
Evaluation of Sustainable Shared Mobility Initiatives in Rudersdal Municipality

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Trafikdage

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Technical University
of Denmark



Overview

- Introduction: GEMINI Project
- Research Questions
- Methods
- Results
 - Temporal Analysis
 - Spatial Analysis
 - Analysis of the Connection Between Shared Mobility and Public Transport
- Conclusion and Future Work

GEMINI Mobility Living Labs

8 implementation roadmaps and operational plans of NMS (New Mobility Services)

Region Hovedstaden
MLL 2 - **Rudersdal**:
Multimodal mobility hubs in
a peri-urban context

✗ Gemeente
✗ Amsterdam
✗

MLL 1 - **Amsterdam**:
Mobility as a Commons
(MaaC)

Clem

Twinning MLL 1 - **Paris-Saclay**: Pan-European
carsharing standards for
peri-urban mobility

Grupo Brisa
Abre caminho

Twinning MLL 3 - **Porto**:
MaaS and PT integration
and integrated mobility
management around
Estádio do Dragão

**FORUM
VIRIUM
HELSINKI**

Twinning MLL 4 - **Helsinki**:
Strengthening
peri-urban mobility
connections

**VOLKSWAGEN
GROUP**

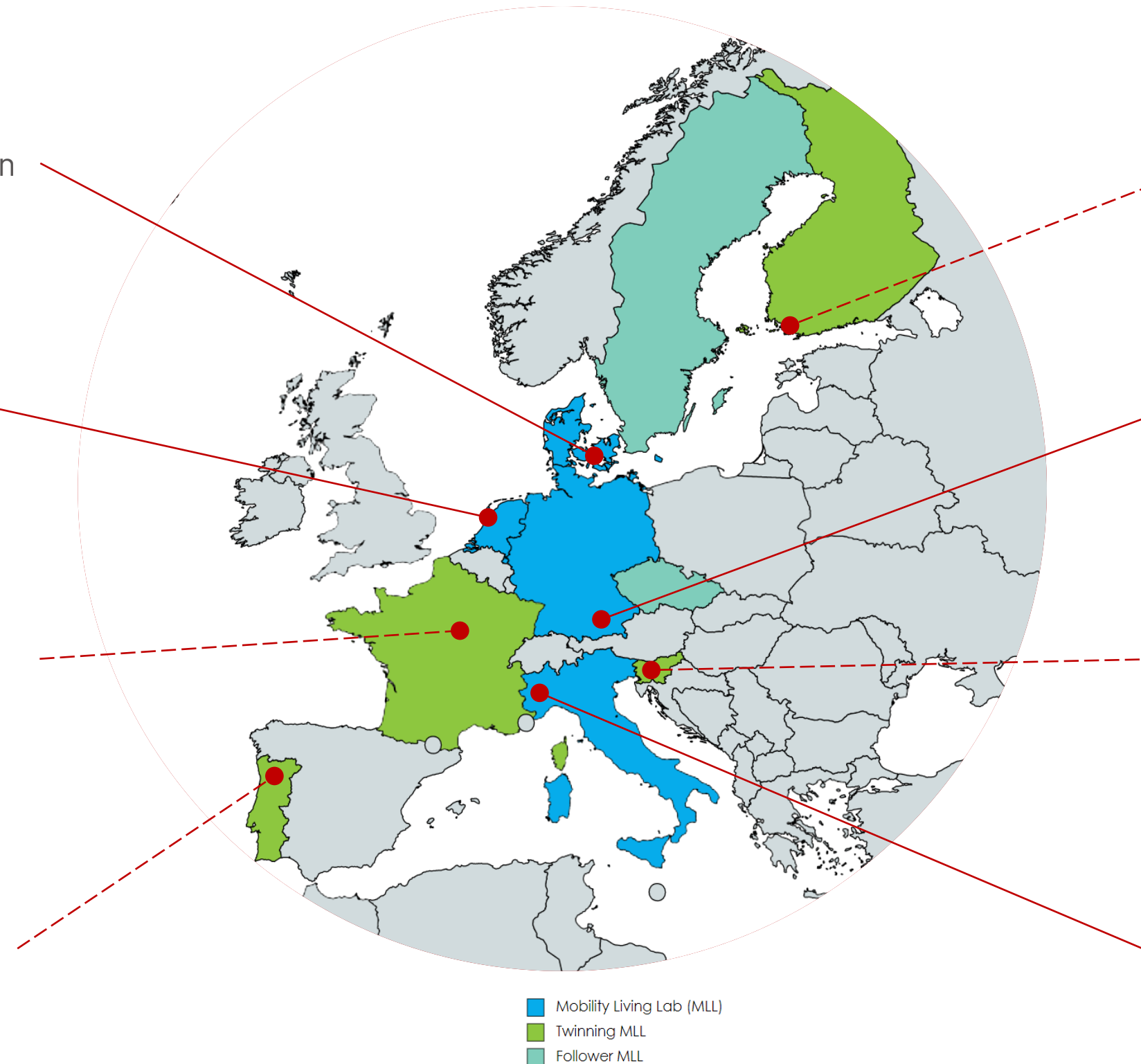
MLL 3 - **Munich**: Integrated
mobility management
during sports events

GoGiro

Twinning MLL 2 - **Ljubljana**:
Shared modes for
commuting and tourist
mobility

**TTS
ITALIA**
Italian ITS
Association

MLL 4 **Turin**: Holistic
mobility service covering
urban, peri-urban,
suburban, rural areas and
cross border mobility



Rudersdal, a preurban municipality

Objectives GEMINI Project

- Integration of shared mobility with public transport
- Shift from private cars to New Mobility Services
- Make it easy and attractive to use shared mobility for the citizens and commuters in Rudersdal

Objectives Master's Thesis

- Understand shared mobility in a suburban context
- Evaluate its role with the public transport system



RudersdalKommune as a living lab



HUBs

HUBs are placed connected to public transport, including information signs, markings, and wayfinding.



Dott e-bikes

200 vehicles can be picked up at designated HUBs and dropped off at another (hybrid)



GreenMobility

The 20 fully electric cars can be picked up and dropped off anywhere within a designated area.



KINTO

The 12 station-based vehicles need to be picked up and returned to the same HUB.

Implementation of mobility hubs



Holte Station



Holte Station



Holte Midpunkt

DTU Sc. Park HUB



Before



After

Holte Station





Research Questions

1. How do shared mobility **demand** and **trip characteristics** vary across **temporal** and **spatial** dimensions?
2. What differences in trip characteristics can be observed across **user segments**?
3. To what extent and under which conditions does shared mobility **complement** or act as a **connector** to **public transport**?

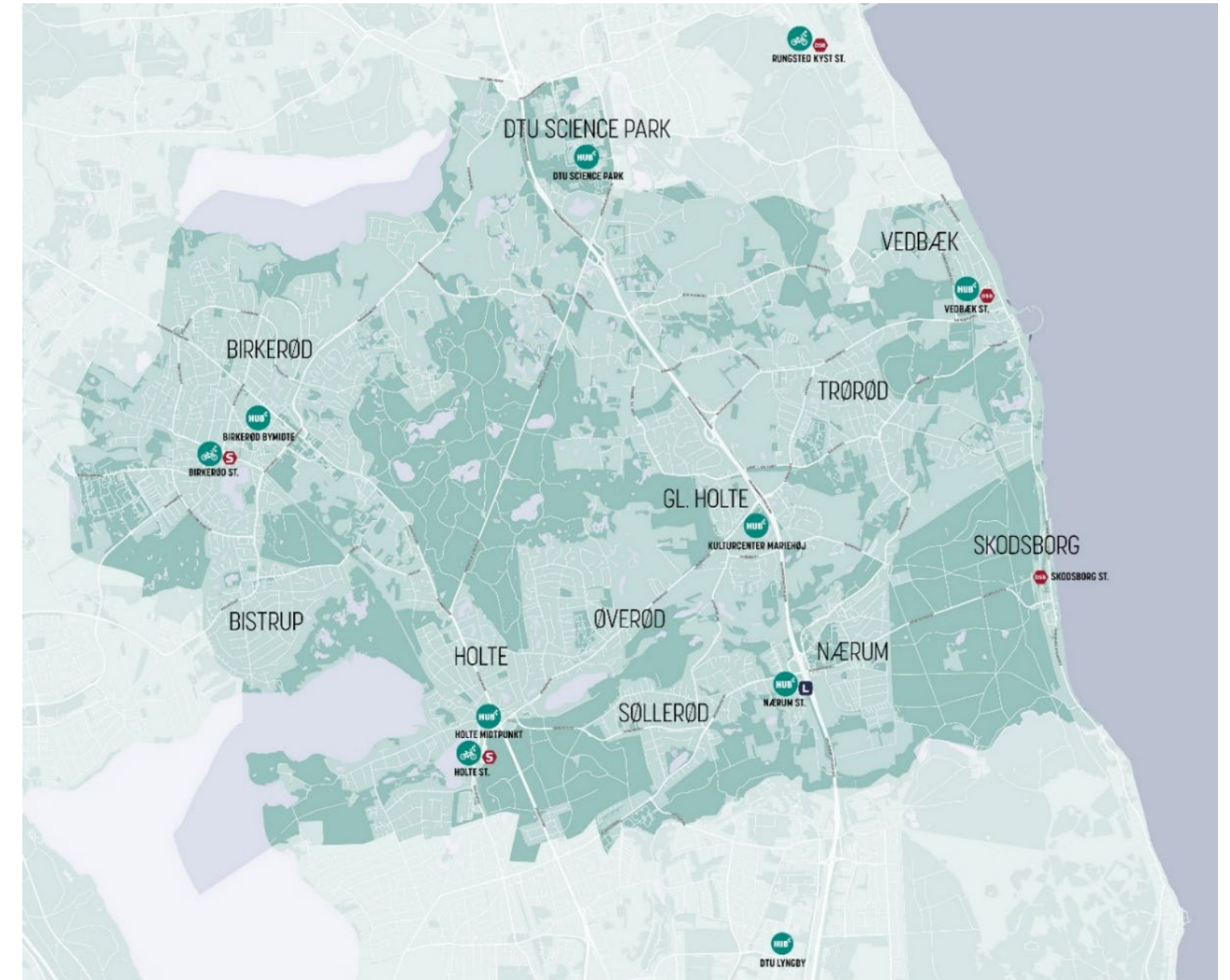


Figure. Locations of the hubs in Rudersdal municipality. Source: Pék et al. (2024), GEMINI D3.1 Report.



Methods

Data sources

-  Operational trip data from the mobility operators
-  User surveys

Methods

-  Temporal analysis
-  Spatial analysis
-  Analysis of the connection between shared mobility and public transport
 -  Proximity to public transport stops
 -  Travel time comparison across transport modes (walking, driving and public transport)
 -  Classification tree and logistic regression

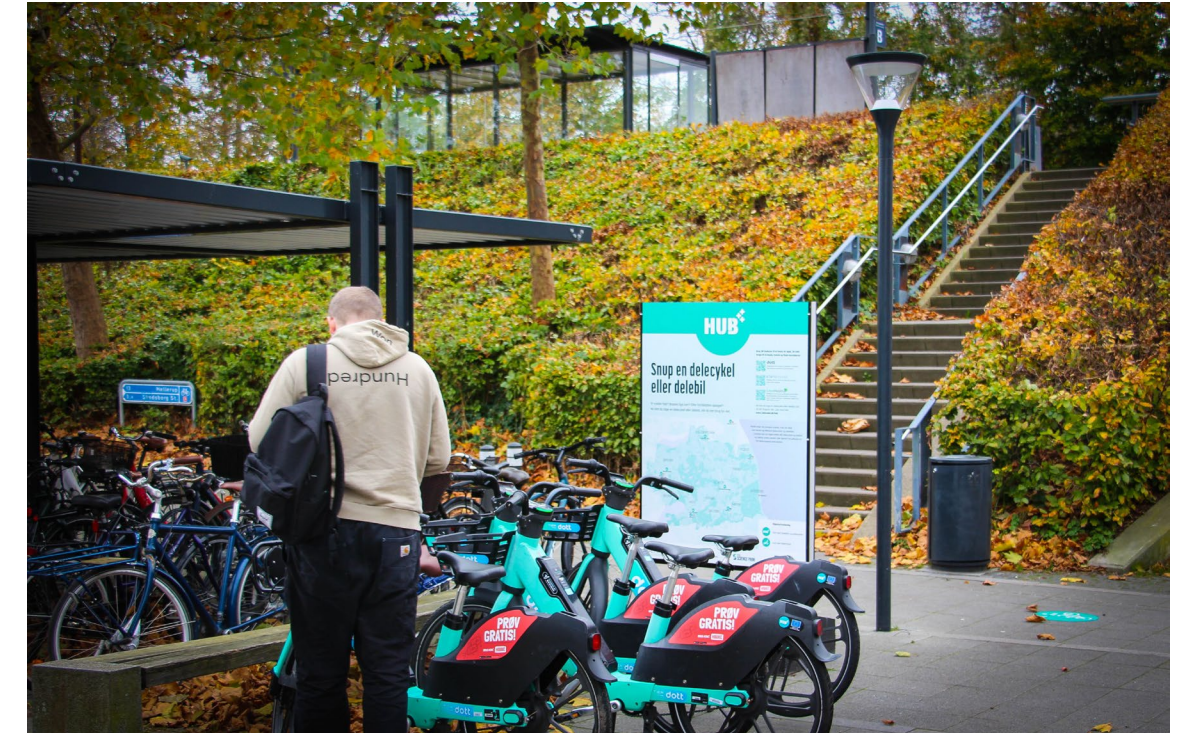
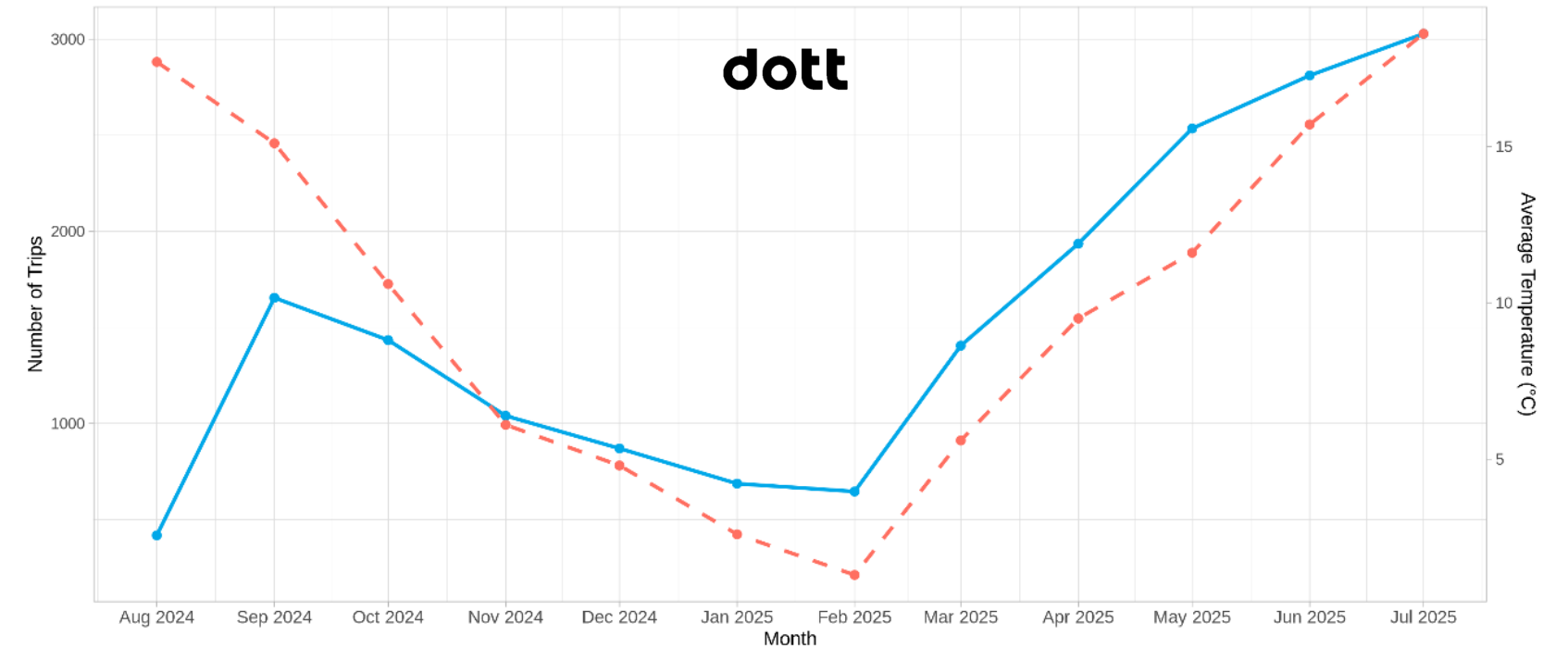


Figure. Photo at the Vedbæk Station. Source: Sjællandske Nyheder (2024).
Available at: <https://www.sn.dk/art6170858/rudersdal-kommune/nyhed/derfor-vrimler-det-med-delecyckler/>

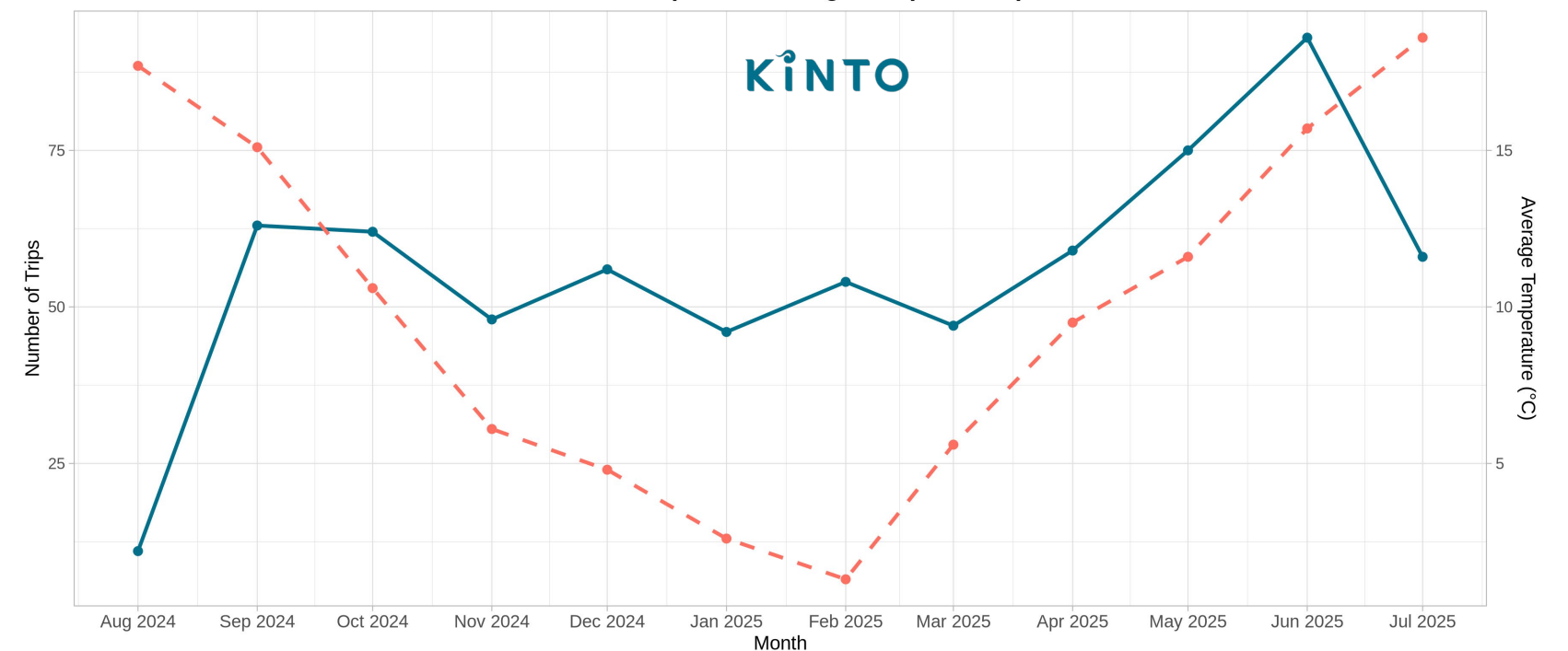
Temporal Analysis: Yearly Trends

- Dott demand is **weather-dependent**. Positive relationship with average **temperature** ($n=12$ months, $r=0,58$, $p=0,047$)
- Carsharing is more **resilient** to seasonality

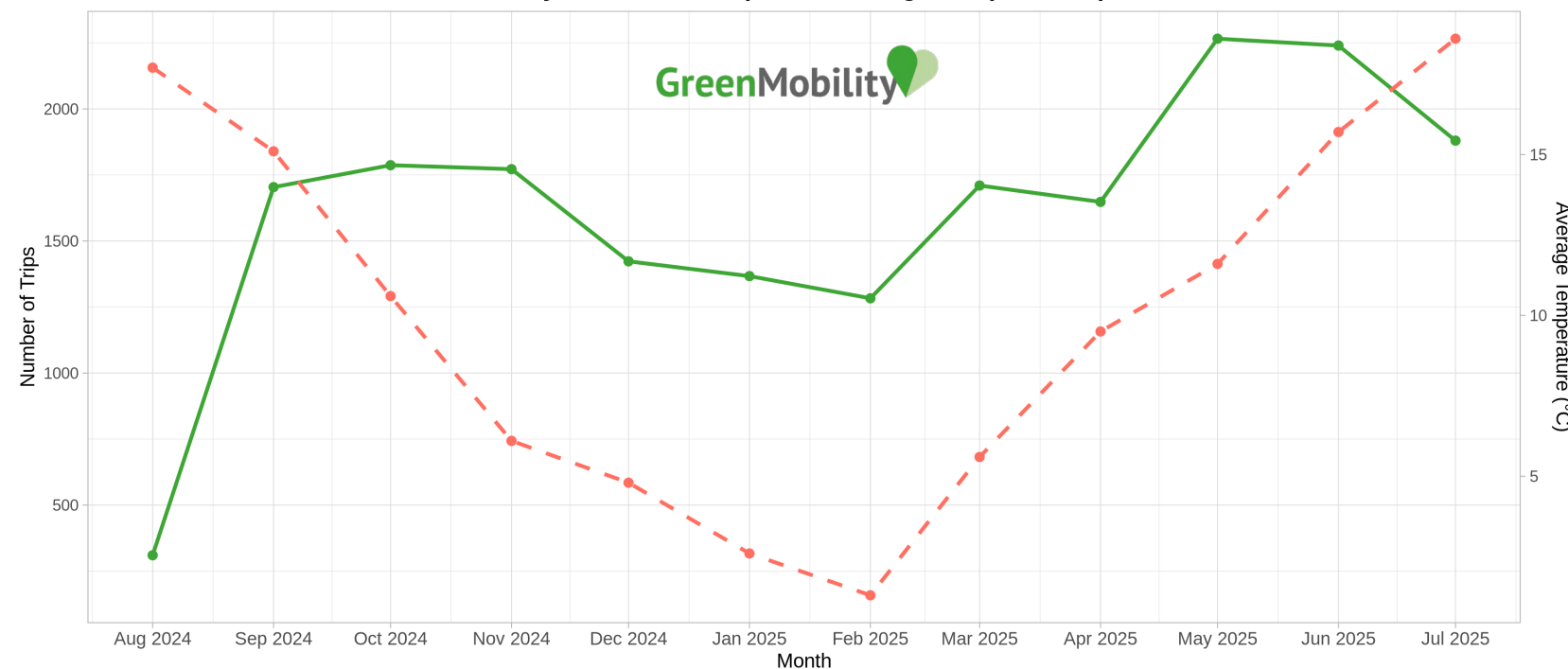
Dott - Number of Trips and Average Temperature per Month



Kinto - Number of Trips and Average Temperature per Month



GreenMobility - Number of Trips and Average Temperature per Month



Legend - Average Temperature - Number of Trips

Legend - Average Temperature - Number of Trips

TemporaAnalysis: Trip Duration

- **Dott: short trips** under 30 minutes (95.1%)
- **GreenMobility: short trips** under 1 hour (84.3%)
- **Kinto: long trips** between 0 – 10 hours (83.3%)

- **Frequent users** → **shorter** trips
- **Occasional user** → **longer** trips

Table 1. Percentage of trips by duration range and service

	Duration Range			
	Short	Medium	Long	Very long
Dott	54.0% (0-10 min)	41.1% (10-30 min)	4.2% (30-60 min)	0.7% (+60 min)
GreenMobility	84,3% (0-1 h)	6.9% (1-2 h)	6% (2-10 h)	2.7% (+10 h)
Kinto	28.1% (0-2 h)	55.2% (2-10 h)	13.1% (10-48 h)	3.6% (+48 h)

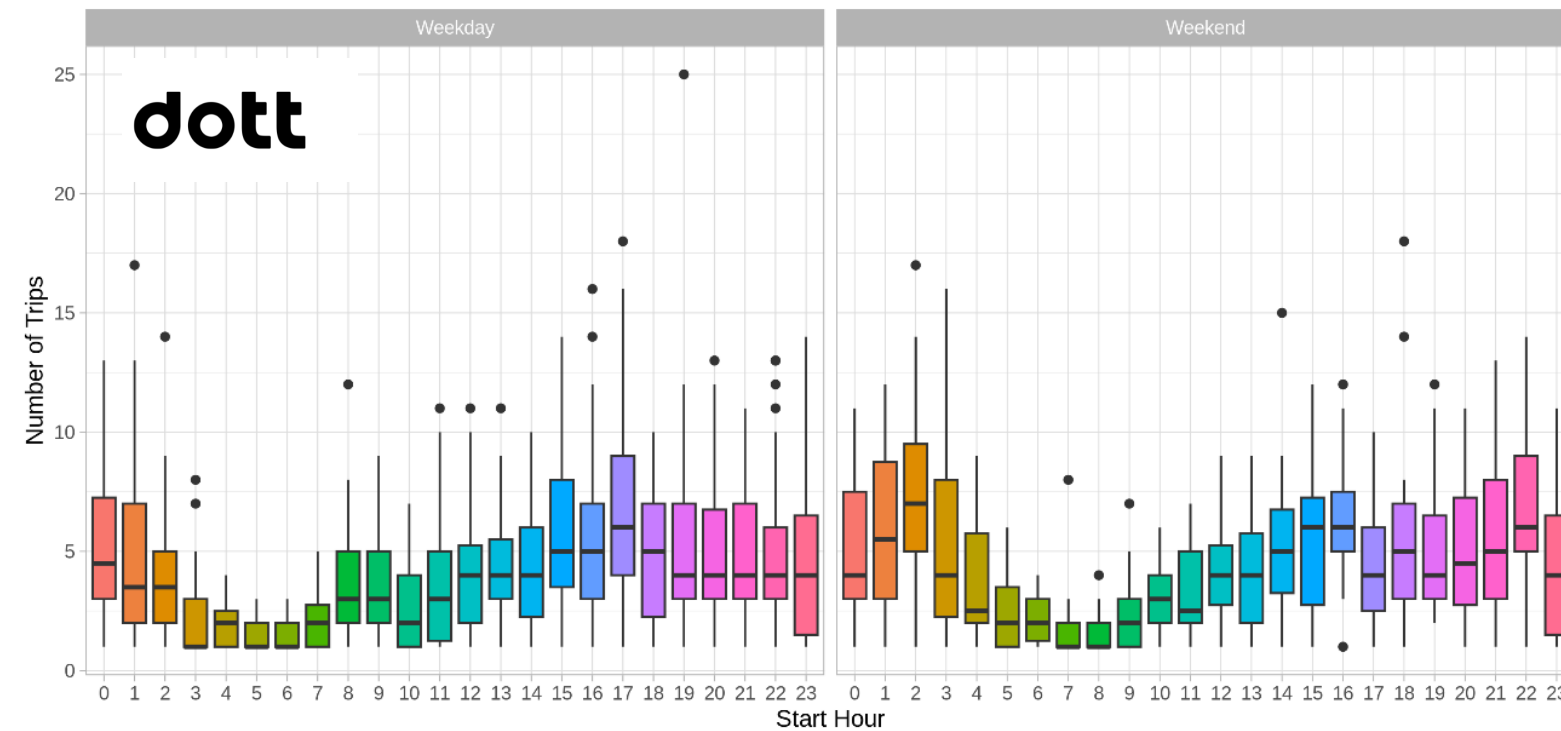
Table 2. Average duration of trips by user segment and service

User segment	Mean duration		
	Dott (min)	GreenMobility (min)	Kinto (h)
Low Use (1 trip)	17.4	128	20.5
Medium Use (2-5 trips)	14	98.1	15.4
High Use (6-20 trips)	10.7	101	8.09
Heavy Use (>20 trips)	10.3	59.9	9.56

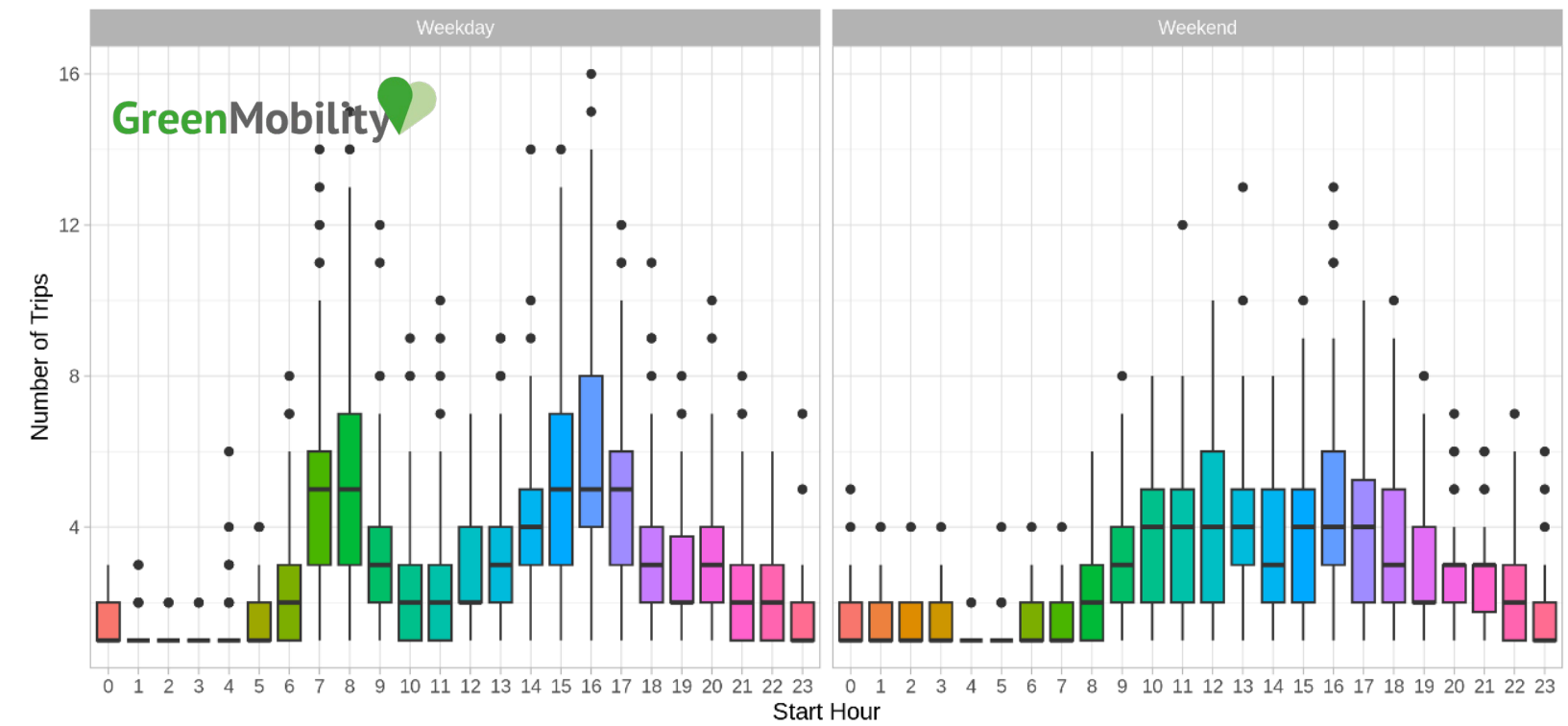
Wort

Temporal Analysis: Daily Patterns

Dott - Trip Count Distribution by Hour and Day Type (Summer)

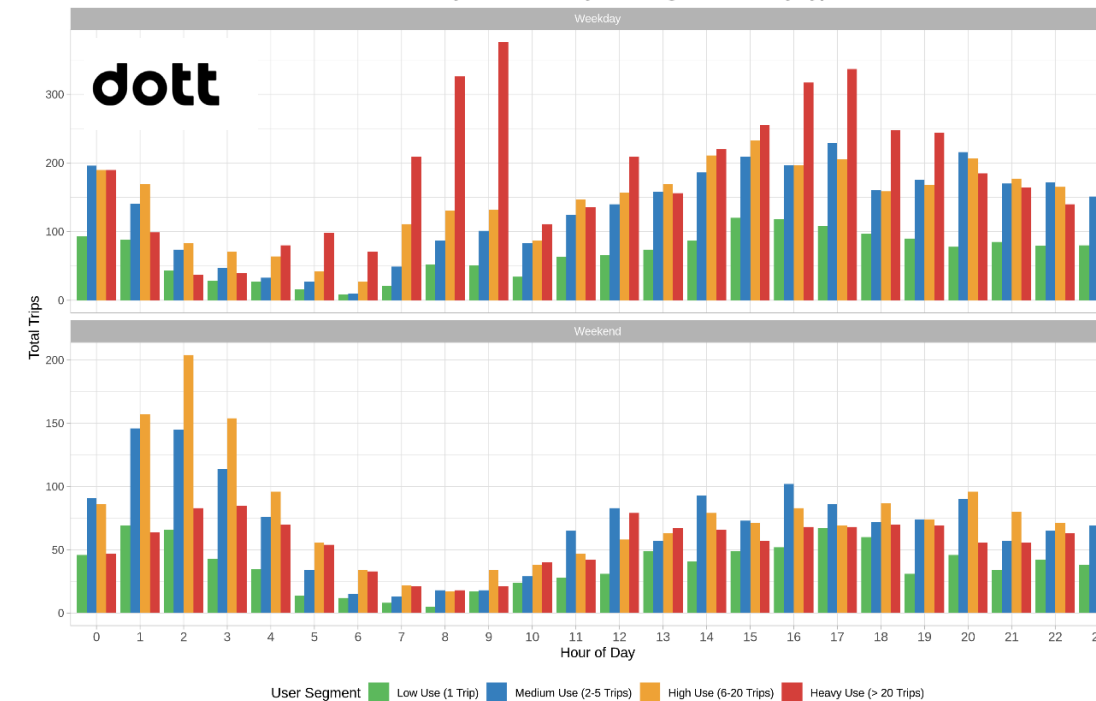


GreenMobility - Trip Count Distribution by Start Hour and Day Type

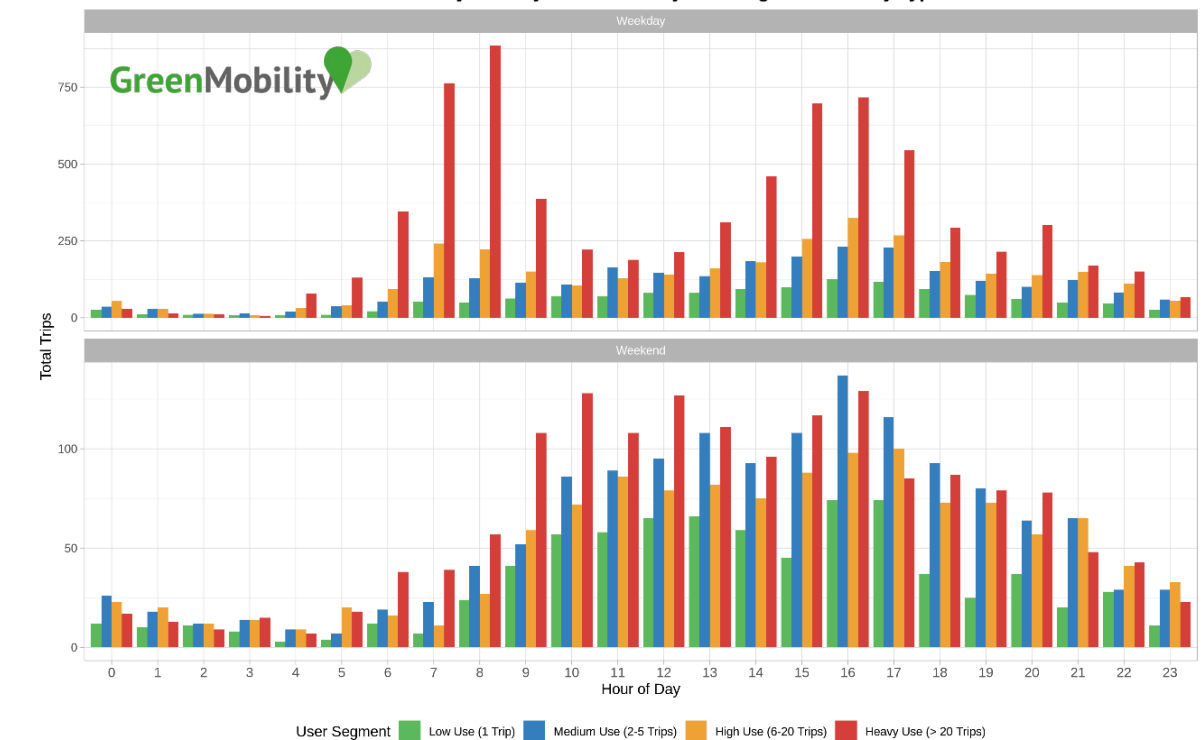


- **Weekdays:** commuting peaks → mostly **frequent** users
- **Weekends:** higher activity in the **afternoon** and **night** → **medium** and **high** users

Dott - Hourly Distribution by User Segment and Day Type



GreenMobility - Hourly Distribution by User Segment and Day Type

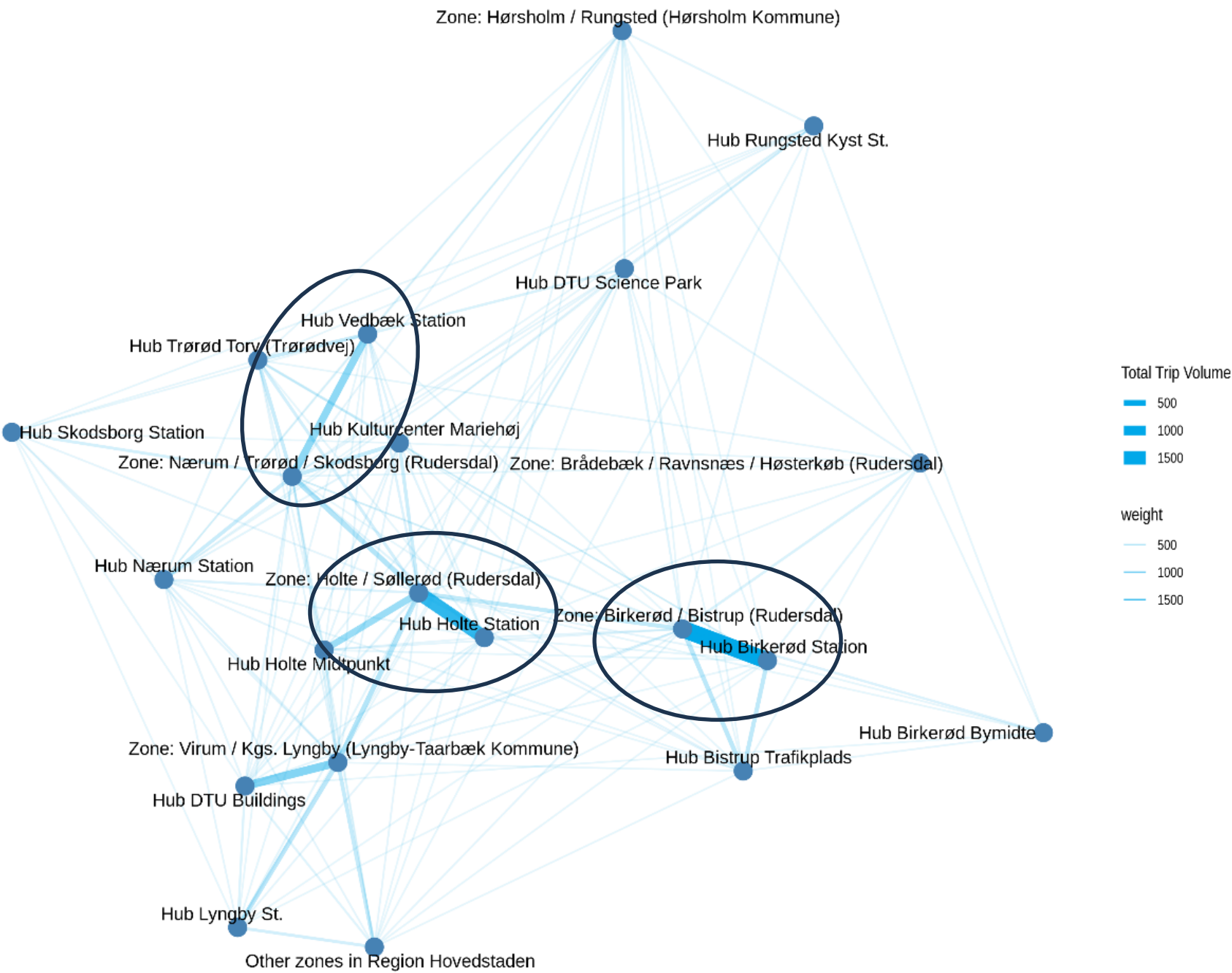


Spatial Analysis: Dott

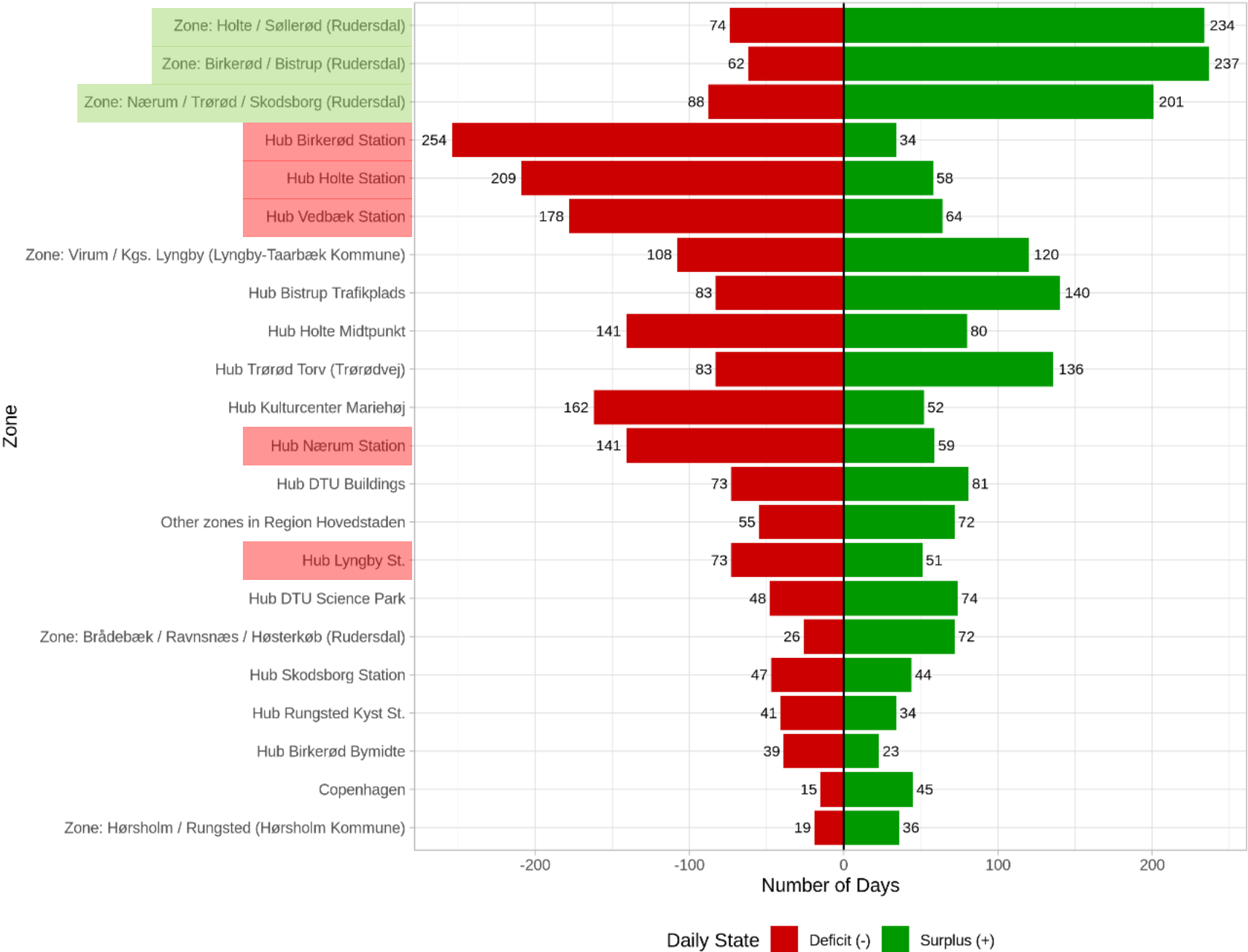
dott

- Hub placed at PT Stations → Residential areas

Dott - Bidirectional Flow Network Diagram



Dott - Vehicle Balance per Zone



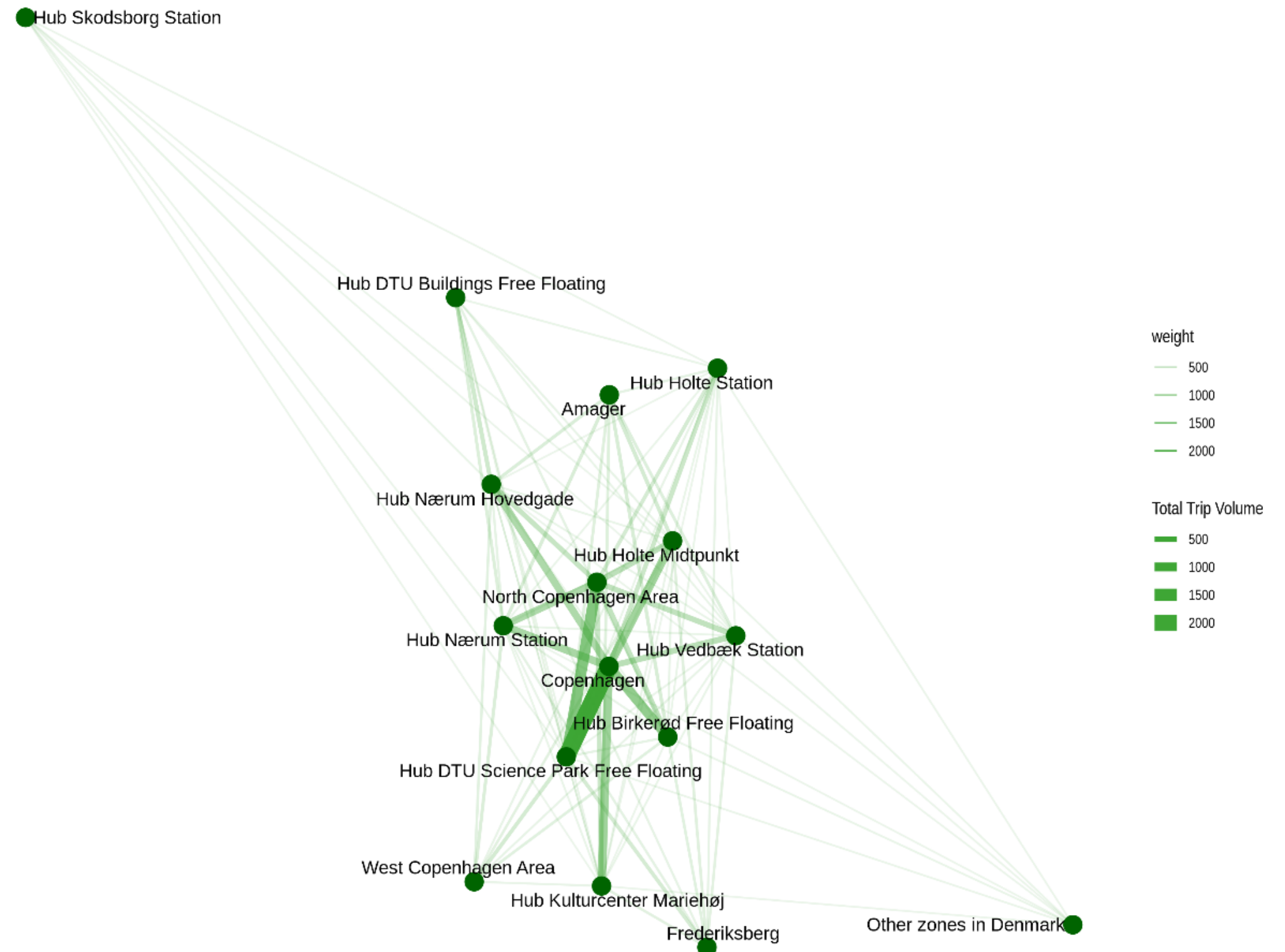
Daily State Deficit (-) Surplus (+)

Spatial Analysis: GreenMobility



- Suburban area ↔ Copenhagen
- High trip volume in the DTU Science Park

GreenMobility - Bidirectional Flow Network Diagram

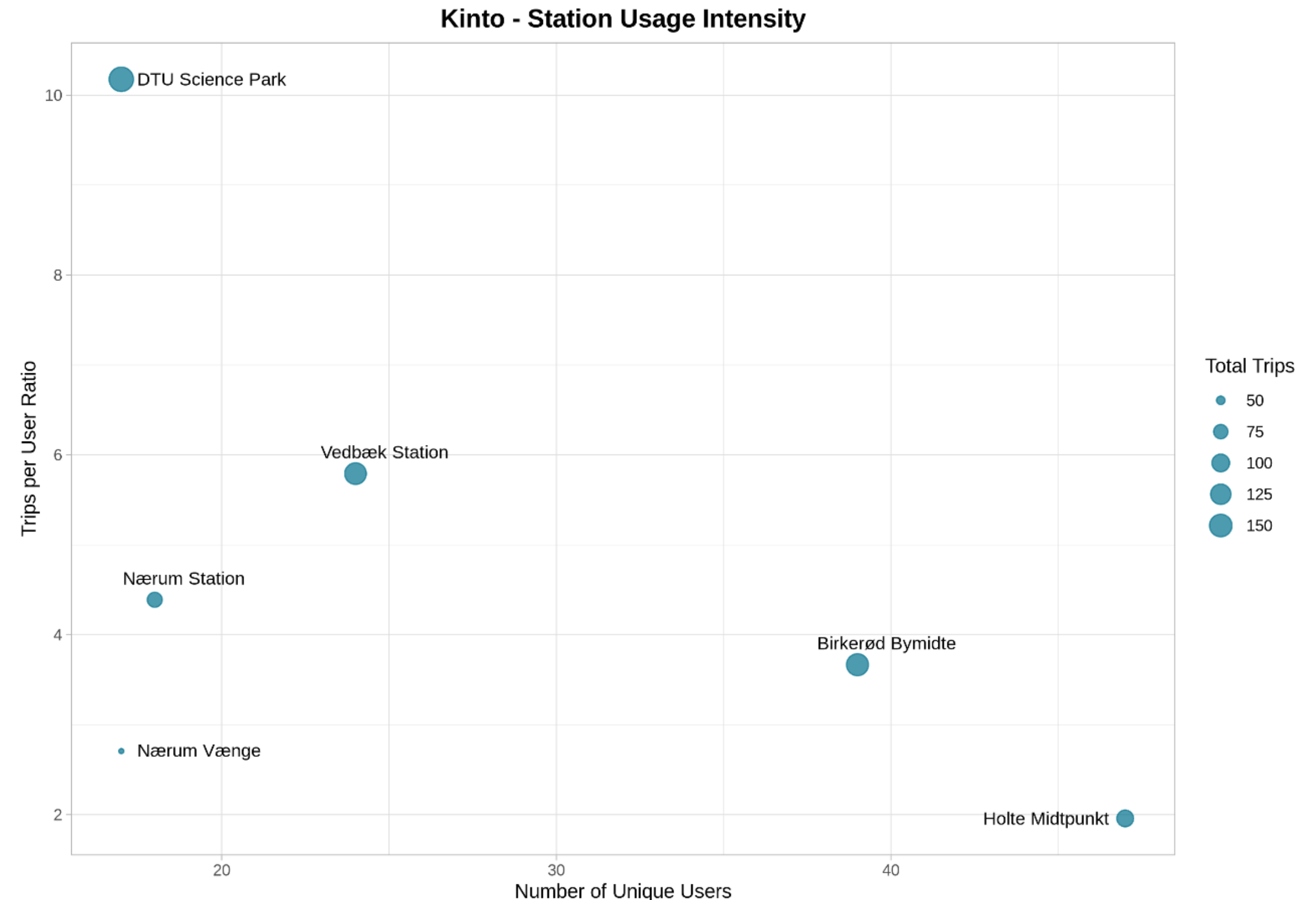


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Spatial Analysis: Kinto

KiNTO

- High **loyalty**: DTU Science Park (outlier user)
- **Attraction of users**: Holte Midtpunkt and Birkerød Bymidte
- **Balanced behaviour**: Vedbæk Station



Wort

Public Transport Proximity

- **Very high proximity:**
 - 87-89% of trips start or end within 100 m of a PT stop
 - Nearly 100% are within 300 m.
- Mobility hubs are located within **walking distance** of a PT stop → **encourage multimodal travel**

Table 3. Percentage of trips near public transport stops

Distance range (m)	All public transport stops	
	GreenMobility	Dott
100	88.82%	87.34%
200	97.98%	97.20%
300	99.76%	99.76%
400	100.00%	99.94%
500	100.00%	99.96%

Travel Time Comparison Across Modes

Table 4. Comparative Analysis of Travel Time

- **Short trips:** Shared mobility **outperforms** public transport and walking
- **Long trips:** PT is faster, and shared mobility is better as a **complement** than a replacement.
- Potential for **car substitution** (Dott short trips)

dott

Type of trip			Comparable trips			
			Short (0-10 min)	Medium (10-30 min)	Long (30-60 min)	Prolonged (+60 min)
Walk		Time Difference (Walk - Dott) (min)	16.31	27.90	47.16	49.30
		% of trips where Dott is faster	98.6%	91.7%	76.5%	64.9%
PT		Time Difference (PT - Dott) (min)	7.36	6.18	-8.24	-41.81
		% of trips where Dott is faster	78.4%	61.6%	26.3%	3.1%
Drive		Time Difference (Drive- Dott) (min)	-2.54	-9.27	-27.15	-58.00
		% of trips where Dott is faster	6.9%	1.0%	0.0%	0.0%

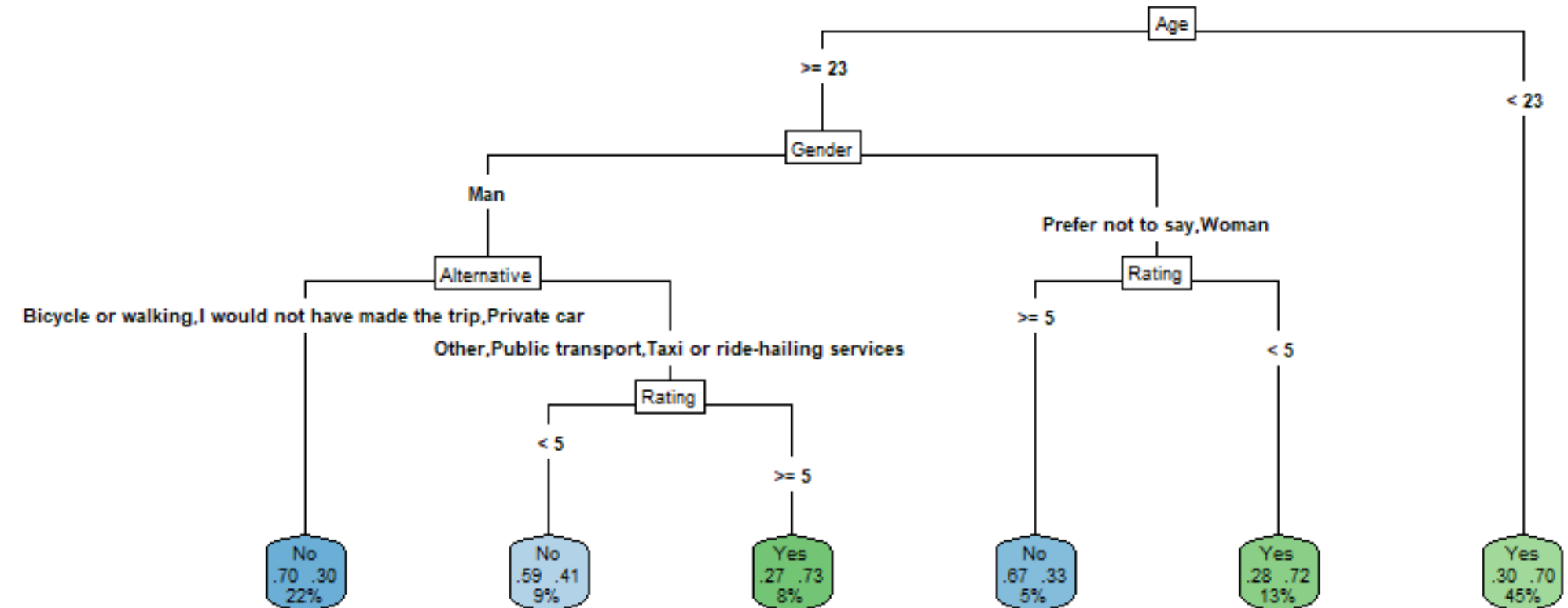
GreenMobility

Type of trip			Comparable trips			
			Short (0-1 h)	Medium (1-2 h)	Long (2-10 h)	Prolonged (+10 h)
PT		Time Difference (PT - GM) (min)	11.48	-29.02	-213.41	-1569.60
		% of trips where GM is faster	81.4%	7.1%	0.1%	0.0%
Drive		Time Difference (Drive - GM) (min)	-9.96	-50.10	-232.67	-1590.80
		% of trips where GM is faster	7.9%	0.0%	0.0%	0.0%

Modelling Public Transport Connectivity

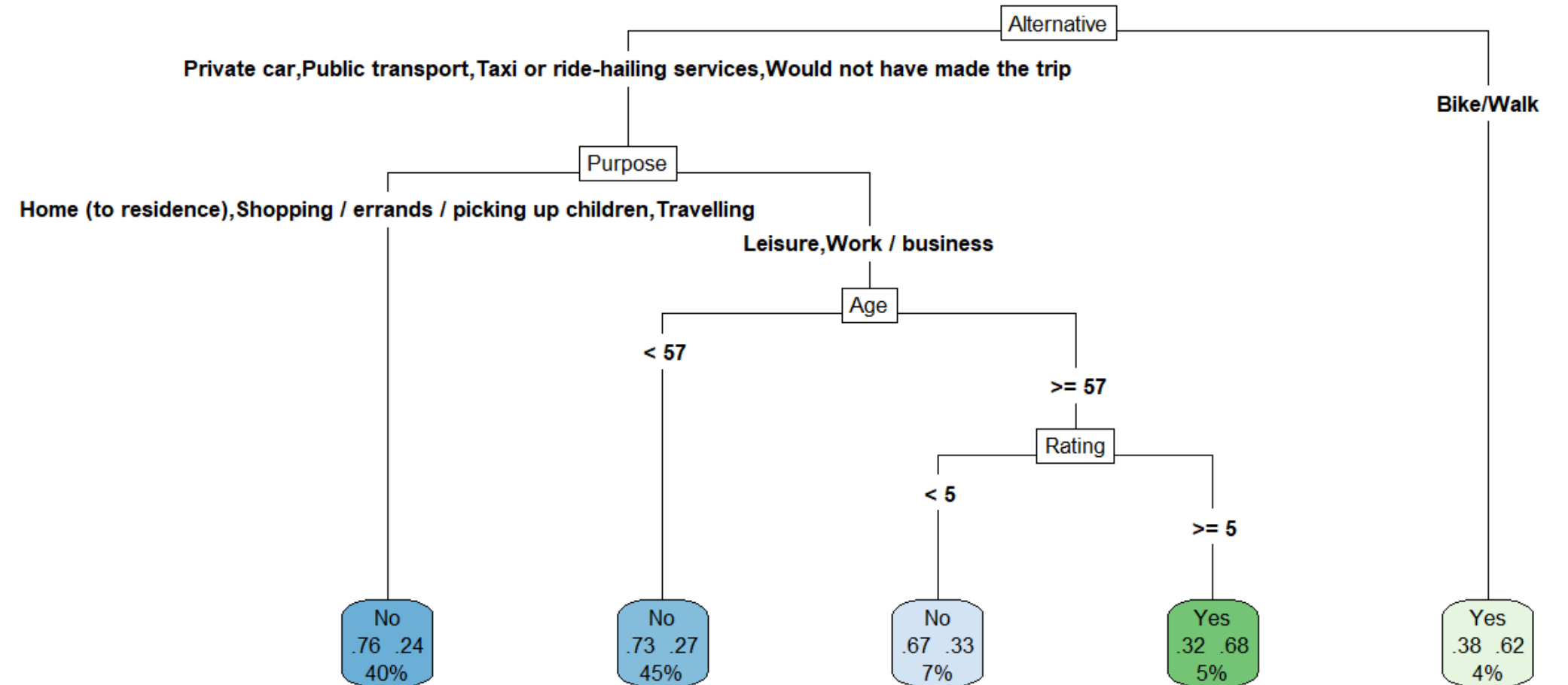
dott

- **39%** of respondents doing multimodal trips
- **Young** users ↑
- **Leisure** ↓



GreenMobility

- **28%** respondents doing multimodal trips
- **Alternative** transport mode:
 - **Walking/cycling** ↑
 - **Car, taxi, PT** ↓



Conclusion

- 📍 Shared mobility can **function effectively in a suburban context**.
- 📊 It supports different travel purposes: **commuting, leisure...**
- 📍 **Strategic hub placement** at key **points of interest** is essential, including railway stations, academic centres and employment areas.
- 📏 **Dott** (0–30 min) and **GreenMobility** (under 1 hour) are **mainly used for short journeys**, for which they are most competitive (often faster than walking and public transport).
- 🚗 **Kinto** serves **longer-duration travel purposes**, with rentals generally lasting up to 10 hours or more.
- 🚂 Shared mobility shows **strong integration potential with public transport**: approximately 88% of trip endpoints are within 100 m of a public transport stop.



Figure. GreenMobility in the Rudersdal Municipality. Source: GreenMobility (2024). Available at: <https://www.greenmobility.com/dk/en/rudersdal-municipality/>

Future Work



Study multimodal travel by combining shared-mobility trip data with public transport data (including bus, train and metro journeys) to better understand complete journeys and user behaviour.



Assess economic impacts and benefits at the trip, operator and transport-network levels, including a comparison between shared mobility costs and private vehicle ownership.



Test the findings in other suburban contexts to assess their transferability, using pilot studies to adapt the services to local transport networks and mobility needs.



Figure. Mobility Hubs: The Future of Multimodal Transportation in Cities. Source: PTV Group (2025). Available at: <https://blog.ptvgroup.com/en/trend-topics/mobility-hubs-the-future-of-multimodal-transportation/>

THANK YOU!

TAK!

<https://www.geminiproject.eu/>



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