdal has an international population. Therefore, offering the app in multiple languages may increase the attractiveness and make more people able to use the service.

Booking routines were identified as a critical component of the service. For users, key concerns included the need for flexibility and the time required to complete a booking. A cumbersome process - particularly one that must be repeated for each activity or occasion - was seen as a potential barrier to adoption. Parents expressed a preference for the ability to book both individual trips and entire seasons in advance, highlighting the importance of convenience and long-term planning.

The travel time was not addressed as a big concern for the children, but still the solutions was expected to reduce the travel time for those living outside of Ålgård that experience the longest travel times today. The parents, on the other hand, pointed out that long travel times could be problematic if it delays other essential activities such as homework, dinner, and bedtime. Getting "home in time for dinner" was also mentioned by the seniors, not because it is crucial, but out of convenience and comfort.

From the seniors' perspective, the discussion was not primarily focused on their current needs, but rather on the needs of other users and perceived future mobility needs, as they age. Pickup distance was considered crucial, as many older adults are unable to walk more than a few hundred meters or shorter distances. Therefore, the service would need to be adaptable to individual mobility limitations.

The time allocated for boarding and alighting was also highlighted as important, as older users may require assistance and additional time, particularly when using mobility aids such as wheelchairs or walkers.

Several participants noted that while an increasing number of older adults are becoming familiar with smartphones, many still face challenges with new technology. To ensure inclusivity, it was considered essential to offer alternative booking methods beyond app-based solutions. Universal design was emphasized, particularly the need to accommodate visually impaired users. While this is especially relevant for older adults, it was also noted that some children and parents would benefit from such accessibility features.

In relation to cost, most users recognized that a DRT service could improve their daily lives and expressed a certain willingness to pay for it. However, many noted that, since they were already paying for a public transport period ticket - which they would still need

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to do in the future- the additional cost of a DRT service would need to be reasonable. This concern was particularly emphasized by newly arrived and immigrant adults.

On the other hand, if the service could resolve transport challenges related to job opportunities or enable families to live in larger homes without sacrificing accessibility, it might increase their willingness to pay. Some parents pointed out that a fare of, for example, 50 NOK (€4.5) per child per trip, several days a week, would quickly become expensive and might lead them to continue driving instead.

Among the groups, seniors appeared to be the least price sensitive. They were aware of the costs associated with driving themselves and indicated that whether the fare was 25 or 75 NOK (€2–7) made little difference, as it would still be cheaper than owning a car. However, it was acknowledged that this view might not be representative of all seniors, and greater variation in responses could be expected with a larger sample.

A common theme across all groups was the importance of ensuring that the service remained accessible to those who currently face the greatest mobility challenges - whether due to economic constraints or geographic isolation. It was suggested that these individuals should be prioritized over those living near services, such as within walking or cycling distance.

How will it influence everyday life in Gjesdal?

The unified point of view about a service like this is that it has the potential to increase the attractiveness of living in Gjesdal municipality and make the life easier if it can reduce the time crush many parents experience during the afternoons. It also holds the potential to reduce disparities in participation in afternoon leisure activities among individuals—regardless of whether they are younger or senior—particularly if the cost is subsidised for low-income groups.

The older children attending upper secondary school/high school and who live in the villages says it also can have an impact on choice of school and education. Now the travel time limits their possibilities if they do not want to move away from home at the age of 15.

For the newly arrived adults, but probably also for native Norwegian people in low income groups, it will increase the area where it is possible to find a house for rent or to buy. Even though it would not be the same as a private car or high frequent public transport, it might be enough to offer a sufficient level of accessibility.

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The social aspect of the service is also important. Since there will naturally be some waiting time before and after activities, as well as during transport, these moments can create opportunities for people to socialize. When the same service is used by people attending different leisure activities and from different age groups, it also opens up for interaction across generations and interests.

4.3 Understanding Mobility Needs: Survey Insights from Norway and Spain

The survey distributed in both Norway and Spain provided the project with valuable insights into attitudes toward demand-responsive transport (DRT). This chapter presents descriptive data on potential users across three groups - children, parents, and seniors - in each of the two countries.

Children in Norway

The survey reached a large number of children in Gjesdal municipality. Ålgård, the main village, was home to nearly all respondents, although a few responses were also received from children living in the villages. As a result, the findings primarily reflect the interests of children residing in Ålgård. However, the perspectives of children living in more remote areas were explored through the workshops and are presented in earlier sections.

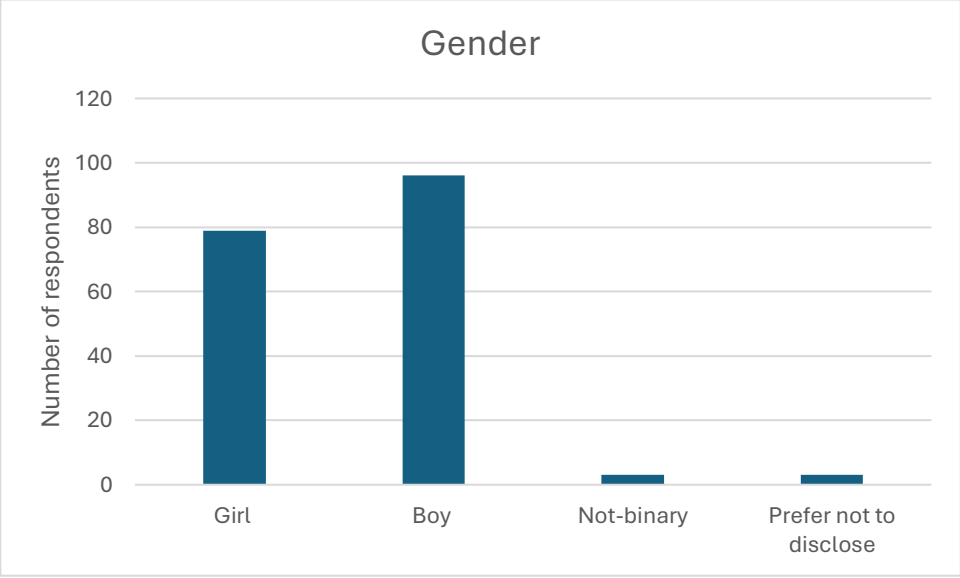

Figure 2: Gender (n=181)

Figure 2 shows that slightly more boys than girls have answered the survey, however both genders are well represented, and it is not supposed to bias the results.

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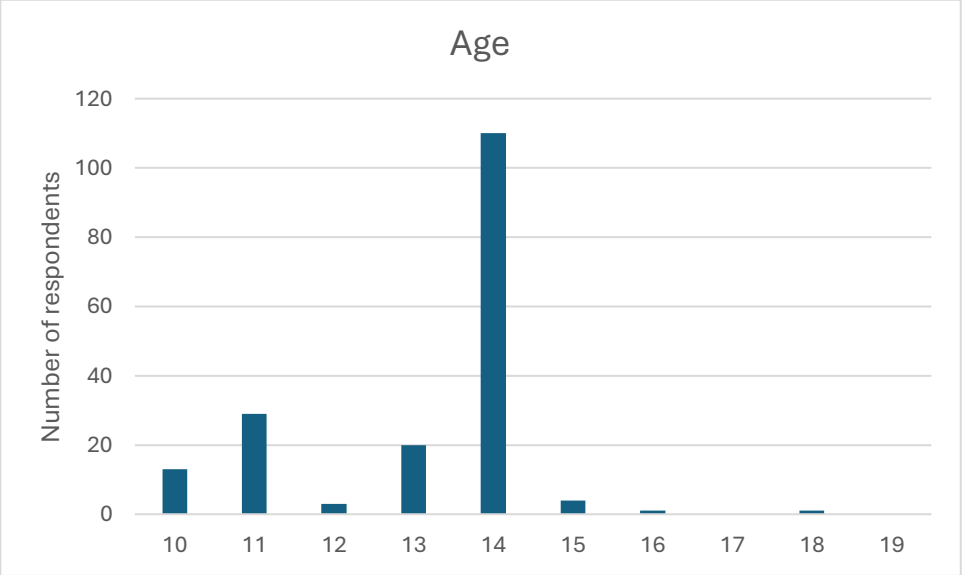

Figure 3: Distribution of respondents by age (n=181)

Figure 3 shows that the survey was distributed exclusively to children aged 10 to 19 (up to the final year of upper secondary school) to ensure appropriate reading comprehension. As seen in the figure, a large proportion of respondents were teenagers, which may introduce some bias in the results. However, this age group is also at a stage where independence becomes increasingly important, and access to adequate mobility is crucial. Therefore, their responses provide valuable insights into user needs and expectations that soon will be relevant for the younger groups but also for older teenagers.

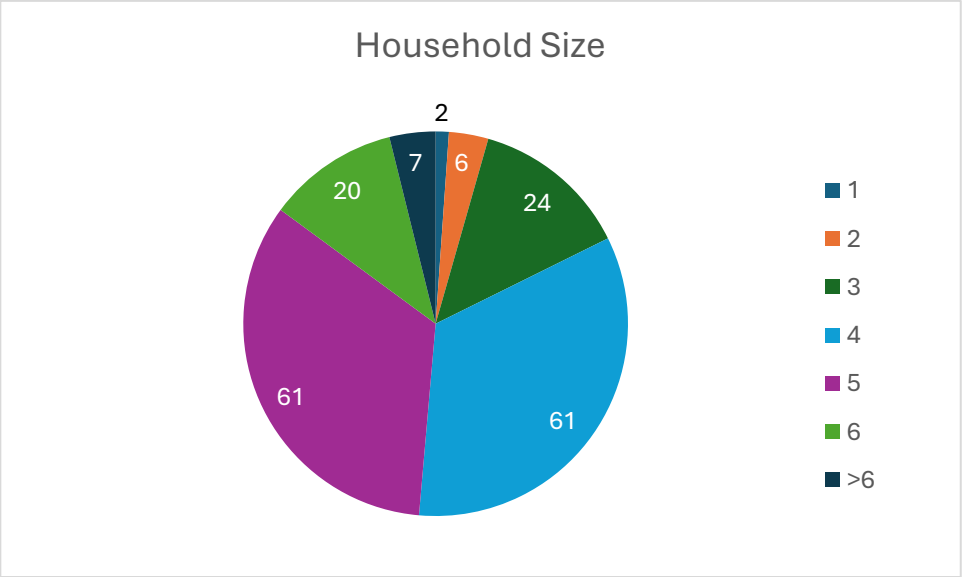

Figure 4: Respondents distributed based on Household size (n=181)

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Most of the children that answered the survey lived in households with four or five members as shown in Figure 4. Household size is likely to influence both the number of daily trips and the extent of car use, as families must coordinate drop-offs and pick-ups and meet the mobility needs of multiple members at specific times.

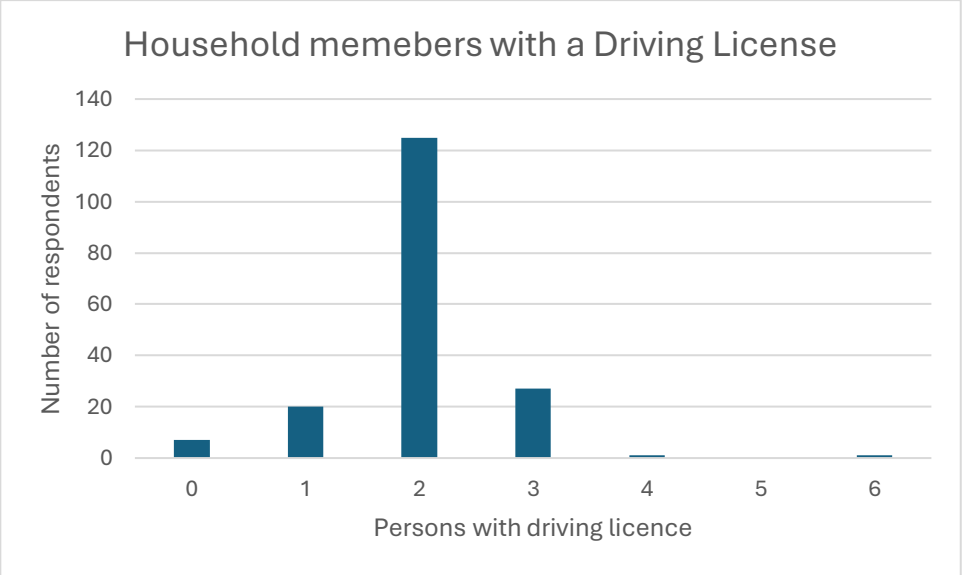

Figure 5: Persons with driving license (n=181)

Figure 5 suggests that many households consist of two adults and several children, although in some cases, older siblings with a driving license may also be part of the household. Notably, seven respondents indicated that no one in their household held a driving license. However, this may reflect some inconsistencies in the data, as two of these respondents reported having access to a car or being able to access a car through someone outside the household.

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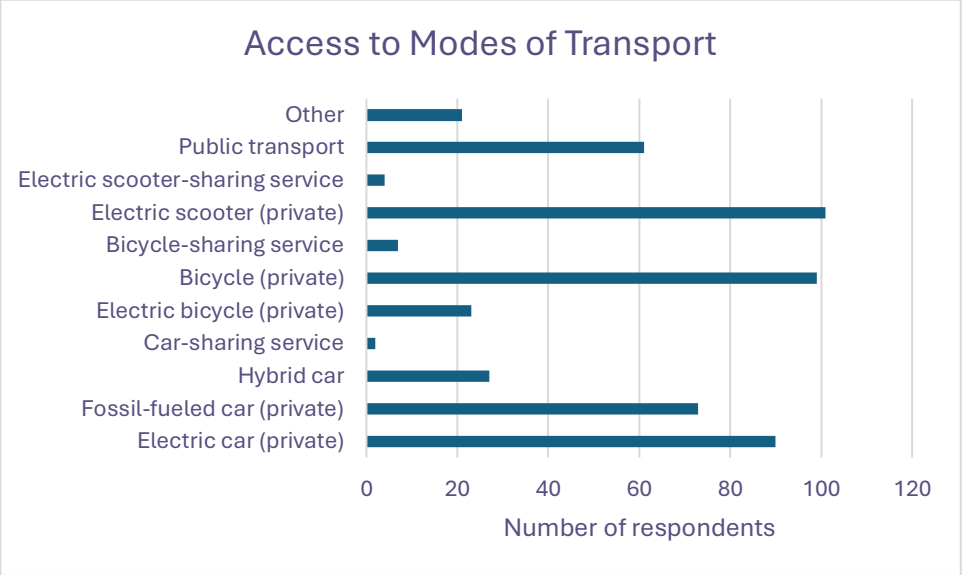

Figure 6: Access to modes of transport (n=178)

Figure 6 presents the respondents' access to various modes of transport. The underlying survey data reveal that 44 (25 %) respondents reported having no access to a car. In contrast, some households appeared to have access to at least two vehicles, as they indicated ownership of cars with different propulsion technologies. However, the survey did not include a question about the total number of cars per household, which limits further interpretation.

A notable finding is the high prevalence of private e-scooter ownership among respondents. This may suggest that parents are actively seeking to reduce their children's dependence on them for daily mobility by providing alternative, independent transport options.

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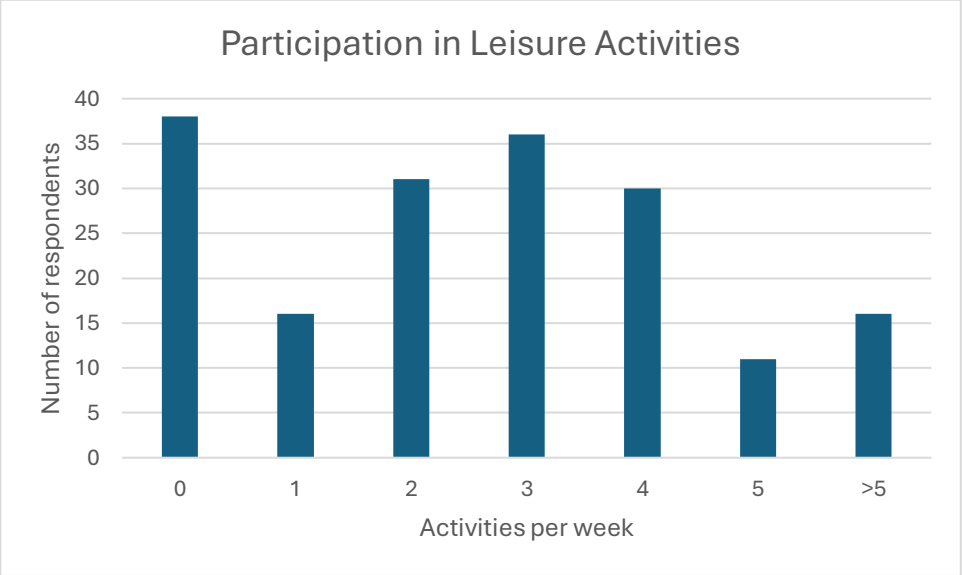

Figure 7: Number of activities per week (n=178)

Figure 7 shows that over 75% of the children in Gjesdal participate in some form of leisure activity, with approximately 50% engaged in three or more activities per week. Collectively, these activities generate more than 800 trips per week among the surveyed children.

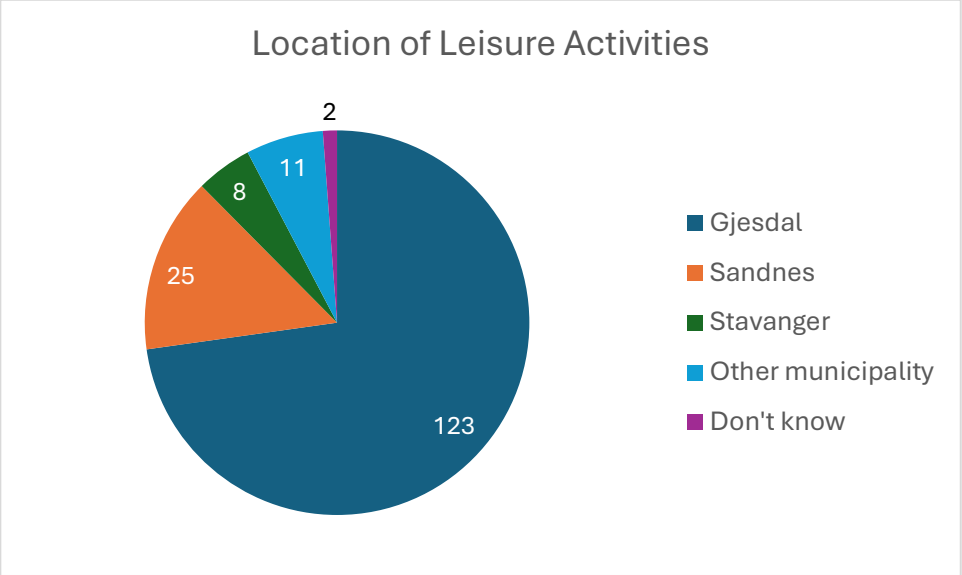

Figure 8: Leisure activities distributed on municipalities (n=141)

Figure 8 shows that most leisure activities of the respondents take place within Gjesdal municipality. However, some children also participate in activities in neighbouring municipalities, which typically require a car journey of at least 20 minutes or a longer

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trip by bus. The high concentration of activities within Gjesdal suggests potential for a DRT service with efficient route planning that could serve multiple destinations and user needs effectively.

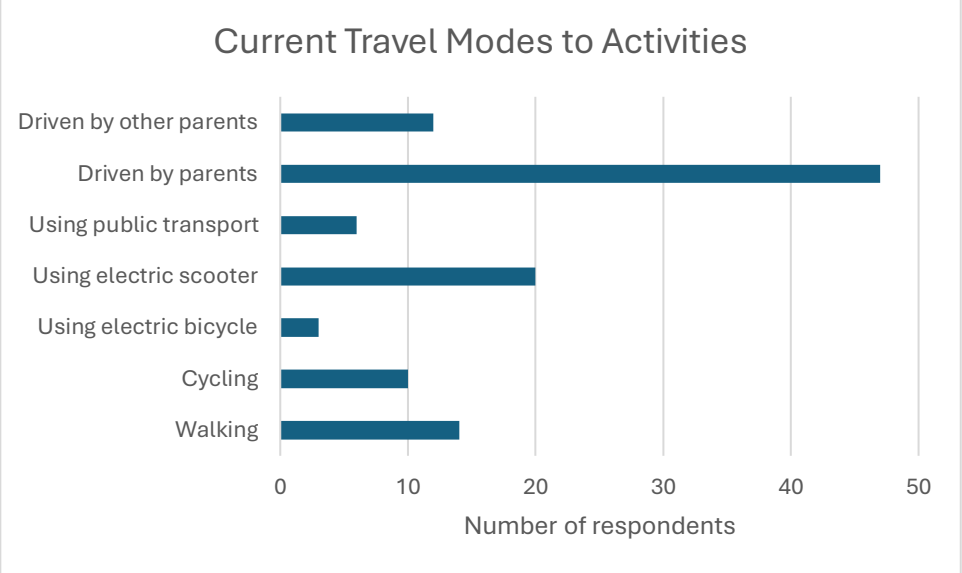

Figure 9: How do the children travel to leisure activities today? (n=62)

Figure 9 suggests that a DRT solution has the potential to reduce car-based travel. Most respondents (95 %) indicated that being driven by their own parents or by other parents is a common mode of transportation to and from leisure activities.

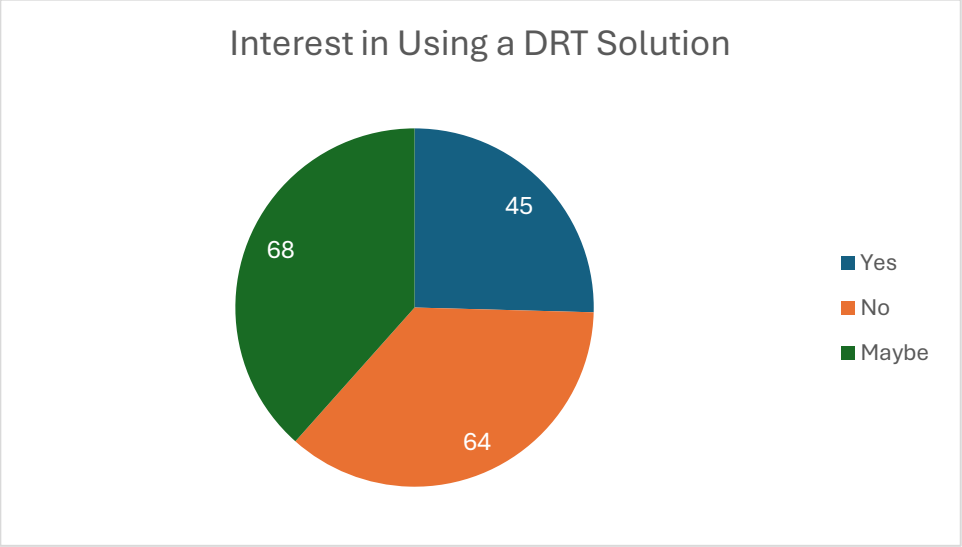

Figure 10: Interest in using a DRT solution if available (n=177)

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As shown in Figure 10 children (64 %) report that they have an interest in using a DRT solution if available. The largest part (38 %), are not sure, reporting that they maybe will use it, while (36 %) reported that they selected 'No' indicating that they will not use it. The majority indicating 'Maybe', can be interpreted as a hesitation towards using a new transport service. A plausible explanation for this result is that the children may lack experience with transport modes beyond those they currently use, which could hinder their ability to conceptualize how a DRT system would operate. This points to the importance of the pilot implementation being accompanied by targeted information campaigns and outreach initiatives aimed at potential users. These efforts should focus on raising awareness and encouraging trial use of the service, thereby reducing reliance on existing travel habits and explore why some users are hesitant or are not interested.

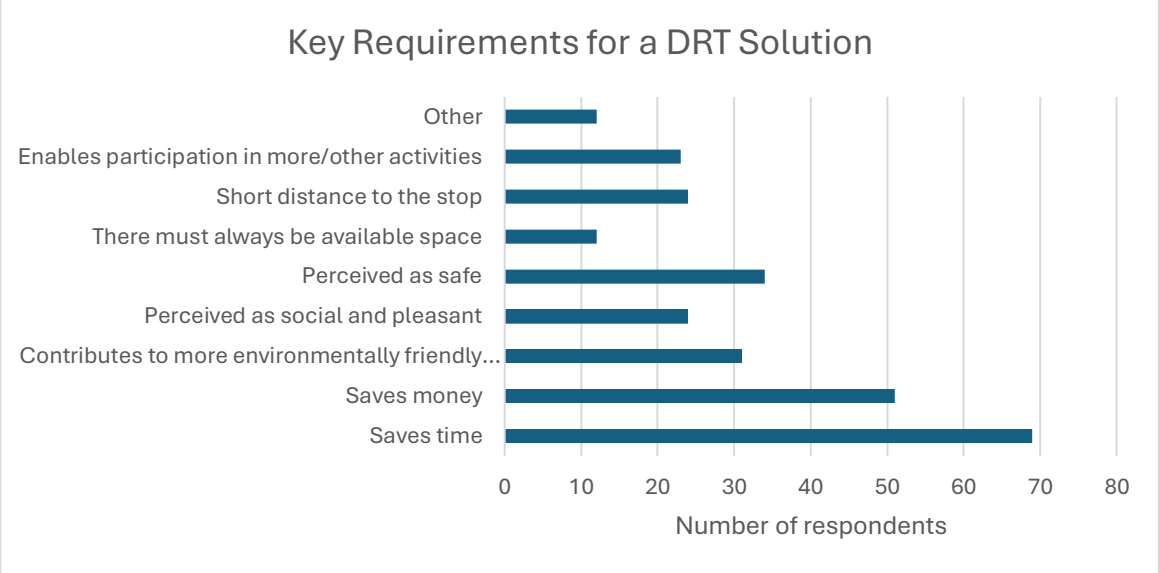

Figure 11: Key requirements for an attractive DRT solution (n=111)

Figure 11 provides valuable insights into the key requirements for successfully implementing a DRT service, particularly in engaging children who were unsure if they were interested to use the service (those responding 'Maybe'). Time savings emerged as the most significant motivating factor, underscoring the importance of careful route planning and defining effective catchment areas to avoid overly time-consuming journeys. It is also interesting to note that many children were cost conscious, even though, it is likely that most children will have their travel expenses covered by their parents. Safety and environmental concerns, along with the perception that the solution is socially engaging and enhances opportunities to participate in more activities, are also important requirements. Given these results—where respondents were able to tick off as many “key requirements” as they wanted—it is clear that emphasis should be

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placed on minimizing travel time and ensuring a pleasant and convenient travel experience to enhance the attractiveness of the service.

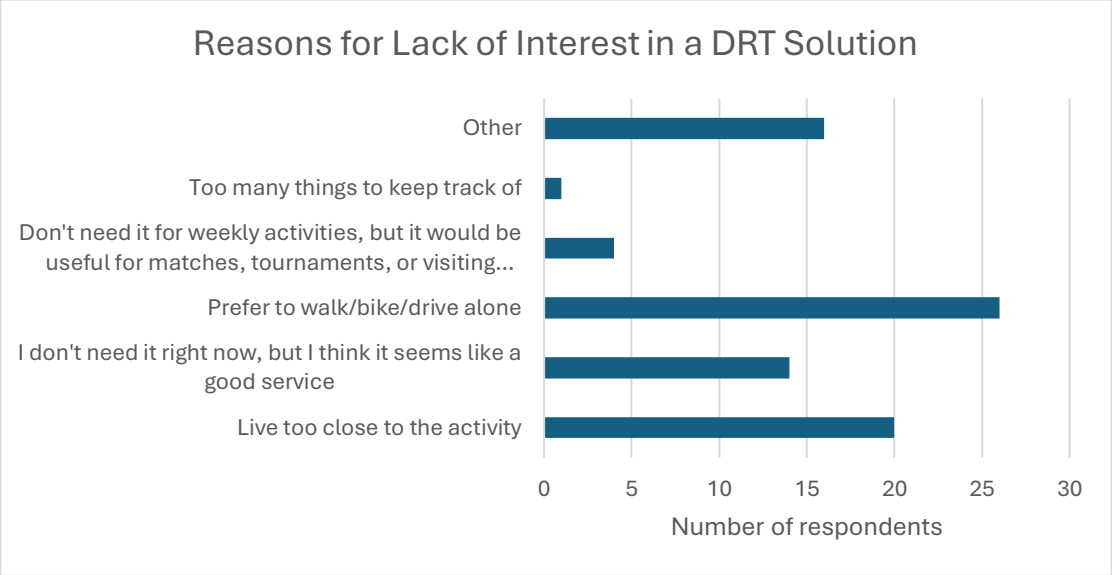

Figure 12: Barriers among "No" respondents (n=63)

Figure 12 highlights that several respondents who answered 'No' answered this because they prefer to walk, bike or drive alone and/or live near their destinations. About 30 % out of those who reported not being interested in using the service reported living close to the activity which is a very valid reason to not use it. Also 22 % of those that reported no interest, report that they are positive towards the service, only it is not something they need now. These findings suggest that most respondents are not necessarily opposed to a DRT solution but rather do not perceive a need for it under their current circumstances. This distinction is important when interpreting the data, as it implies that the potential user base may be broader than the initial responses suggest, provided that the service is adapted to meet diverse mobility needs and where children are living, or poor access to public transport.

Adults in Gjesdal Norway

The survey was distributed among adults in Gjesdal and resulted in 144 responses, including both parents and individuals without children. Although the high proportion of adults living in households with children (80%) is not representative of the general population, it provides valuable insights for developing the DRT solution in the next phase of the project. The remaining 20% reported having no children in their household.

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Despite their smaller representation, their perspectives on shared mobility remain important and have been included in the analysis where relevant.

The results also highlighted a gender imbalance among the survey respondents, with 73 % being women. Although the distribution channels used should not have contributed to this disparity, it may suggest that women tend to take greater responsibility for organizing children's leisure activities, which could explain their higher interest in a survey about DRT solutions. This observation indicates that being attentive to female (potential) users should be important when designing the DRT service.

As expected, almost half of the respondents are in the age group 31-40 years old, and 32 % in the age group 41-50. Thus, most respondents are within the age range where it is common to have children participating in leisure activities. While this does not provide a representative sample of the general population, the sample offers very relevant insights representing a group of potential users.

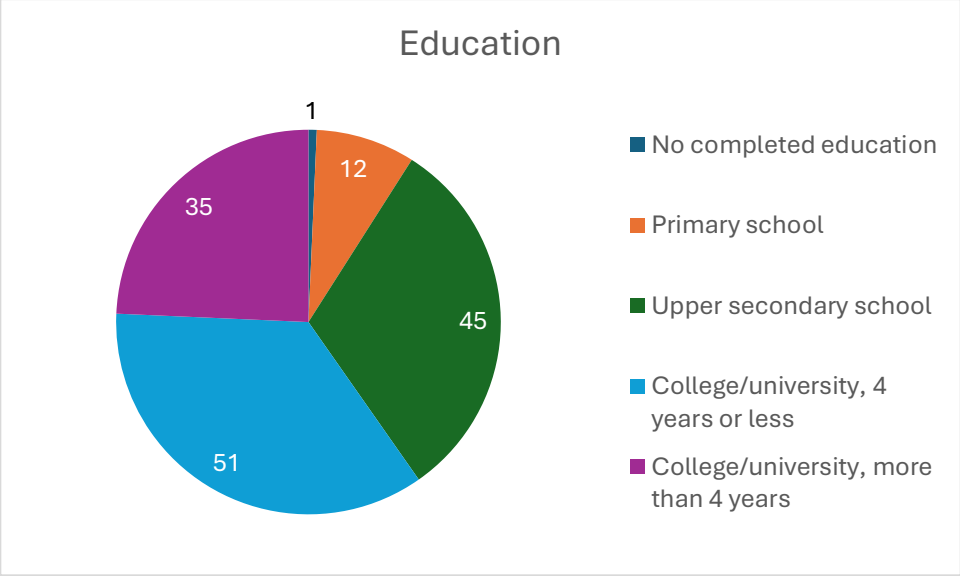

Figure 13: Level of education among respondents (n=144).

Figure 13 shows that over half of the respondents have completed higher education at the university level, while approximately one-third have only completed upper secondary or primary school. This represents a significantly higher share of people with higher education compared to the Norwegian average[1]. Although income was not directly surveyed, education level can serve as a proxy for salary, an important factor when considering willingness to pay. Based on this, the relatively high education level

[1] https://www.ssb.no/en/utdanning/utdanningsniva/statistikk/befolkningens-utdanningsniva

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and the fact that 80% of respondents indicated income-generating work as their main activity may suggest that many have a fairly good income.

However, the survey did not ask whether respondents work full-time or part-time, which could affect their disposable income. It is also important to note that individuals without employment or with lower income levels may be underrepresented in the data. This should be kept in mind to ensure equitable access to services, regardless of income later in the project.

Only 7% of respondents live in households where no one holds a driving licence, while 75% live in households with at least two licensed drivers. This was expected, given the municipality's limited public transport options and long travel distances, which make car use almost essential for commuting and daily errands. Figure 14 also reflects this trend, showing that car access is common among respondents. Based on the survey data, only nine households reported having no access to a car, while several indicated access to more than one vehicle. The category 'others' includes responses such as 'multiple cars,' 'scooter,' and 'on foot.' However, this high level of car access could pose a barrier to adopting a DRT solution, as noted in the literature review above.

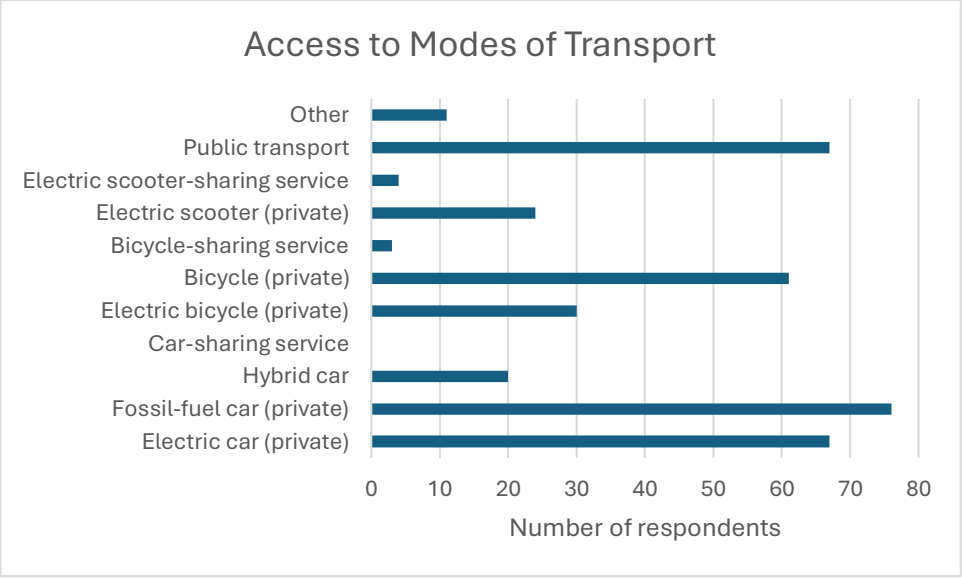

Figure 14: Access to modes of transport (n=144)

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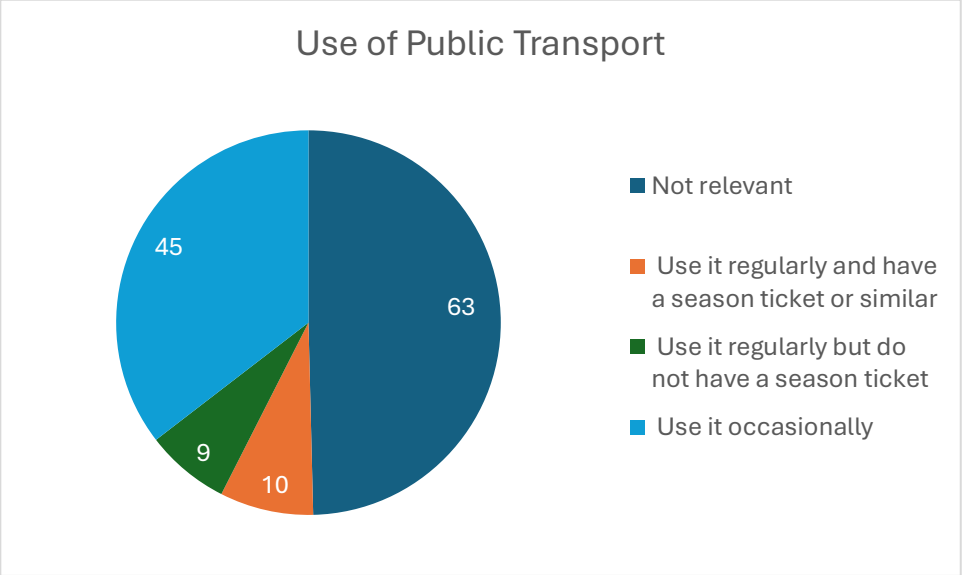

Figure 15: Use of public transport (n=126)

Only half of the respondents reported having access to public transport. This reinforces the points raised in the group interviews, highlighting that many inhabitants currently have poor access to public transport. As Figure 15 shows, few of the adults that responded to the survey uses public transport on a regular basis, highlighting the municipality's heavy reliance on private vehicles for daily travel and commutes.

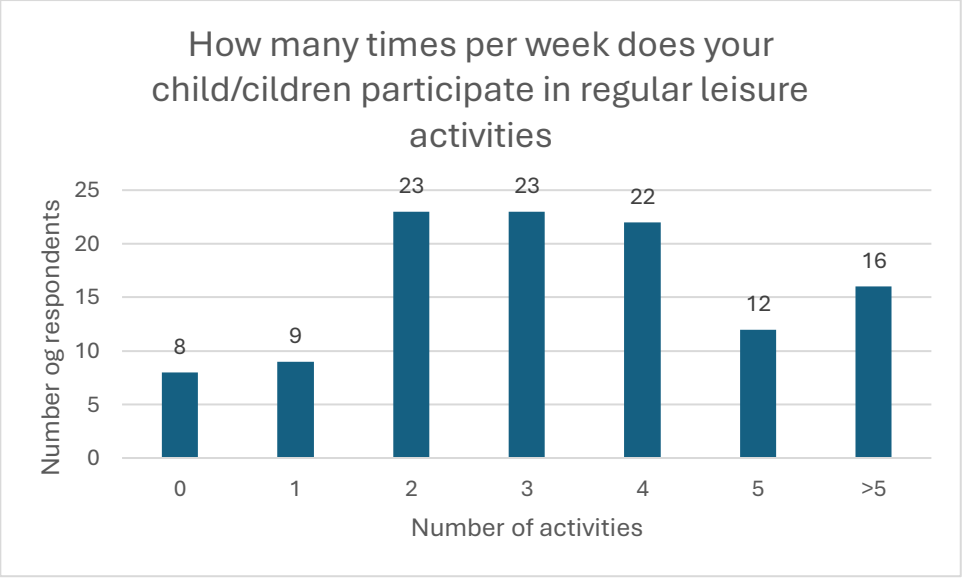

Figure 16: Number of leisure activities for the children in the household (n=113)

Figure 16 shows that only 7 % of households do not have children participating in activities during the week, leaving 93 % to have children participating in 1 or more

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activities per week. Almost equal number of participants (20 %) have children participating in 2, 3 or 4 activities per week, while 12 participate in 5 and 16 in more than five per week. Thus, a high number of households report a relatively high number of activates per week. Based on the survey data, altogether the households account for almost 400 activities in total per week, evidently generating a lot of travel in the municipality.

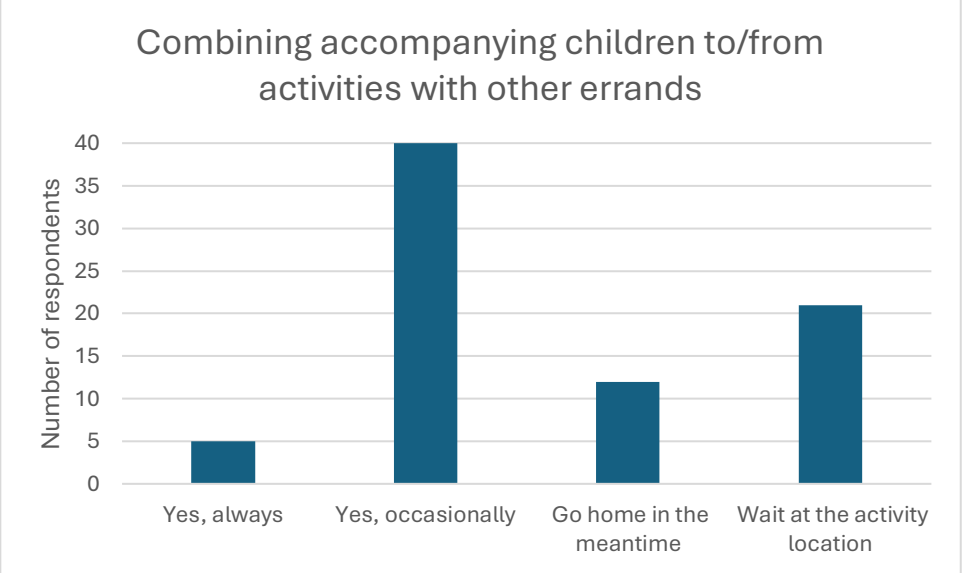

Figure 17: Combining accompanying children to/from activities with other errands (n=63)

As shown in Figure 17, of the 63 respondents who answered the question about combining trips to accompany children with other errands, many indicated that they do so—at least occasionally. This is an important consideration when evaluating the potential for a Demand-Responsive Transport (DRT) solution. Even if children do not require transport themselves, accompanying adults may still generate car trips due to other errands, which could influence overall travel behavior and demand.

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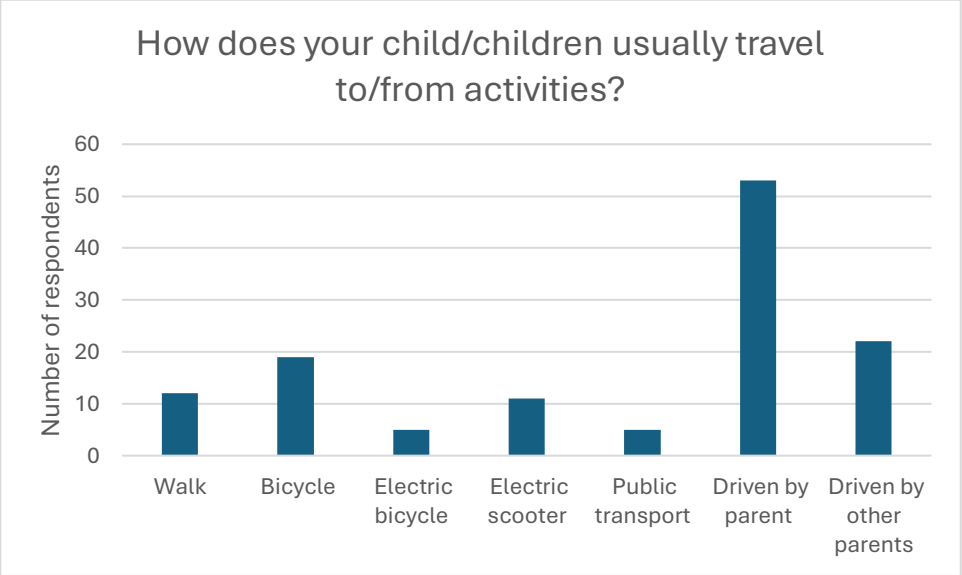

Figure 18: Mode of transport to/from leisure activities (n=60)

Figure 18 shows that the most common way for children to travel to and from leisure activities is by being driven by their parents (53 out of 60 answers ticked this box). However, a notable share of respondents also reported using other modes of transport, in addition. Altogether, the numbers suggests that there is a significant amount of traffic in Gjesdal related to transporting children—traffic that a DRT solution could potentially help reduce.

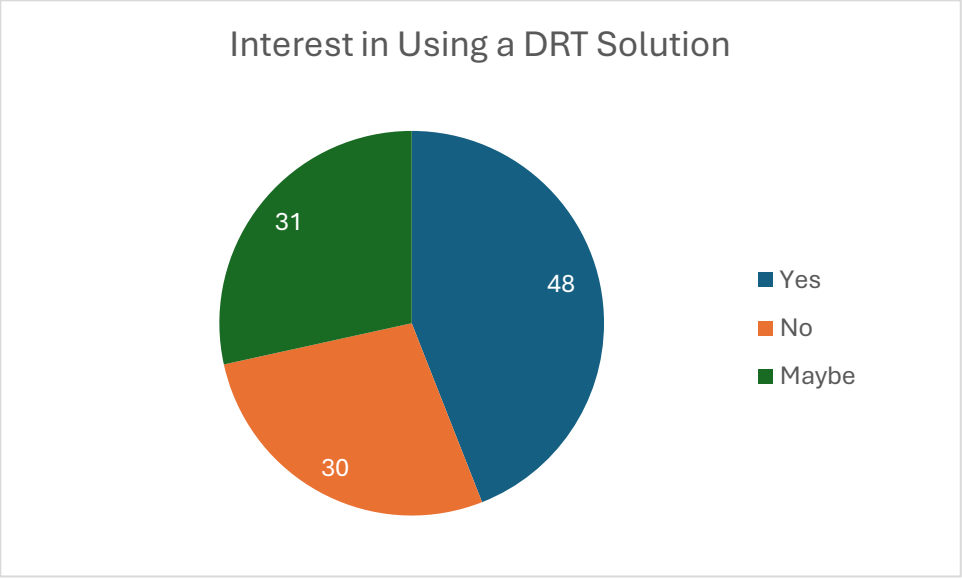

Figure 19: Potential for a DRT solution (n=109)

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Figure 19 indicates that a DRT solution has strong potential to reduce traffic, as over 70% of respondents expressed interest or at least willingness to consider using it.

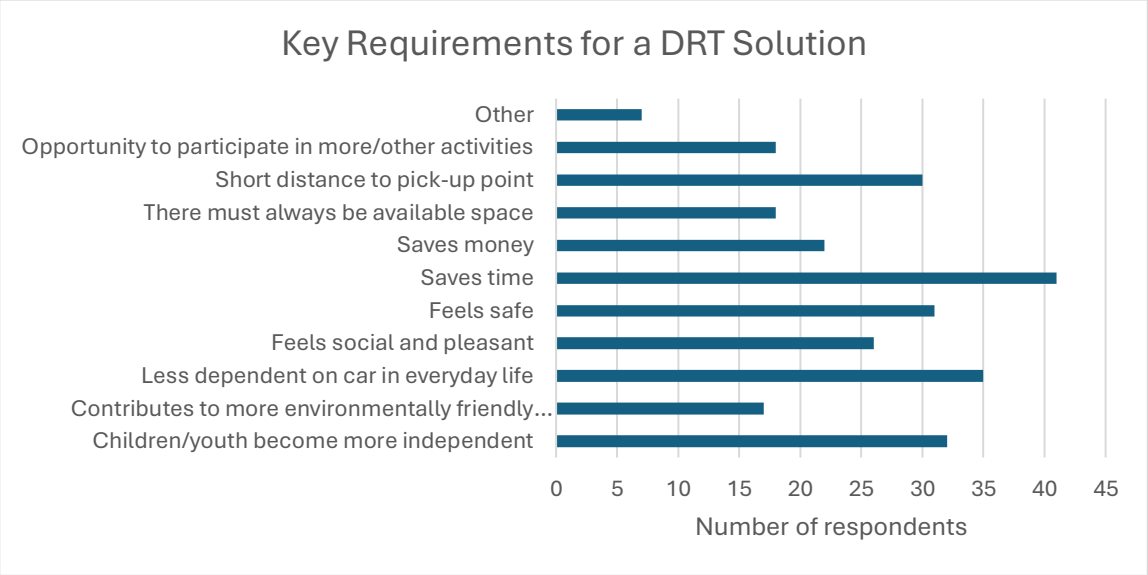

Figure 20: Key requirements for a DRT from adults' point of view (n=72)

Figure 20 presents key factors influencing adults' willingness to choose a DRT solution. Saving time emerges as the most important requirement, followed by the desire to become less dependent on cars in everyday life. This may indicate a wish to foster a more environmentally friendly mobility pattern, as 23% specifically cited environmental concerns as one of their reasons for supporting the service. Other motivations could include cost, safety, and personal values. For example, some respondents expressed a desire to foster greater independence among children. Safety and short distances to the pick-up point are also considered important. Overall, these responses highlight that the service must meet multiple expectations related to convenience and safety to be perceived as valuable, while the benefits could range from time savings to environmental improvements and social values such as promoting children's independence. Importantly, many of these findings align closely with Gjesdal municipality's objectives for introducing a DRT solution, suggesting strong potential for successful implementation.

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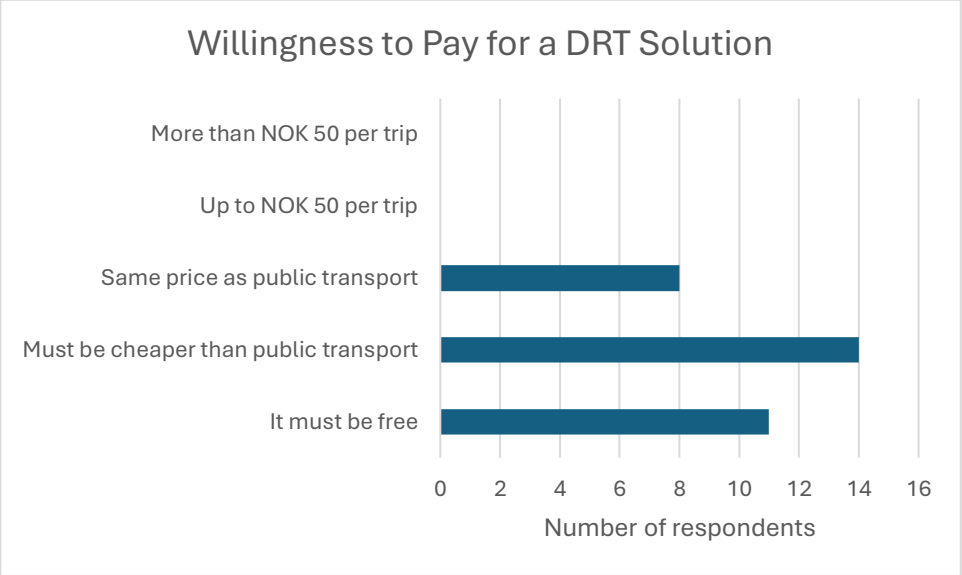

Figure 21: Willingness to pay for DRT (n=33)

Few respondents answered the question regarding willingness to pay. Figure 21 shows that cost appears to be a potential barrier. Currently, a one-way public transport ticket for children costs NOK 23 (approximately €2), which represents the highest amount any respondent indicated they would be willing to pay. To ensure broad accessibility and adoption, it will be essential to explore business models that can keep costs low.

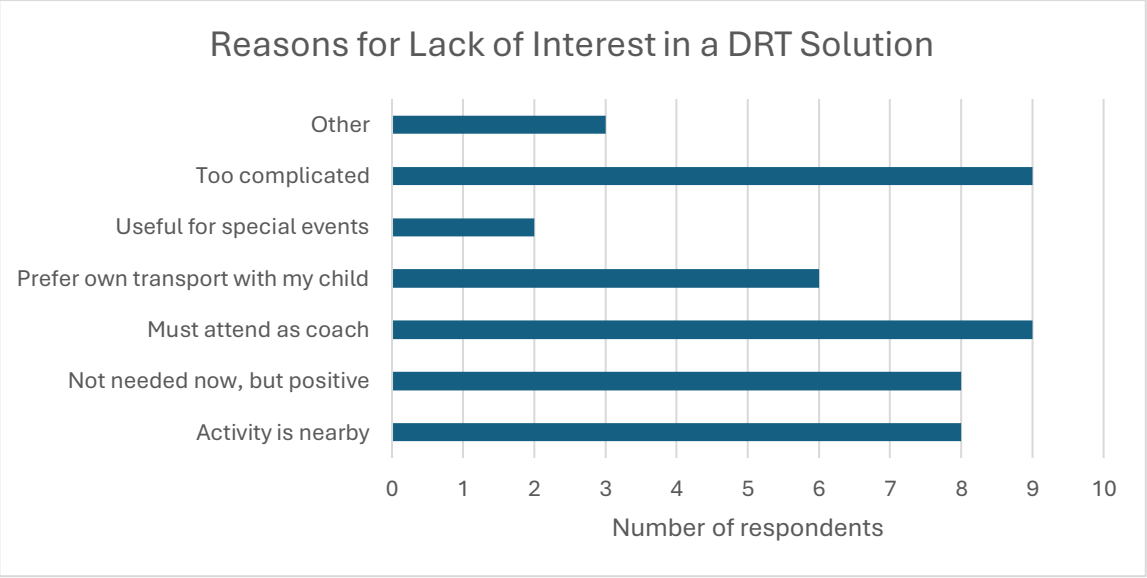

Figure 22: Reasons for lack of interests in a DRT solution (n=30)

Figure 22 highlights several reasons given by respondents who answered "not interested" in a DRT solution – and represents a relatively little sample compared to

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those who were positive or that was more unsure. Soliciting answer from those that are negative, is however important, to potentially make the service more attractive for more inhabitants and users. Some reasons—such as short travel distances or parents serving as team coaches—are of course, difficult to influence and not areas where a DRT service should aim to intervene. However, it is worth noting that around one-third of respondents chose “too complicated” as a concern. This underscores the importance of designing the DRT solution that is very user-friendly, predictable and easy to integrate into daily routines.

Seniors in Gjesdal municipality Norway

Seniors are considered as potential users of the DRT solution in Gjesdal. In addition to meeting their mobility needs, DRT can serve as a tool for promoting social inclusion and enhancing accessibility in a sustainable manner. Although the number of respondents from this demographic group is relatively small (n=21), limiting the representativeness of the findings, their input remains valuable for understanding the specific requirements and preferences of seniors living in the area.

The demographic profile of respondents is broadly similar to the adult population, with slightly more women than men participating. Education levels are high, even among retired respondents, suggesting a relatively well-educated—and possibly well-off—sample. The age distribution includes both recently retired and older individuals; however, the sample may not fully represent the population living in Gjesdal.

As expected, most households in this group consist of one or two people. Nearly all households—except for two—have at least one member with a driving licence, which may reduce their current need or willingness to use a DRT solution.

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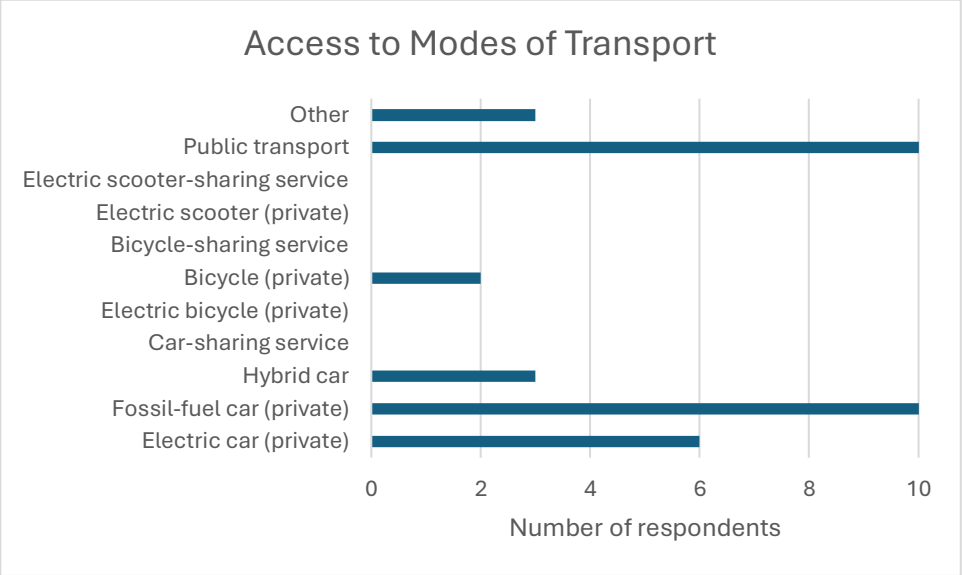

Figure 23: Access to modes of transport (n=21)

As shown in Figure 23, car ownership is high among this group. All households with at least one person holding a driving licence also reported having access to at least one car. Additionally, some respondents mentioned that walking is an important mode of transport for them. Also, half of respondents report having access to public transport in this group, as shown in Figure 24 and that out of those that use public transport (N=18), most use it occasionally (N=11).

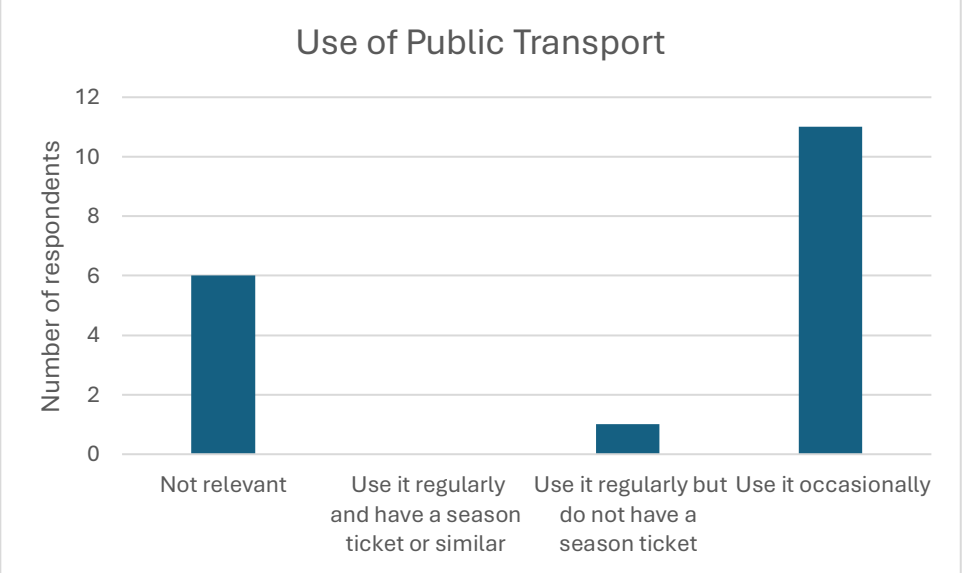

Figure 24: Use of public transport (n=18)

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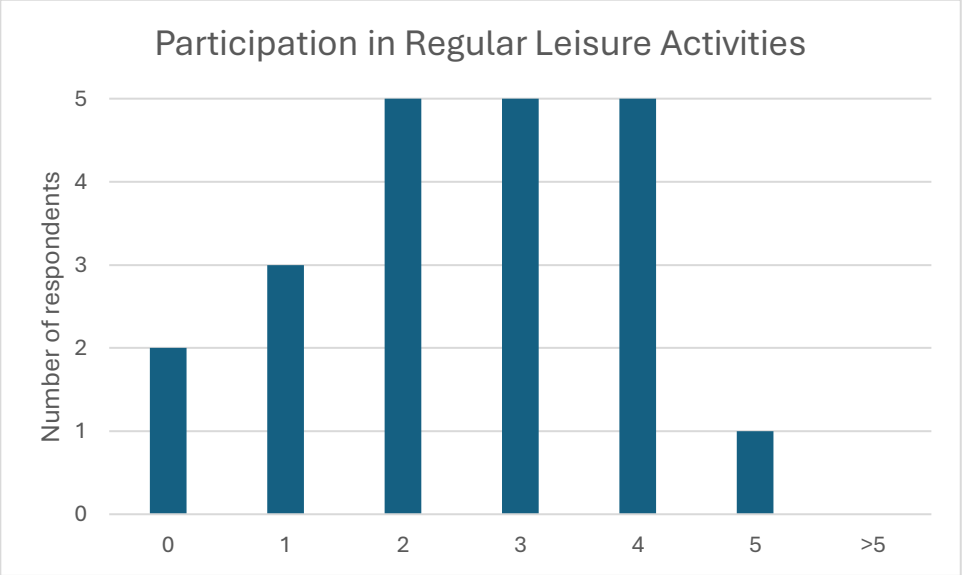

Figure 25: Number of leisure activities respondents participate in per week (n=21)

Figure 25 shows that also this group of inhabitants are very active: Only two of the respondents do not participate in any activities. Most respondents participate in 2, 3 or 4 activities per week, while three participate in 1 and oner person participate in 5 activities. Altogether, the respondents report a total of 53 weekly activities. When asked how they currently travel to these activities, walking and driving were the two modes of transport most mentioned.

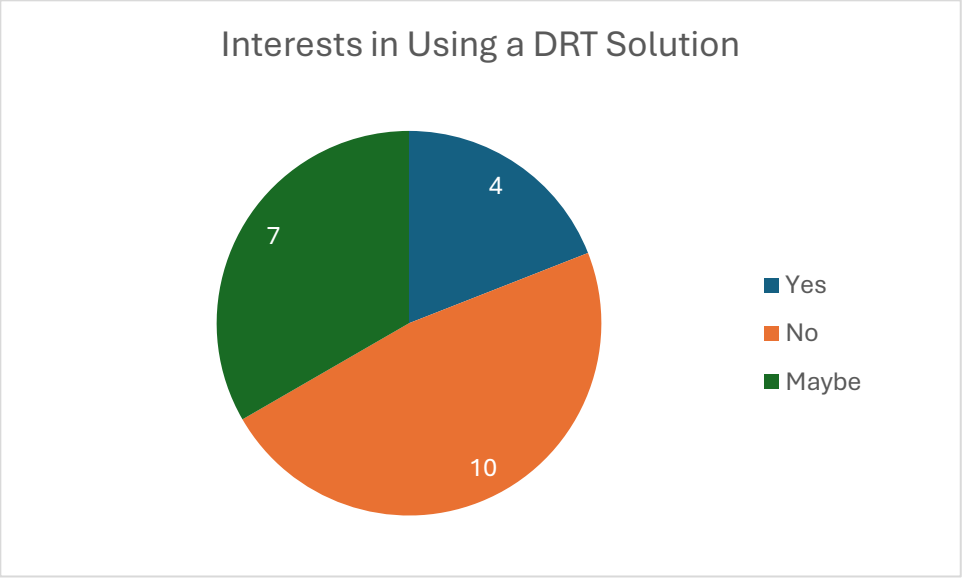

Figure 26: Potential for a DRT solution (n=21)

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Figure 26 shows that while interest in a DRT solution exists within this group, it is not overwhelmingly strong. About half of the respondents either expressed interest or were open to the idea. From previous research on the topic, we can induce that the high level of access to private cars is likely to be one of the factors behind the moderate interest for a new DRT service, as we know car ownership contribute to reducing the perceived need for alternative transport options.

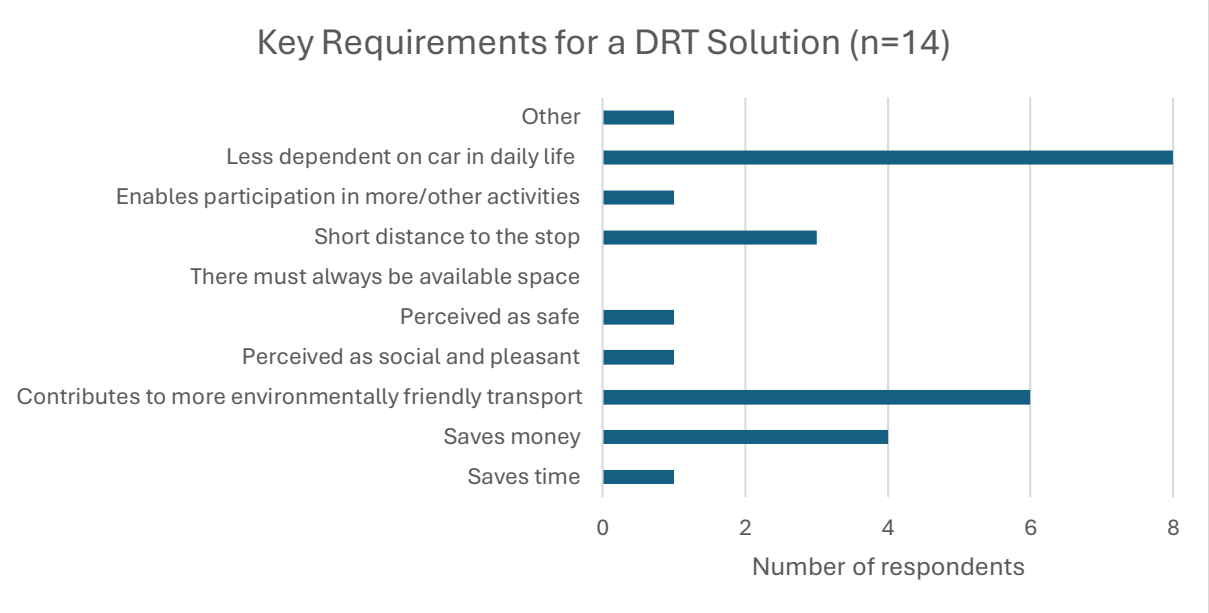

Figure 27: Key requirements for use (n=14)

Figure 27 shows that the key requirements for seniors to consider using a DRT solution differ slightly from those stated by parents and other adults. For seniors, saving time is less important. Instead, reducing car dependency and environmental friendliness are more significant factors. These priorities suggest that DRT could appeal to seniors if designed to align with their values and mobility needs, time not being the most pertinent factor.

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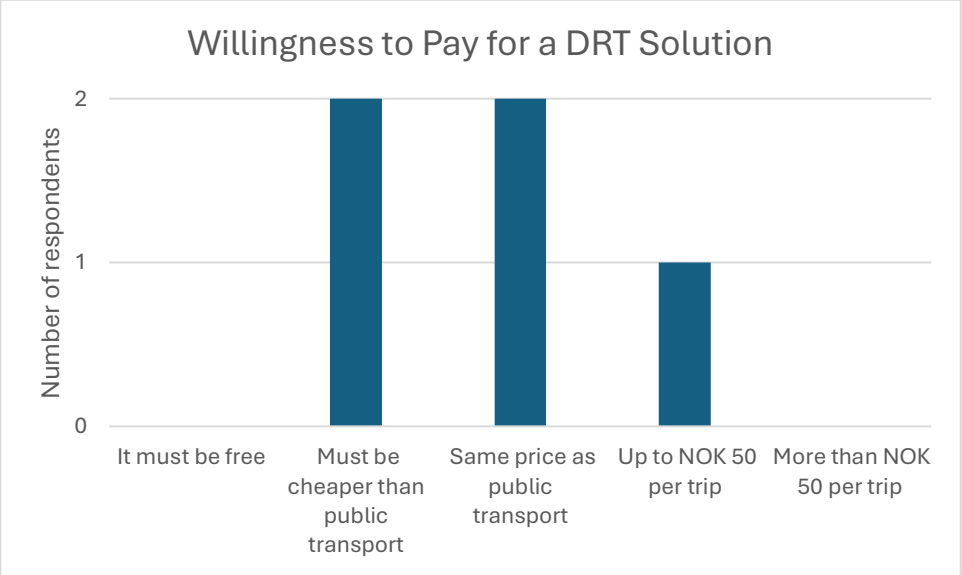

Figure 28: Willingness to pay for a DRT solution (n=5)

Figure 28 suggests that seniors may have a slightly higher willingness to pay for a DRT service compared to adults, with the upper limit reaching up to NOK 50 (approximately €5). However, due to the limited number of responses, it is difficult to draw firm conclusions about appropriate pricing. Further research will be needed to determine a suitable and inclusive fare structure.

The lack of interest in a DRT solution among some respondents can be attributed to several factors, including long distances to the nearest stop, concerns about seat availability, and a perceived lack of need due to living in close proximity to destinations. Booking preferences varied, with most respondents favouring a call-based service, followed by app or website-based options. As the number of responses to this question was relatively low, no graphs have been included. Nonetheless, the feedback provides useful insights into potential barriers and user expectations that should be considered in the design and implementation of a DRT system.

Spanish Perspectives on Demand-Responsive Transport (DRT)

An additional survey was conducted in Spain targeting the same user groups to identify their preferences regarding DRT services for leisure activities in rural areas. The results for adults follow the same framework as the Norwegian survey. However, due to the small number of respondents among seniors (n=14) and children (n=3), only some results from senior will be presented, but without visuals such as graphs.

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Adults in Spain

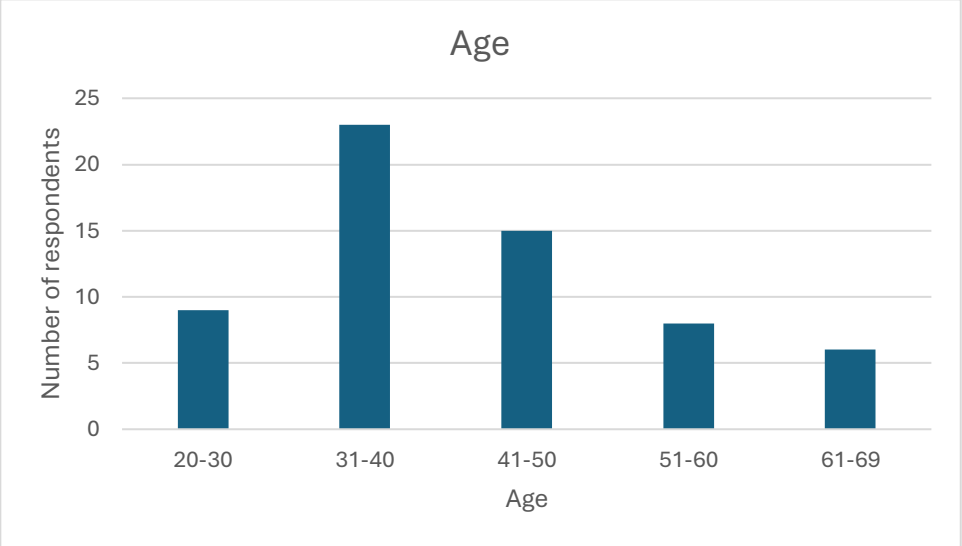

Figure 29: Age distribution among respondents (n=61)

The survey achieved a balanced distribution across genders. Most of the respondents are middle-aged people between 30 and 50 years old, as shown in Figure 29. This indicates that several of the respondents most likely have an active lifestyle including both job and leisure activities. They are at the same time relatively young which favour an open mind regarding new technologies. The majority also hold a university degree (see Figure 30), and almost all reported income-generating work as their main activity, which research suggests may make them more prone to try new things according to previous research.

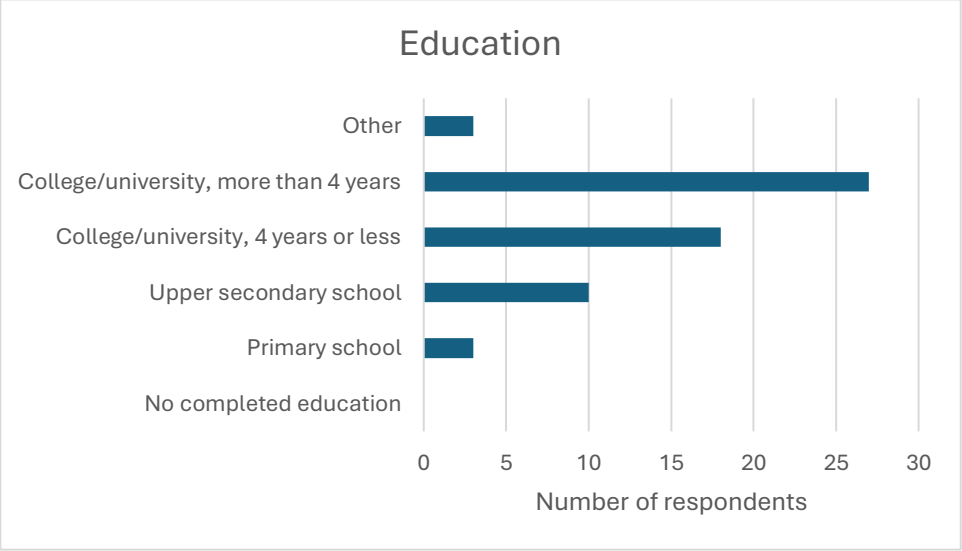

Figure 30: Level of education among respondents (n=41)

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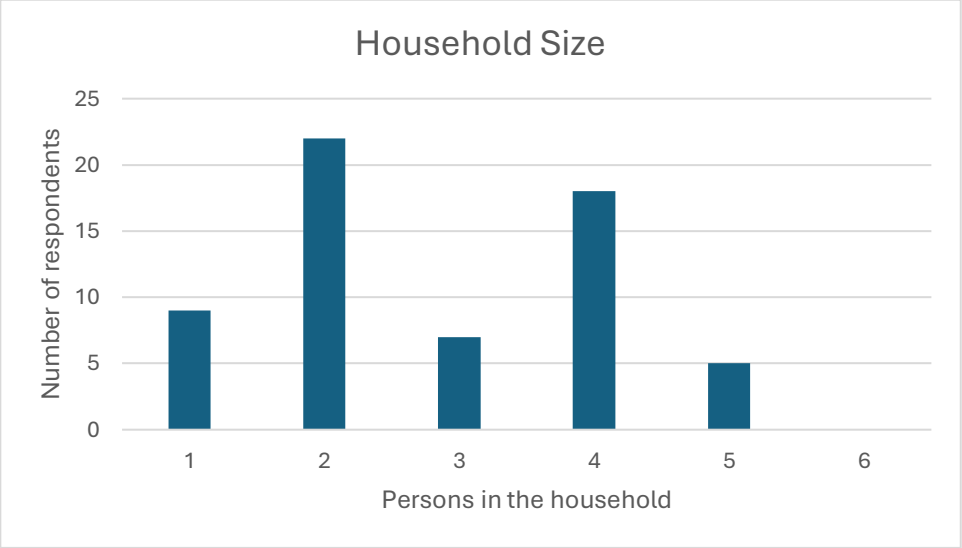

Figure 31: Respondents by household size (n=61)

Figure 31 shows a variance in the size of households where about half of them consisting of single or two persons households. Worth noting as well is that about half of the respondents lives in households without children, a significant difference from the Norwegian sample. Similar to Norway, most households include at least one person with a driving licence, and car access is also relatively high Figure 32.

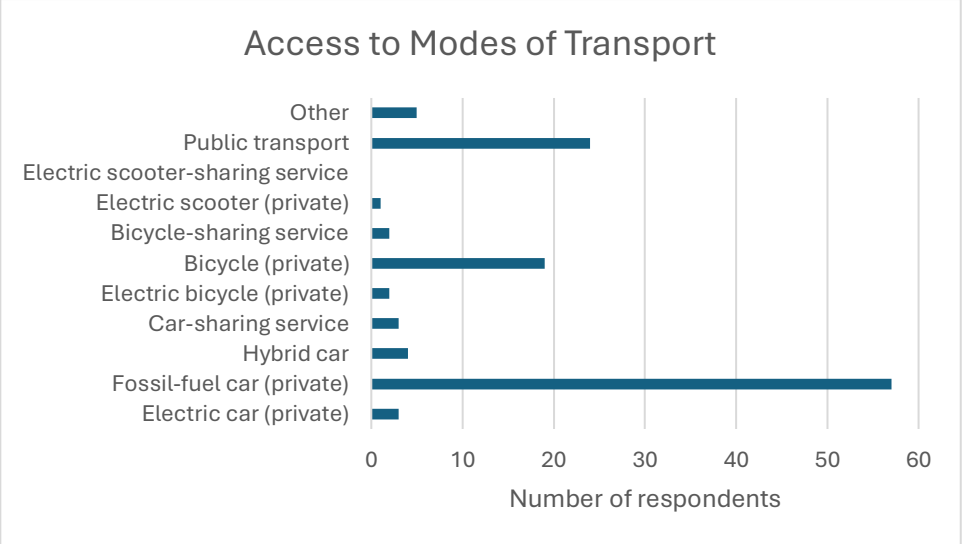

Figure 32: Access to modes of transport (n=61)

Figure 32 shows that besides car, private bicycle and public transport is the main modes of transport. However, respondents reported that public transport is rarely used.

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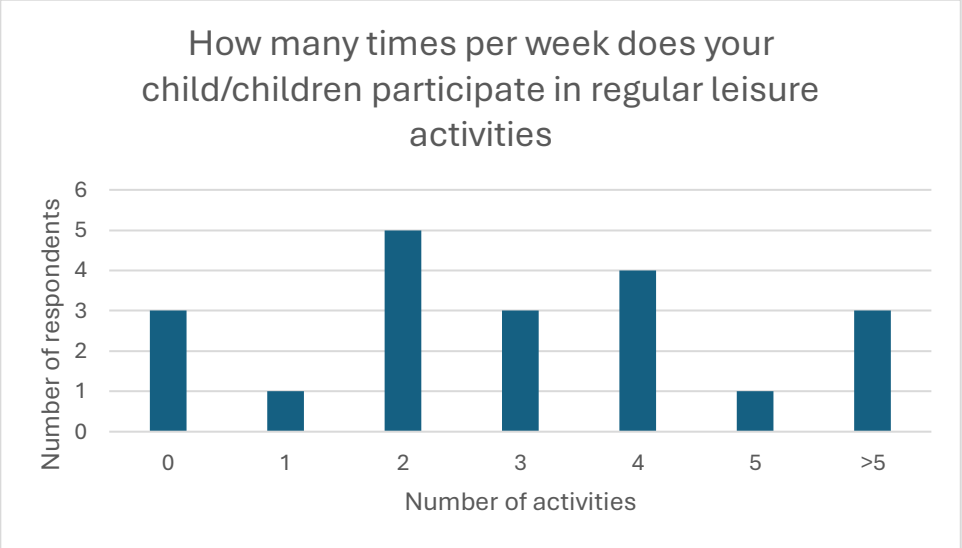

Figure 33: Number of leisure activities for the children in the household (n=20)

Figure 33 shows that the majority of respondents report their children participate in some form of leisure activity during the week, similar to Norwegian parents.

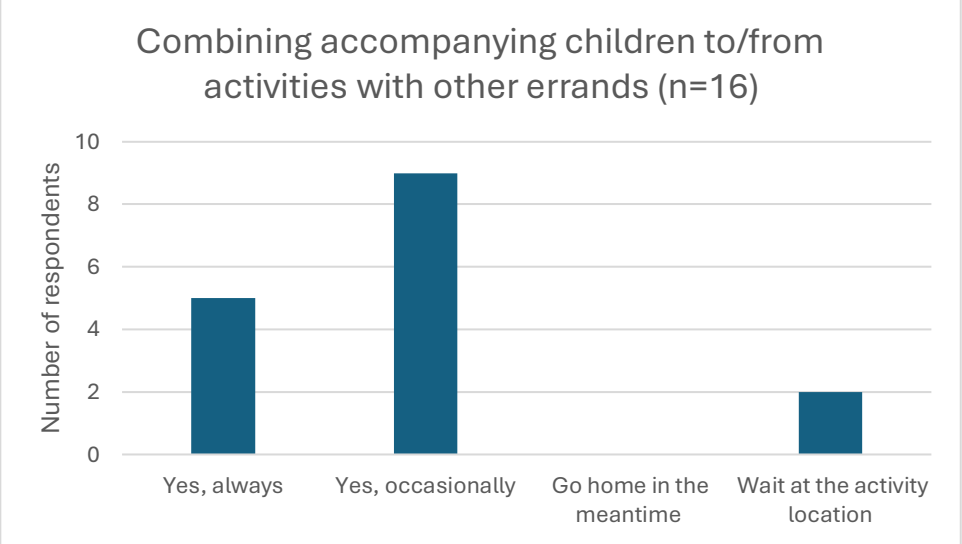

Figure 34: Combining accompanying children to/from activities with other errands

It is also common for parents to combine accompanying children to leisure activities with running other errands (see Figure 34), which may reduce the likelihood of using a DRT solution, as they are leaving the house anyway.

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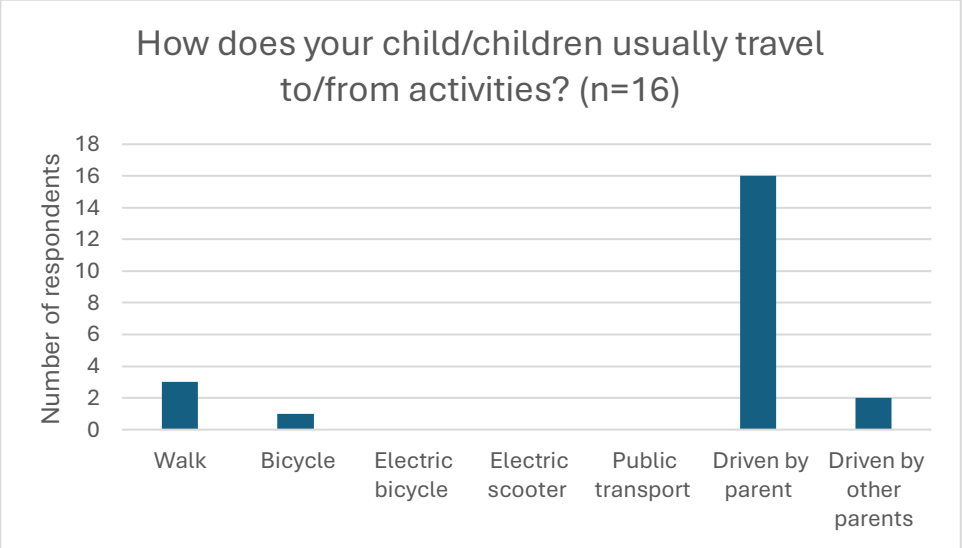

Figure 35: Mode of transport to/from leisure activities

Figure 35 indicates that most children are driven to and from activities by their parents. This suggests that a DRT solution could help ease the logistical burden on parents by reducing the number of tasks they need to manage related to their children's transportation. Additionally, it may contribute to lowering the volume of private vehicles around activity venues.

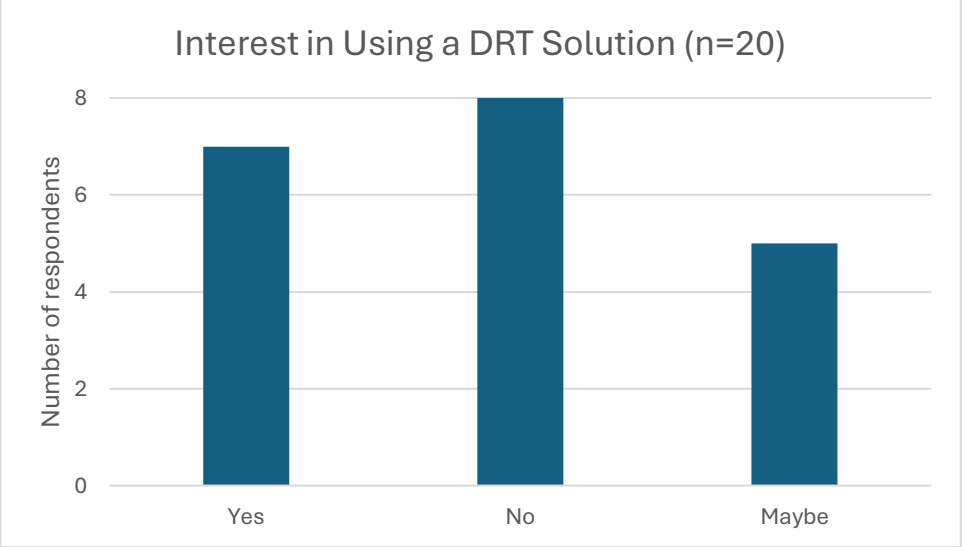

Figure 36: Potential for a DRT solution

As shown in Figure 36, interest in a DRT solution is moderate—about one-third of respondents find it appealing, while the majority respond with 'No' or 'Maybe'. For successful implementation in rural areas of Spain, it will likely be essential to both

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promote the service and tailor it to local needs, particularly to engage those who are currently undecided.

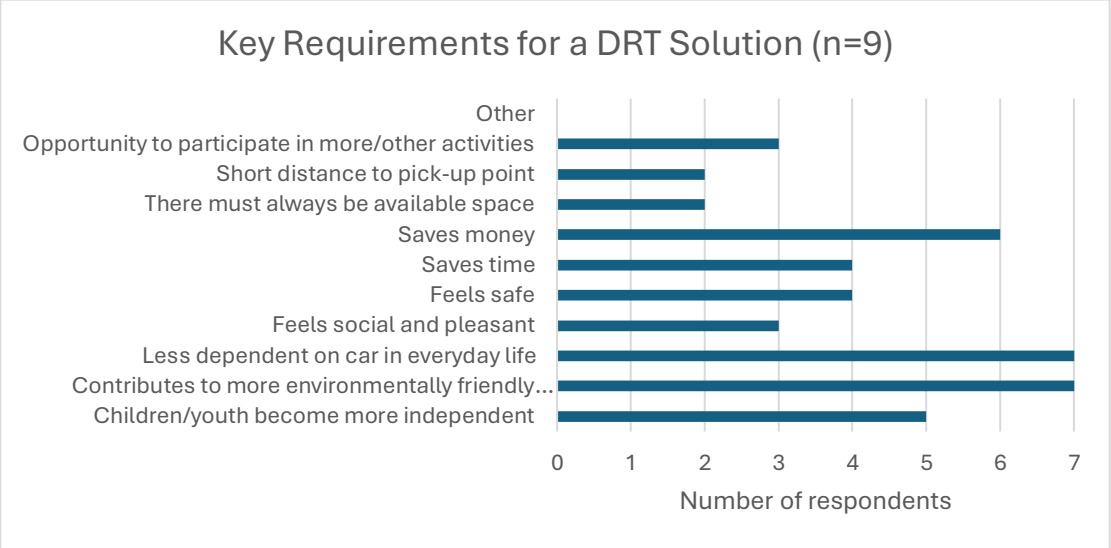

Figure 37: Key requirements for a DRT from adults' point of view

For the successful implementation of a DRT solution, understanding the key requirements of potential users is crucial. As shown in Figure 37 the most important expectations, among those who said they were interested include reducing car dependency and contributing to more environmentally friendly transport, along with saving time. The use of electric vehicles could therefore be an effective measure to encourage parents to adopt the service.

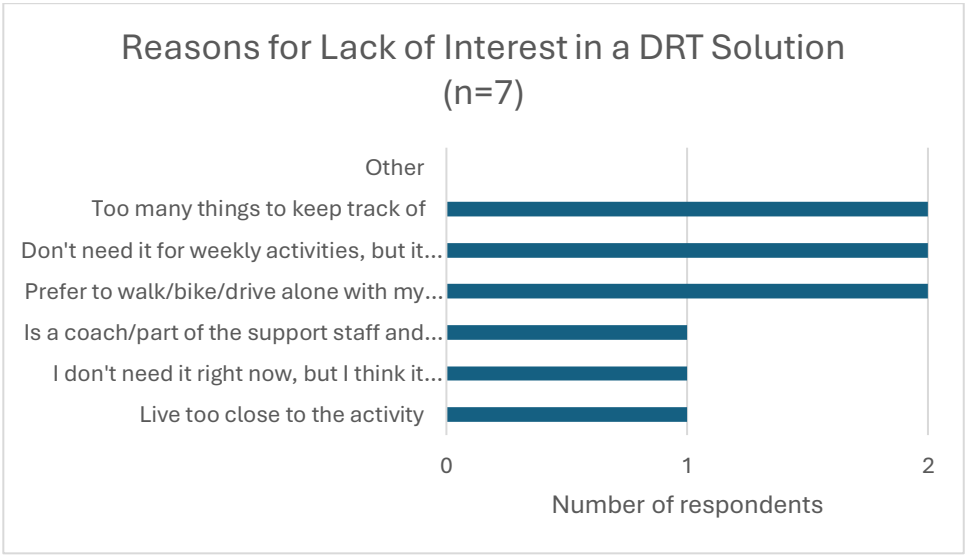

Figure 38: Reasons for lack of interests in a DRT solution

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Respondents who indicated that they were not interested in using a DRT solution were asked to explain their reasons. However, due to the limited number of responses, it is difficult to draw a single, definitive conclusion. Instead, the results, shown in Figure 38, suggest that a variety of factors, likely dependent on each family's specific circumstances, influence their attitude.

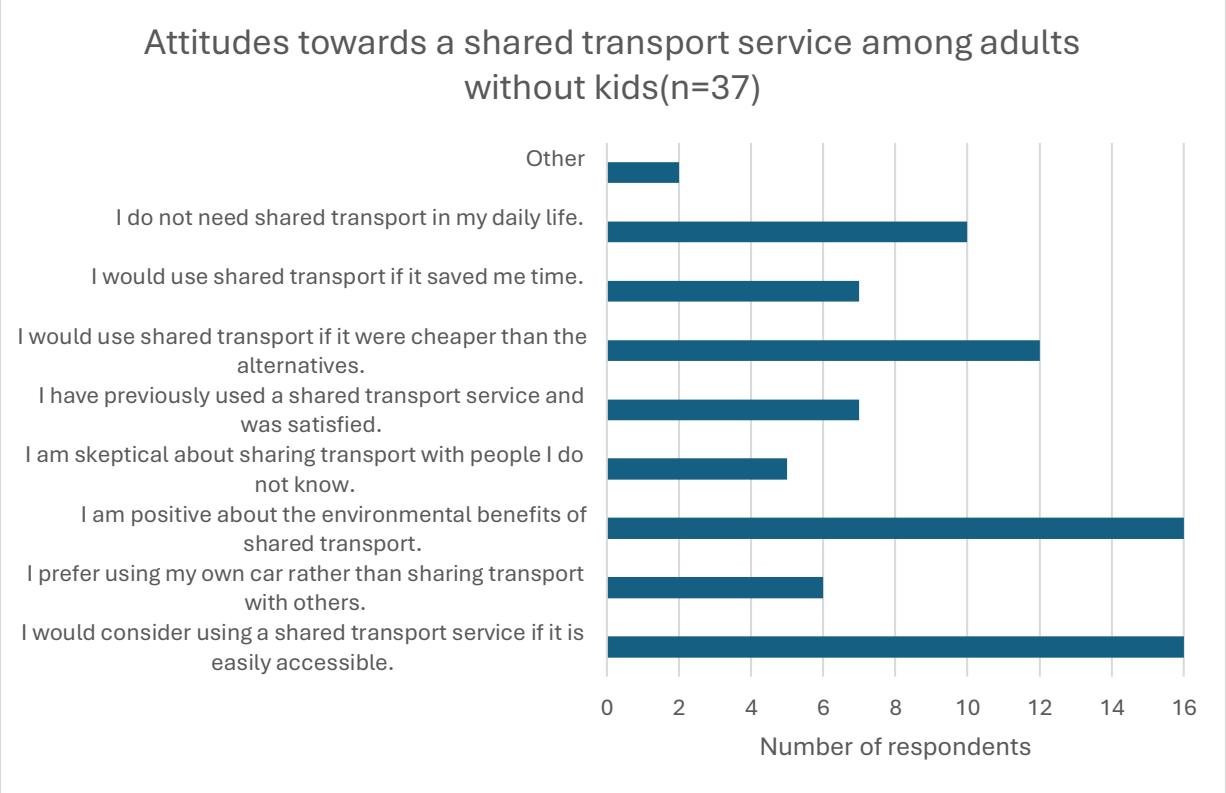

Figure 39: Attitudes towards a shared transport service among adults without kids

Since a large proportion of respondents reported living in households without children, it is also relevant to explore their attitudes toward DRT solutions. As shown in Figure 39 many of them express a positive view, given the right conditions are met. Accessibility and cost emerge as the most important factors for this group, although these are also among the most challenging to address in rural areas with low population density.

Seniors in Spain

The sample consists of an equal distribution of men and women, with most respondents aged between 62 and 75 years; four participants are older than 75. Educational attainment among this group is generally low, with most having completed only primary or upper secondary school. Only one respondent reported having a university education exceeding four years.

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Access to a fossil-fuelled car is common and appears to be the primary mode of transport, alongside walking. Most respondents engage in some form of weekly activity.

When asked about interest in a Demand-Responsive Transport (DRT) solution, three respondents indicated potential interest, while the majority expressed no interest. Key requirements identified by those interested include reducing car dependency, enabling more environmentally friendly transport, saving time and money, and ensuring a guaranteed seat. Reasons for lack of interest among others include no perceived need due to short distances between home and activities, preference for existing transport modes such as private cars, and concerns related to privacy.

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5. Discussion

The STORCITO project aims to enhance the DRT solution developed by Nimmo to address mobility needs and gaps in rural areas across Europe and promote a more equitable transport system that reduces socioeconomic disparities. To achieve this, previous experiences were analysed through a comprehensive literature review, supported by extensive data collection among potential users in the pilot area of Gjesdal municipality in Norway. An additional survey was conducted in Spain to ensure that findings are relevant in a broader European context.

This discussion draws on the Norwegian results to answer the research questions, compares these findings with insights from the literature review, and examines differences in preferences and requirements between Norwegian and Spanish respondents. The chapter concludes with recommendations for implementing DRT solutions in rural areas.

5.1 Research questions

RQ1: What are the key drivers and barriers influencing the adoption of Demand-Responsive Transport (DRT) among seniors, low-income families, and children in rural areas?

The analysis reveals several factors that motivate or hinder the adoption of DRT solution among these user groups.

Key Drivers

Convenience and time savings emerged as the most significant motivators, particularly for parents and some children who value reduced travel time. Seniors and some adults emphasized the potential to reduce car dependency, while sustainability and environmental benefits were highlighted across all groups. For seniors, social inclusion is another important driver, as DRT can help maintain an active lifestyle as they age and prevent isolation. The transport service itself can also become an arena for socialization, which was especially important for children, who expressed that it should ´feel social´ to use.

Children and parents also viewed DRT as a positive measure to improve access to leisure activities, particularly for those living in more remote areas where transport options are limited. Parents further noted that it would be beneficial if the solution could support children's independence in terms of mobility. Finally, guaranteed seat availability, reliability, and safety for both children and their parents were considered

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critical factors, as unmet expectations in these areas could undermine trust in the service.

Key Barriers

Despite these potential benefits, several barriers may limit adoption according to potential users. High car ownership in most households reduced the perceived need for alternative transport solutions. Short distances to activities among all user groups, or the fact that children prefer to be driven by their parents, may also diminish interest. We should note, though, that the preference for being driven might stem from a lack of understanding of how a DRT solution would work. Many parents reported combining driving their children with errands, which may reduce the attractiveness of a DRT solution since they have to leave the house anyway. However, one could also imagine that parents do errands because they anyway need to leave the house when driving the children to activities. Thus, if this demand for transporting children was reduced, there is a potential that parents may also reduce the number of errands done by car.

Cost concerns also played a role, and parents as well as immigrant and foreign adults were the most price sensitive. Willingness to pay for the service was reported to be generally low and should not be more than the usual fare for a bus ticked (NOK 23 (€2)), as noted in the group discussions; if families have many children with activities, even paying €2 per trip could be a challenge as costs accumulate. Complex booking routines were another deterrent that respondents expressed concerns about as they already experienced having too many things to keep track of. This is interesting as the DRT service is targeting the time pressure of families. However, it is worthwhile noting that it can be adding to it as well if booking and use of the service do not run smoothly. This need to be taken seriously when developing the service.

RQ2: How do digital skills and access to technology affect the willingness and ability of vulnerable rural residents to use a DRT app?

Digital skills and access to technology significantly influenced both the willingness and ability of seniors and individuals with disabilities to adopt a DRT app-based solution. While smartphone use is becoming more common among seniors, many still face challenges with new technology. This creates a risk of digital exclusion if the service relies solely on app-based booking. Seniors, for instance, expressed a clear preference for call-based booking options, followed by web-based alternatives, highlighting the need for multiple booking channels to ensure inclusivity.

Universal design features, such as support for visually impaired users, were considered essential to accommodate diverse needs and include vulnerable groups. For newly

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arrived immigrants and low-income families, limited digital confidence and potential lack of devices may further restrict access. Language accessibility was also emphasized; offering the app in multiple languages was identified as an important measure to include non-natives speaking language individuals.

Among parents and children who often have a high degree of technological understanding ease of use was still identified as a critical success factor. Complex or time-consuming booking routines were perceived as a barrier.

Overall, while digital tools can enhance convenience, the findings underscore the importance of providing simple, intuitive interfaces and alternative booking methods to avoid excluding vulnerable groups.

RQ3: What are the mobility preferences and behavioural patterns of children, seniors and low-income families in Gjesdal, and how can these inform the design of inclusive DRT services?

Children and seniors, the main target user groups in this case, included both individuals who did not participate in any leisure activities and those who were highly active, engaging in more than five activities per week. However, it is worth noting that the seniors who attended the workshop were likely among the more active and reliant on personal vehicles, while many others who lacked access to transport and remained at home, were not represented.

As expected in a rural area with limited transport options beyond private cars, the preferred mode of travel was typically by car unless destinations were within walking or cycling distance. The lack of public transport seems prominent, with only 50% of respondents reporting having access to public transport and many of the participants in the workshops complaining about this. However, a strong reliance on private cars is not the only factor that may hinder the implementation of a DRT solution. Parents reported combining child transport with other errands, which may reduce the attractiveness of a shared service if those errands are considered necessary regardless of the children's activity.

Cost also emerged as a critical barrier. Parents and newly arrived adults were particularly price-sensitive, noting that even a low fare can become burdensome when multiplied across multiple activities and children. Some respondents, especially those attending the adult education program, highlighted that they would remain dependent on public transport for other trips, making affordability a decisive factor for adoption.

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On the other hand, the centralization of sports activities around a major arena in Ålgård (the centre of the municipality) creates an opportunity for efficient route planning, enabling multiple activities to be served at a single destination. Reasonable travel times and competitive pricing were identified as key drivers of adoption. High vehicle utilization is essential to keep fares low, while minimizing the number of stops is critical for reducing travel time. Together, these factors present a promising opportunity for implementing a DRT solution in Ålgård and other rural areas where leisure activities are concentrated in small municipal centres.

High vehicle utilisation may also lead to capacity constraints, potentially creating a new source of stress for parents who wish to rely on the service and therefore require predictable booking conditions. Concerns over whether they can secure a seat when bookings open could add uncertainty to daily planning. For families, long-term scheduling is particularly important, as predictability was identified as a key driver for reducing the stress associated with transporting children to activities. If the system cannot guarantee availability for planned trips, it risks undermining one of its core advantages—providing relief from the logistical burden of parents´ afternoon transportation of children.

5.2 Norwegian perspectives considering previous studies

The results from the literature review are summarized in Table 1 and highlight both drivers and barriers to DRT solutions in an international context. Norway, however, presents a unique case: it is among the wealthiest countries in the world, yet lacks large metropolitan areas, and approximately 50% of its population lives in rural regions often characterized by mountainous terrain. These factors may influence attitudes and practical possibilities for implementing DRT solutions and make Norway particularly suitable to the adoption of such solutions.

Cost emerged as a potential barrier across all user groups and is consistently noted in the literature. However, Norwegian seniors appear less price-sensitive compared to international respondents. This difference may of course also reflect the sample composition, although in general seniors have a relatively high wealth and living standards in Norway compared to other age groups[2][3] and other countries[4].

[2] https://www.ssb.no/en/sosiale-forhold-og-kriminalitet/levekar
[3] https://www.ssb.no/sosiale-forhold-og-kriminalitet/levekar/artikler/seniorer-i-norge-2024/_/attachment/inline/a4172794-4624-4bca-a487-78b12dba586d:d4efe6a9a5d28bb2ef36591c01c5b89fae47524f/SA178_web.pdf
[4] https://www.im.natixis.com/content/dam/natixis/website/insights/investor-sentiment/2018/global-retirement-index/2018-global-retirement-index-report-f.pdf

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Nevertheless, this observation warrants attention, as there are also seniors in Norway who face economic challenges. If the goal is to create a more equitable transport system, it is essential to ensure that these individuals are not excluded from access to DRT services.

Another area where Norwegian results diverge from international findings concerns technological barriers. While the literature identifies technology as a barrier across all user groups, in Norway this issue was limited to some senior respondents and mentioned as a potential challenge for visually impaired individuals. This suggests that technological maturity among Norwegian respondents is relatively high, as also noted in prior research (see Table 1). However, it is important to note that newly arrived individuals may face difficulties if the app is not available in languages they are familiar with.

The time perspective represents another notable difference. While time-related factors are absent in the international literature, they emerged as both a driver and a barrier in the Norwegian data. For parents, time savings can be a strong motivator if a DRT solution helps alleviate the time constraints they experience in the afternoons. Conversely, time can become a barrier if booking and coordination processes are perceived as too time-consuming. Children and seniors also expressed preferences regarding travel time. Although these two groups are less time-sensitive than parents, they emphasized that travel times should not be unreasonably long. Respondents living in the outskirts of Gjesdal, who currently experience long journeys, expect improvements and shorter travel times. However, if the service provides departures at more attractive times enabling participation in more events and activities, travel time becomes secondary to accessibility. In such cases, the ability to attend an activity can outweighs concerns about the duration of the trip.

There were also several similarities between Norwegian participants and previous findings in an international context. A key requirement is that the service genuinely meets the needs of the users. The service should be capable of replacing current unsustainable modes of transport for trips that users already make, while simplifying coordination particularly for children's activities. Some respondents viewed the service as unnecessary because they already live close to activities and therefore prefer walking and cycling. It is important that the DRT solution is designed to complement, not compete with positive and active transport modes and habits such as walking and cycling.

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Closely related to this is the need for a well-developed system that guarantees reliability, both in terms of transport and the associated software or booking process. In rural areas, reliability is critical as there are usually no alternative backup options such as public transport. Cumbersome booking routines or failed transport attempts are likely to undermine trust and reduce willingness to use the service in the future.

Although Norwegian seniors seem less sensitive to pricing than their international counterparts, affordable fares remain a key factor for success globally. To promote a more equitable transport system, pricing strategies must still take these considerations into account.

5.3 Cross-Country Comparison: Attitudes in Norway and Spain

Although the number of respondents in Spain was significantly lower than in Norway, it is still valuable to examine similarities and differences between the two countries. The results show that slightly more men participated in the Spanish survey. Most respondents were highly educated and around 40 years old, like in Norway. Nearly half of the Spanish respondents lived in households without children, which marks a notable difference between the countries.

Access to transport modes also varied. In Norway, access was more diverse, whereas in Spain the private fossil-fuelled car dominated, followed by public transport and private bicycles. Among respondents with children, patterns related to number of activities were quite similar across the two countries, and travel habits also showed commonalities as parents played an active role in transporting children in both contexts.

Regarding interest in a DRT service, the Spanish respondents expressed lower interest compared to those in Norway. However, due to the small sample size (n=20) and even fewer responses to follow-up questions, it is not possible to determine the reasons why with certainty. Price sensitivity and combining driving with other errands is, however, also probably important in Spain.

5.4 Lessons Learned for Future Mobility Planning

In the STORCITO project, a demand-responsive transport (DRT) solution is being adapted to meet the mobility needs of rural residents who have limited access to private vehicles and conventional public transport. While previous studies have predominantly focused on urban contexts—where multimodal transport options are more abundant and the market for shared mobility is larger—this report demonstrates that some of the fundamental drivers and barriers to adoption in rural settings are similar. For instance,

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factors such as pricing, reliability, safety, and user-friendliness are important across both urban and rural environments.

Still, rural environments present some distinct challenges, such as smaller user bases (markets), fewer transport alternatives and often longer distances. For the sustainable and inclusive mobility solution studied here the target group is youth, elderly and low-income families which represents relative new user segments for this type of mobility solution. Consequently, understanding user preferences of these groups becomes critical.

This report introduces a set of criteria derived from both literature and empirical data to guide the successful implementation of DRT services in rural areas. These criteria aim to ensure that the service is inclusive, reliable, and responsive to the diverse needs of the community:

1) Tailoring DRT solutions to local conditions and user needs is a fundamental requirement for successful implementation in rural areas. This process demands a nuanced understanding of existing travel patterns among potential users, particularly identifying journeys that currently pose significant challenges, such as those constrained by time, especially for parents or others who regularly provide transport.

However, if the goal is to enhance social inclusion and enable participation among individuals who currently refrain from engaging in leisure activities due to transport-related barriers, the analysis must also account for unmet mobility needs—i.e., trips that are not taken today especially from residents not normally engaging in public meetings, such as the workshops conducted in this project. Several workshop participants in this sample highlighted that they represent the healthy and well-off part of the population, which may have introduced some bias into the results and contributed to underrepresenting the mobility challenges faced by more vulnerable groups. This adds complexity to the mapping process, as it requires us to get more insight into latent demand.

One effective strategy for capturing these perspectives is to involve public authorities and stakeholders who are in regular contact with vulnerable groups. In STORCITO, this approach was operationalized by engaging municipal representatives and conducting interviews with newly arrived immigrants, which yielded valuable insights into hidden mobility needs and structural barriers.

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Moreover, understanding which trips are most critical is essential, as the DRT service cannot realistically cover all activities and time slots throughout the week. To maximize its value, the service should be designed to support transport during periods when it can most effectively relieve parents or other caregivers—particularly in the afternoons, when time pressure is highest.

2) Reliability and trust in the service are fundamental to the successful adoption of DRT solutions, particularly in rural contexts. These factors are closely tied to several aspects of the service design such as the booking process and user interface. The process must be intuitive and straightforward; otherwise, users such as parents may continue to rely on private cars, which may be perceived to offer greater personal control and flexibility. For seniors, complex booking procedures may represent a challenging barrier, potentially resulting in continued car use or withdrawal from social and leisure activities altogether.

Beyond the booking experience, reliability and perceived trust in the transport service itself is equally critical, as many of the users targeted for this specific mobility solution (children, seniors and vulnerable groups) would have limited capacity to manage unexpected disruptions. Therefore, issues such as last-minute cancellations, unavailable seats, or delays can significantly undermine confidence in the service and over time, may reduce willingness to use the service.

3) Pricing and overall cost of use represent key determinants for user adoption of DRT services. Under the current service model, users are required to pay for each individual journey. This structure has raised concerns, particularly among parents, who noted that the cumulative cost of multiple trips, especially since many children participate in several weekly activities, could become prohibitively expensive.

Given that the DRT service is unlikely to cover all transport needs or time slots, identifying and prioritizing the most critical trips is essential to maximize perceived value. Strategic mapping of travel patterns can help ensure that the service delivers the greatest benefit where it is most needed, thereby improving cost-effectiveness and user satisfaction. Moreover, knowledge about user needs and preferences, such as the fact that users from different groups (e.g., seniors and youth) do not perceive barriers to sharing vehicles, can be important for improving vehicle utilization and reducing costs.

In addition to affordability, equitable access must be addressed. Individuals who cannot afford to pay for transport should be included through publicly funded support schemes

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to ensure participation on equal terms. This is especially important for children, as transport barriers can exacerbate socio-economic disparities in access to leisure activities and social inclusion.

Implementing such support schemes may require rethinking existing public funding structures, particularly in light of constrained transport budgets. However, providing mobility to underserved groups may yield broader societal benefits, including improved public health and reduced long-term costs in the healthcare sector. Therefore, pricing strategies must consider not only the direct cost to users but also mechanisms for inclusion through targeted public support—balancing affordability with fiscal sustainability.

4) Education and targeted outreach campaigns are essential to promote awareness and understanding of DRT services among rural residents. As the concept represents a change of established transport habits, successful implementation requires not only technical reliability but also behavioural change. Building trust in the service is therefore closely linked to clear and accessible information about how the system works—from planning and booking to the actual journey and arrival at the destination.

For users with limited technological expertise, such as some seniors or newly arrived immigrants, communication must be tailored to ensure clarity and confidence. This includes providing multilingual materials and using simple, intuitive language and visuals. Without such efforts, these groups risk being excluded from the benefits of the service due to uncertainty or lack of understanding. Effective information strategies are thus not only a matter of marketing but a prerequisite for inclusive and equitable service delivery.

6. Conclusion

A successful implementation of a demand-responsive transport (DRT) solution is a complex process that requires a deep understanding of user needs, well-designed user interfaces that accommodate diverse user groups, and reliable transport services that meet those needs. It may also necessitate new approaches to financing public and shared mobility.

Despite several challenges, DRT solutions hold significant potential to support the transition of rural areas across Europe toward more sustainable and inclusive communities. When appropriately implemented, DRT can help alleviate time

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constraints related to transport, particularly for families, and reduce dependency on private cars. Lower car dependency can lead to reduced vehicle mileage and, especially in countries with lower electric vehicle penetration than Norway, contribute to substantial reductions in transport-related CO2 emissions.

Ensuring accessibility in rural areas is also essential for preventing social exclusion and promoting equitable living conditions—particularly for youth and seniors. In the long term, improved mobility may encourage young people to remain in rural areas and attract adults to return from urban centres.

Altogether, developing effective models for DRT in rural contexts is a key component of the STORCITO project's overarching goal: to foster vibrant, resilient rural communities that actively contribute to climate change mitigation.

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