

## Description of the measure and main outcomes expected

This measure aims to explore methods for enhancing and gaining experience in same-day and on-demand ordering for Ruter age-friendly transport (RAT). We will attempt to acquire the necessary skills and experience to operate on-demand DRT systems, whilst also taking into account the unique needs of RAT users. Key issues to investigate include (1) the impact of reserving vehicles for on-demand/same day on productivity, (2) the effect of on-demand/same day on trip aggregation, and (3) determining the number of vehicles needed for on-demand/same day to observe systemic effects, among other considerations.

Measure outputs:

- Increased number of vehicles reserved for on-demand/same day ordering.
- Increased flexibility for end users.
- Reduced pre-booking rate for RAT.
- Operational experience with partial on-demand DRT systems.

Case description

Ruter Age-Friendly Transport (RAT) has evolved since its launch in 2017 and has become a well-liked and valued transportation service for the elderly. Over time, the demand for this service has increased, stretching its capacity thin. A known consequence of DRT systems operating at maximum capacity is the increase in pre-booking, and RAT is no exception. The service is typically booked days in advance, negatively impacting productivity. The most effective DRT systems are usually on-demand only.

This upcoming fall, RAT plans to significantly expand its service area to four new city districts, increasing the fleet from 16 to 27 vehicles. Past experiences indicate that it takes time for the service to meet the anticipated demand when expanding to new districts. This presents us with a “window of opportunity” to experiment with new solutions and approaches on a large scale without affecting capacity.

Why is on-demand ride planning relevant for Ruter?

On-demand ride planning, particularly in the context of paratransit and elderly transportation provides a level of service quality that surpasses traditional fixed-line public transport, offering unprecedented convenience and flexibility.

This is important for Ruter, which aims to substantially reduce private car use in the long term. Achieving this goal requires offering competitive mobility solutions. We believe that demand-responsive transit, combined with on-demand ride planning, has the potential to become a viable alternative to private car ownership, providing an attractive, flexible, and sustainable transportation option by:

- 1) Optimising Routing and Scheduling

On-demand route planning can decrease the number of empty trips compared to pre-booked planning, resulting in better vehicle productivity

## 2) Reducing costs and environmental impacts

By reducing unnecessary trips and improving vehicle utilization, on-demand systems lower operational costs and emission.

## 3) Facilitating ride sharing:

Encouraging shared rides maximises vehicle occupancy, increasing the overall capacity in the system.

## Preparation of the measure

### Project structure for phase 1

Phase one of the project involved identifying a suitable structure and methodology. RAT is a service that involves many different people across the Ruter organisation, and to implement this measure, it was necessary to find suitable partners. For this initial phase, we decided that a small project group would be appropriate. It consisted of one representative from operations, one from digital development, and one from business development. Additionally, a handful of other individuals were consulted as needed but were not part of the core project group.

The project group ensures progress through circa monthly working sessions. This measure is also actively discussed in our weekly meetings with our planning system provider.

### Methodology for phase 1

As mentioned in the introduction section, part of the goal of this measure is to reserve vehicles for on-demand booking this fall. The Age-Friendly team lacks proprietary knowledge on this subject, so we needed to begin the project with a phase of data collection and experience formation.

Consequently, the project group decided to establish baseline data levels for vehicles reserved for on-demand booking. It was also necessary to investigate how this change would affect different parts of the organisation.

Therefore, we decided that phase 1 would involve reserving two vehicles in the age-friendly service specifically for on-demand/same-day booking. The decision to include same-day booking rather than strictly on-demand booking will be further discussed in section 3.1. These two vehicles were alternated between "On" and "Off" on-demand booking status on a weekly basis. This approach was taken to create a reliable baseline of data.

### Project structure for phase 2

Phase 2 of this project will involve reserving a minimum of five vehicles for on-demand booking this coming fall. The project structure for this phase is not yet fully determined. Project partners from phase 1 will remain involved, but it will be necessary to include more personnel, particularly from customer service. This aspect will be further discussed in the section on next steps.

## Challenges & Mitigations

### Practical challenges and mitigations from phase 1

At the beginning of phase 1, two vehicles were manually selected at the start of each shift during "On" weeks. This approach proved unsuitable as it relied on staff remembering to designate vehicles for on-demand service each morning. Given the large size of Ruter and the many employees involved, consistent communication was challenging,

leading to instances where vehicles were not properly designated. This inconsistency negatively affected the quality of data and made data extraction time-consuming and labour-intensive.

To address this, the project group decided to consistently use the same two vehicles each week. This change reduced the number of manual actions needed to implement phase 1. However, this approach also impacted data quality since RAT vehicles have static shift starting locations spread across the city. For example, selecting vehicles on the far west side could skew the data. To mitigate this, we chose two vehicles with starting locations centrally located in the city. While not a perfect solution, this adjustment significantly improved data quality and streamlined the data extraction process, making it less time-consuming.

For phase 1, the project group allowed both same-day and on-demand booking for two main reasons. First, our planning and booking systems were not fully equipped to handle true on-demand bookings, especially for phone reservations via customer service. Second, restricting these vehicles to on-demand only would have posed significant communication challenges with customer service staff. This approach also provided the necessary experience for the next phase of the project.

In phase 2, we will exclusively allow on-demand bookings, eliminating same-day bookings. By late August, our planning system will transition to a new technology stack that will better support on-demand functionality, making it more user-friendly and tailored to our needs.

Although these two vehicles were reserved for on-demand/same-day bookings, they remained part of a dynamic planning system largely dominated by pre-ordered rides. Unlike vehicles allowing pre-booking, the on-demand vehicles often had open slots in their shifts, especially in the mornings. Since route planning is dynamic, rides are often reassigned to other vehicles in cases of delays or deviations. Consequently, the two on-demand vehicles often absorbed rides that would otherwise have been delayed. This meant that some completed rides were not truly on-demand but were pre-booked rides dynamically reassigned. The project group reviewed this issue and decided not to alter the planning system's functionality, concluding that leaving the system unchanged provided a more accurate representation.

An important aspect of phase 1 was data extraction and analysis. However, our current reporting systems for RAT lacked the flexibility and efficiency needed for this project, making it difficult to extract data on specific vehicles. While it was possible, the process was time-consuming and inefficient. As a result, significant effort has been put into developing a new reporting structure in PowerBI, providing the necessary functionality and flexibility for this and future projects (see figure 1 below).

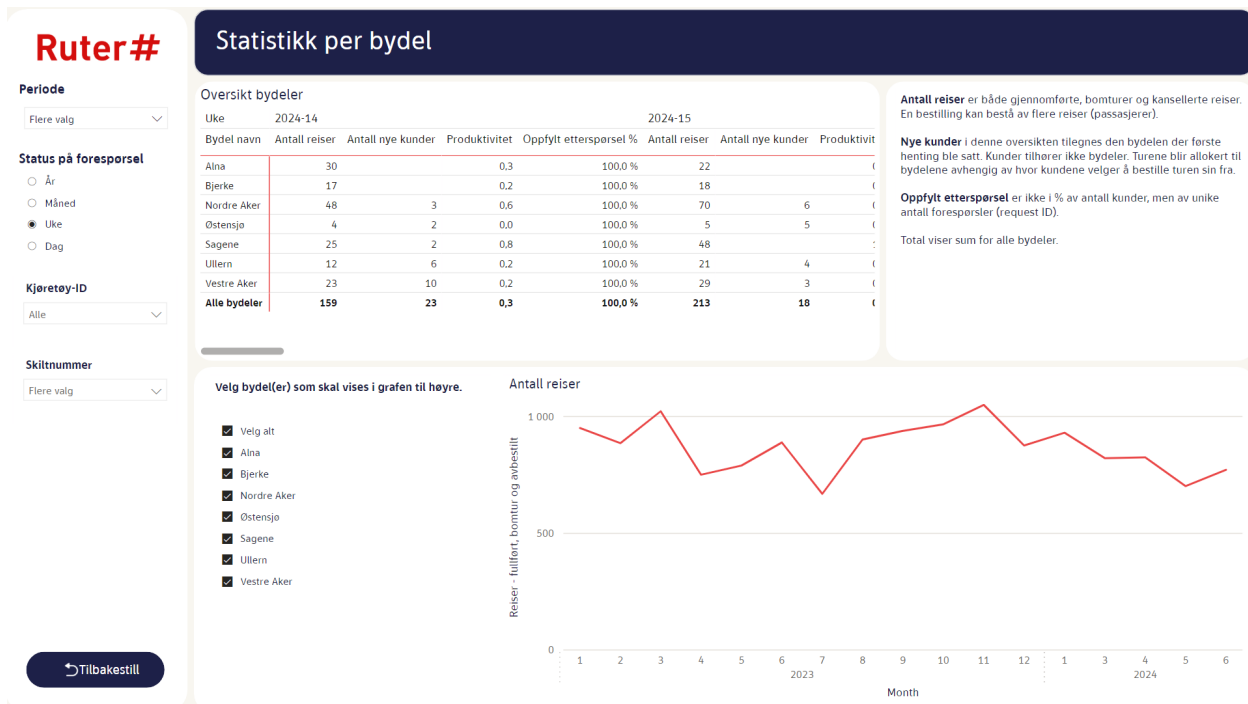


Figure 1 Updated PowerBI report

### Results from phase 1

Since early April 2024, we have reserved two vehicles for on-demand/same-day booking. On-demand booking is available during even-numbered weeks (e.g., weeks 14, 16), while it is unavailable during odd-numbered weeks (e.g., weeks 15, 17). The data for weeks 14, 18, and 20 are skewed due to several bank holidays.

Figure 18 below displays the number of on-demand bookings for vehicles 242 and 243 from April through June.

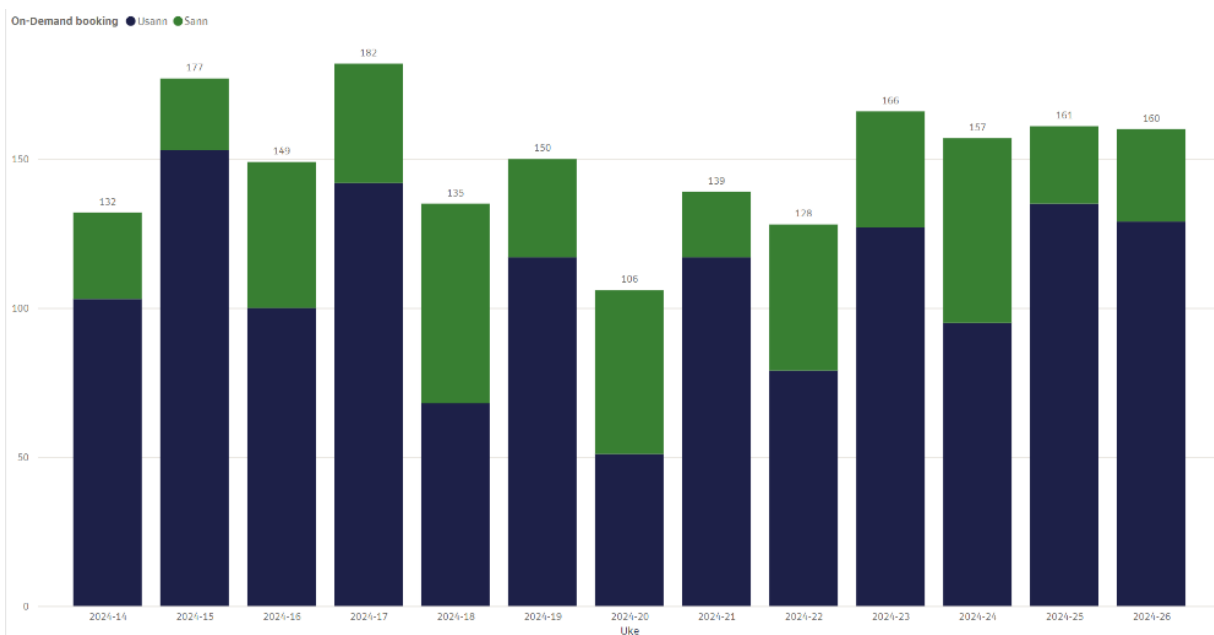


Figure 2 Proportion of on-demand booking

The data shows that the proportion of on-demand bookings during even-numbered weeks is 35.8%. In contrast, the proportion for odd-numbered weeks, which serves as the baseline for this project, is significantly lower at 18.24%.

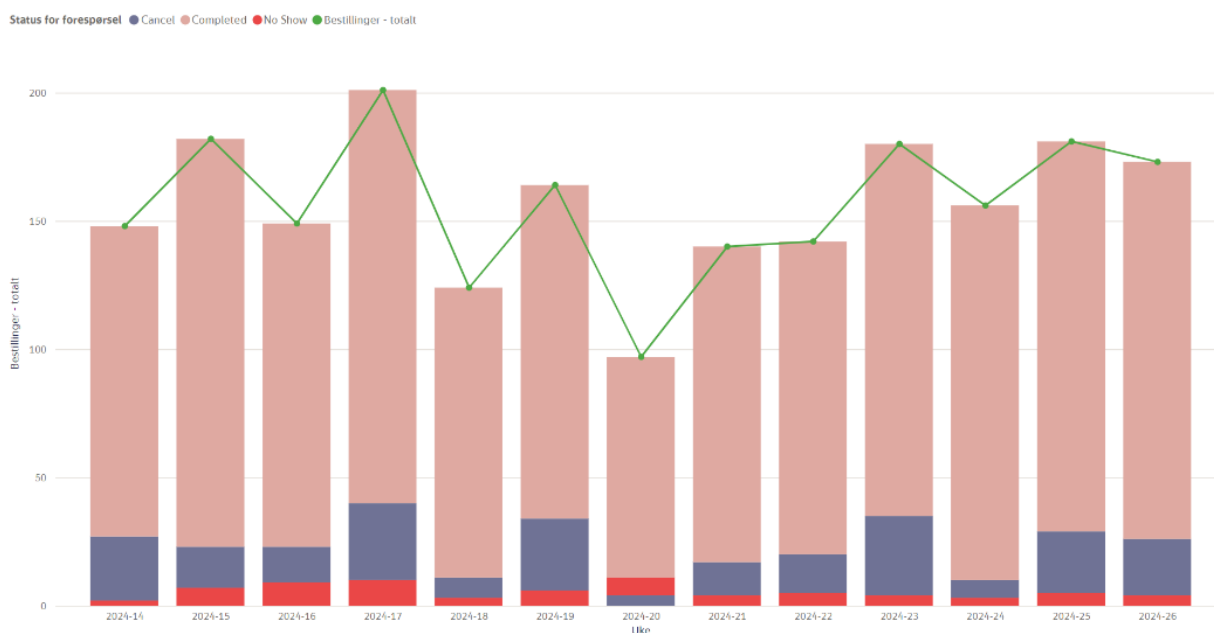


Figure 3 Total number of bookings for vehicles 242 and 243

The total number of bookings for vehicles 242 and 243 during on-demand weeks was 967, compared to 998 during non-on-demand weeks. This represents a decrease of approximately 3.21% in total bookings during on-demand weeks.

## Next steps towards implementation

During phase 1, it has become evident that implementing on-demand booking for RAT is more complex than initially anticipated, requiring coordination across many parts of Ruter. In the coming months, we will focus on expanding the project team and involving the necessary stakeholders to ensure continued progress. A key priority is to further

involve customer service to establish routines that allow for on-demand booking via phone. We will start by identifying a suitable project partner to join the core team, followed by organising a workshop on the subject. This workshop will help us develop a structure that accommodates on-demand booking while considering the needs of our elderly user base.

A new tech stack for our planning system will be implemented in late August. After its deployment, we will experiment and test how on-demand booking functions within this new system. This phase of testing will be discussed with the project group and is expected to begin in late September.

Once these steps are completed, we will be ready to implement phase 2 of this measure, which involves a full roll-out of at least five vehicles reserved exclusively for on-demand booking. The estimated timeline for phase 2 implementation is mid to late October.

## [References<sup>1</sup>](#)

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<sup>1</sup> <https://ridewithvia.com/resources/what-is-microtransit>

<https://solidstudio.io/blog/demandresponsive-transport-what-is-it>

<https://asiamobility.com/understanding-demand-responsive-transit-drt/>