Preferred citation style

Axhausen, K.W. (2018) Automated vehicles and Alpine regions: Capacities and service levels, EUSALP Conference, Innsbruck, April 2018.

Automated vehicles and Alpine regions: Capacities and service levels

KW Axhausen

IVT
ETH
Zürich

April 2018

Institut für Verkehrsplanung und Transportsysteme
Institute for Transport Planning and Systems

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Acknowledgements

P Manser, S Hörl and H Becker for the AV market simulations

P Bösch, F Becker and H Becker for the cost estimates

J Meyer, H Becker and P Bösch for the work on the induced demand

A Loder, L Ambühl and M Menendez for the MFDs

What is produced by the transport system?

Accessibility ~ Log

f(speed, costs, comfort and spatial distribution of opportunities)

What is next?

- Getting more out of existing roads:
  - Automated vehicles (AV)
- Managing road use (explicit «speed targets»):
  - Shoup-style demand responsive parking pricing
  - Demand responsive pricing for miles driven
  - Rationing of miles driven
  - Speed control
  - Control of the number of vehicles

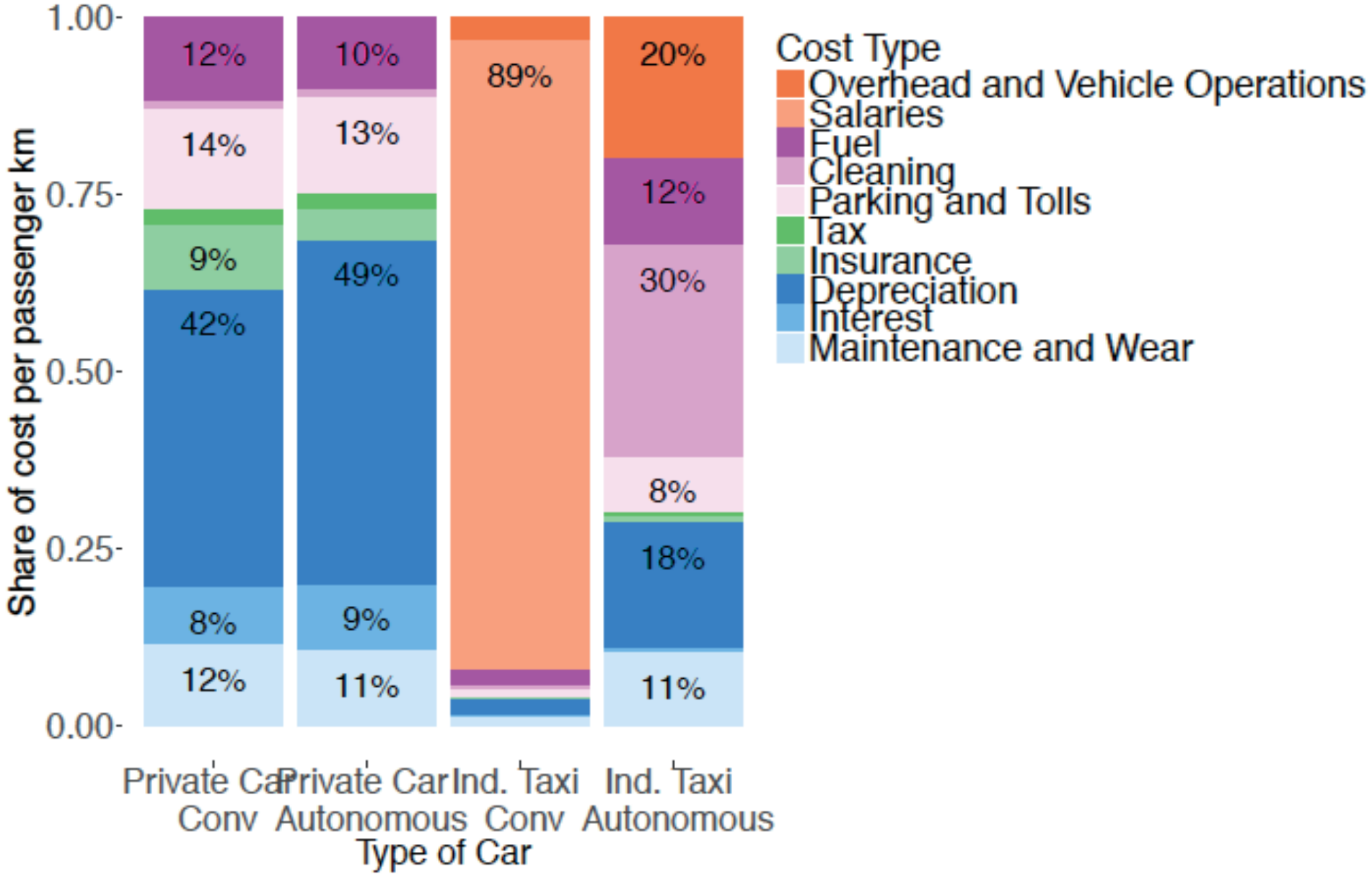
- Getting more out of existing/new rails
  - ETCS
  - Hyperloop

- Conquer the
  - Airspace: «flying cars»
  - Underground: Cargo sous terrain, Swiss Metro

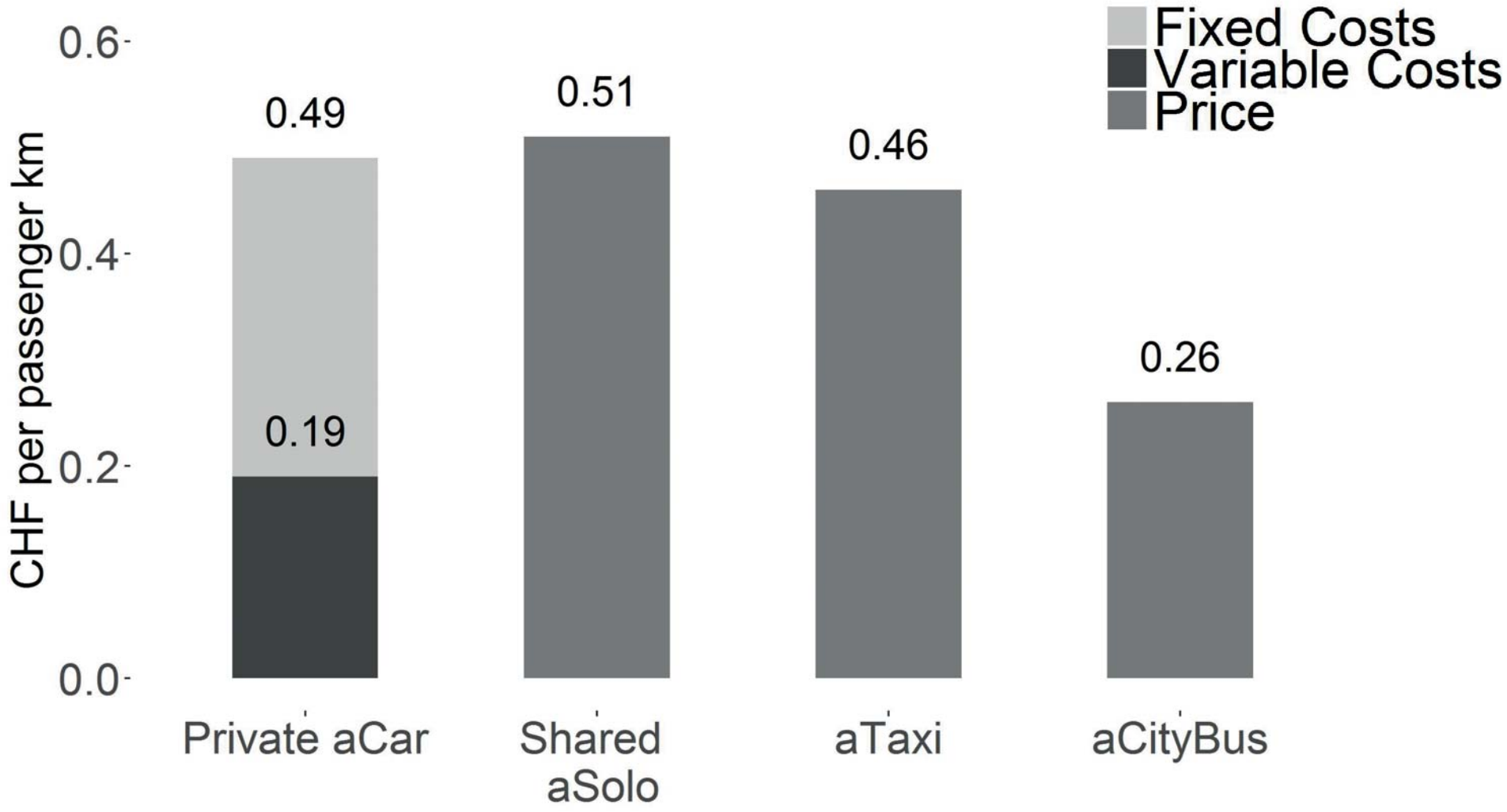
AV expectations

AV cost structures

IVT estimate of SFr/pkm (today's occupancy levels)

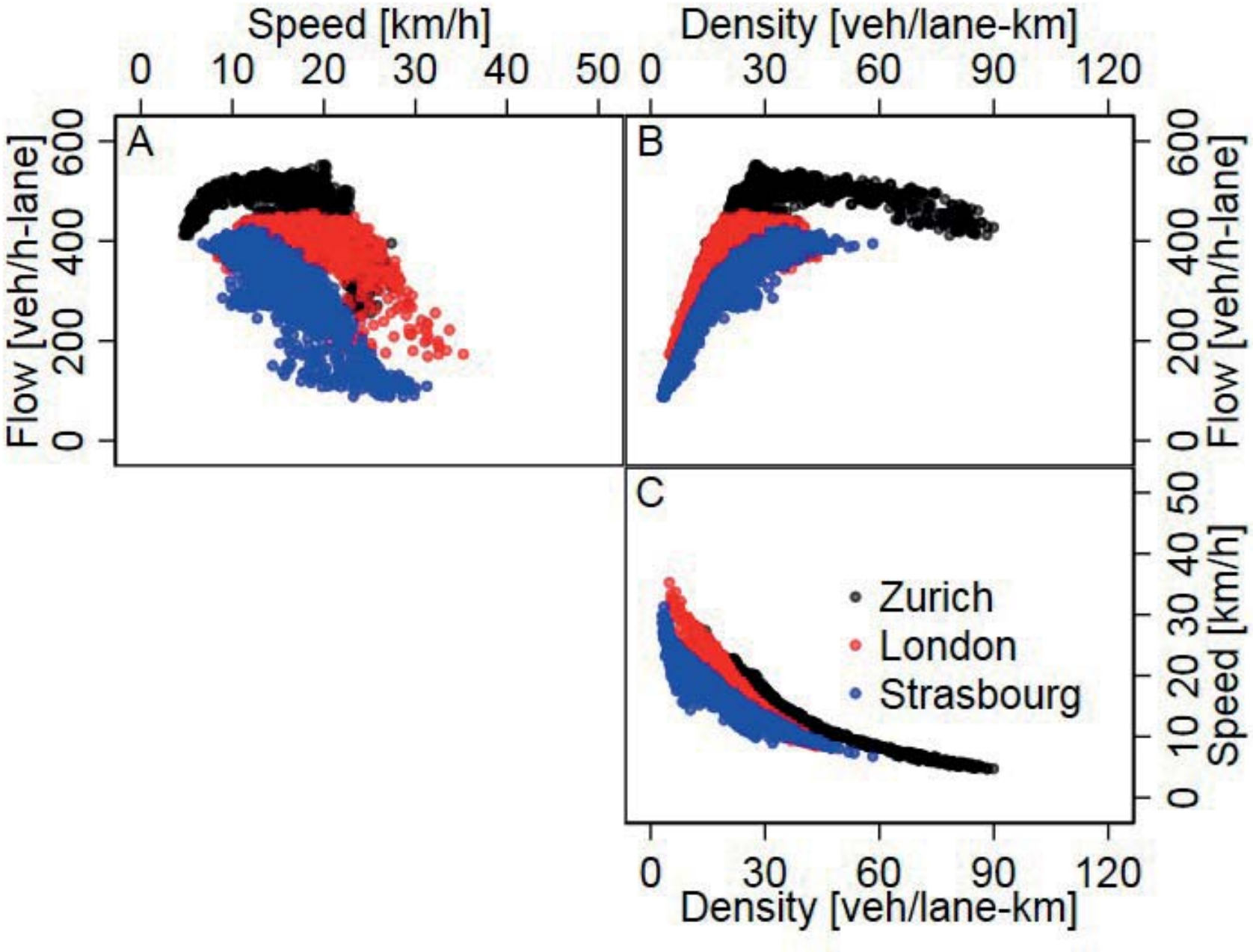


IVT estimate of SFr/pkm (today's occupancy levels)



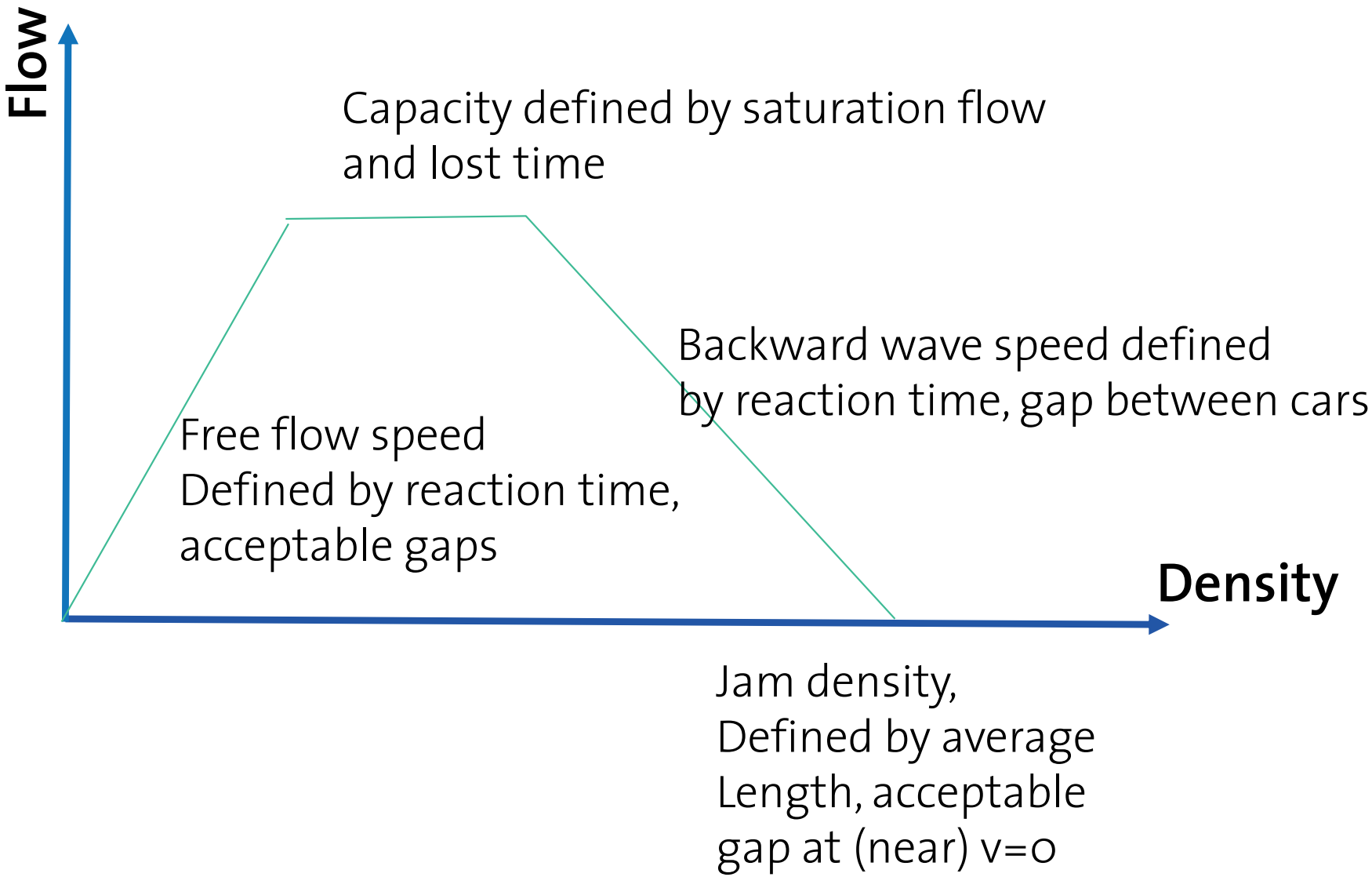
AV capacity impacts

MFD (e.g. London, Zürich, Strassbourg)

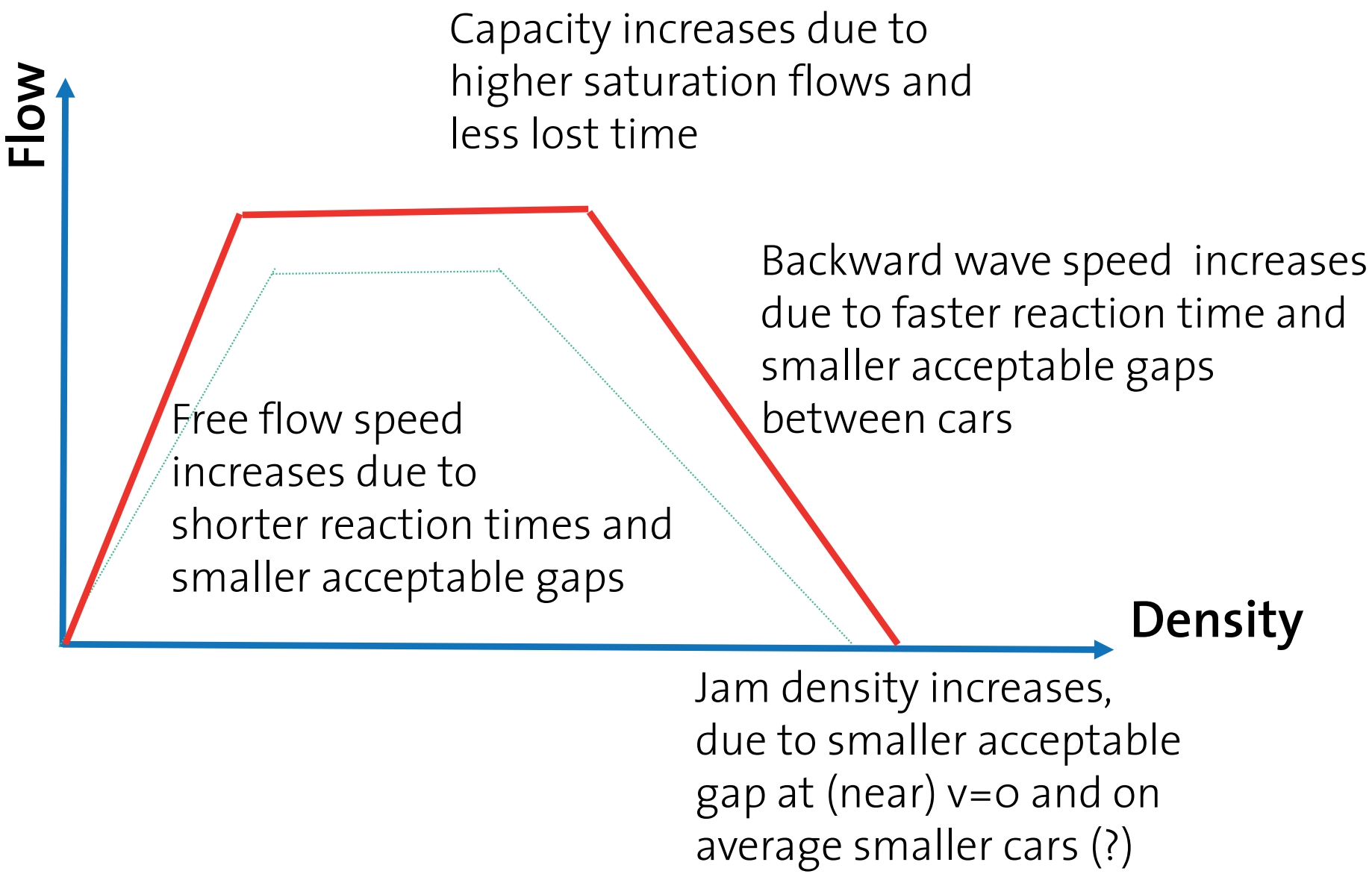


Loder et al., 2018

MFD - Maxima


Flow
Capacity defined by saturation flow
and lost time
Backward wave speed defined
by reaction time, gap between cars
Free flow speed
Defined by reaction time,
acceptable gaps
Density
Jam density,
Defined by average
Length, acceptable
gap at (near) v=0

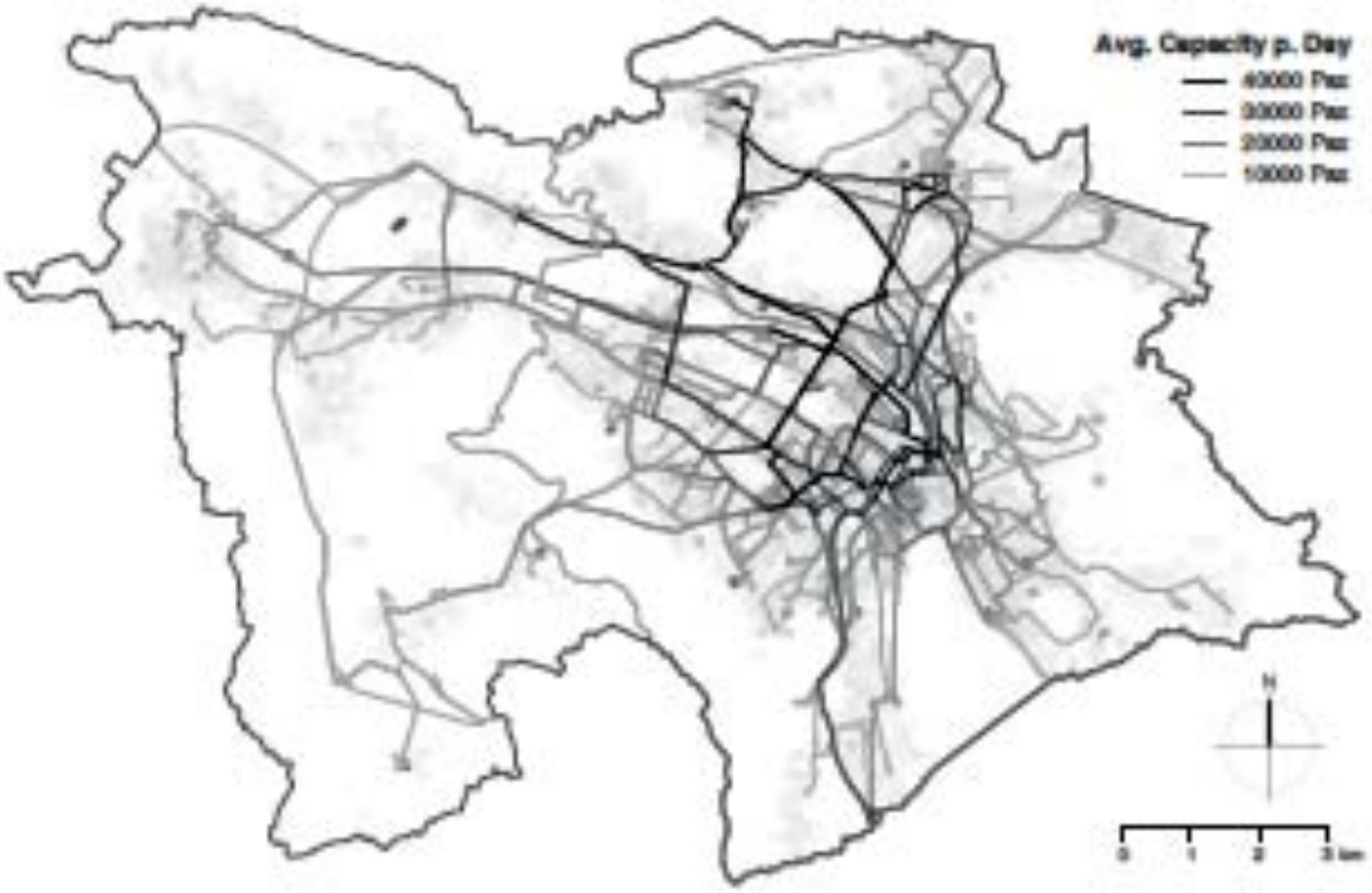
MFDs with AVs



Loder et al., 2018

AV impact on current «public transport»

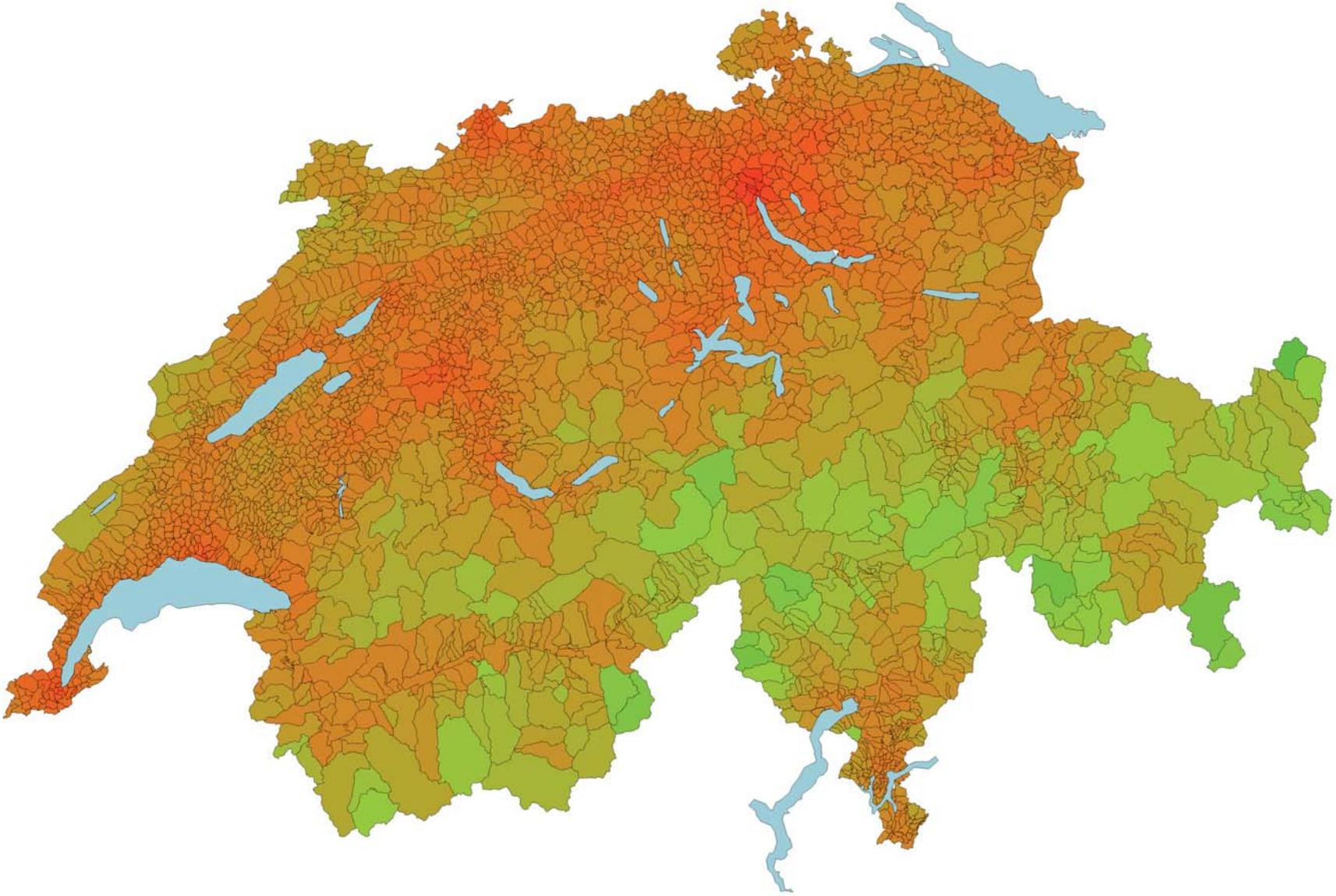
Remaining lines with 100%+ cost recovery (avg. 10 runs)



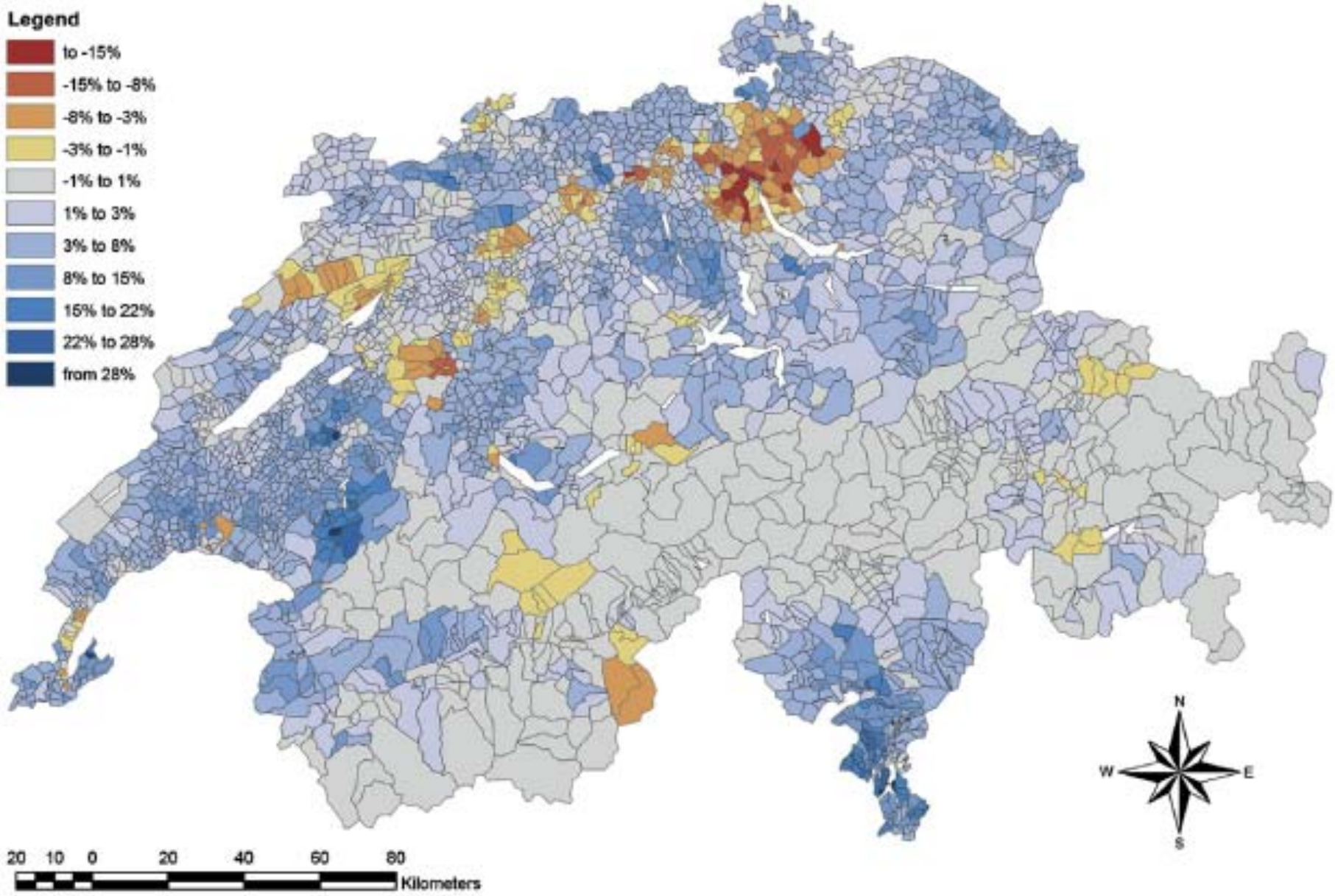
Manser et al. (2017)

AV induced demand/land use impact

2010 Schweiz “general accessibility”



2030 accessibilities, 100% AV use, conservative capacity gains

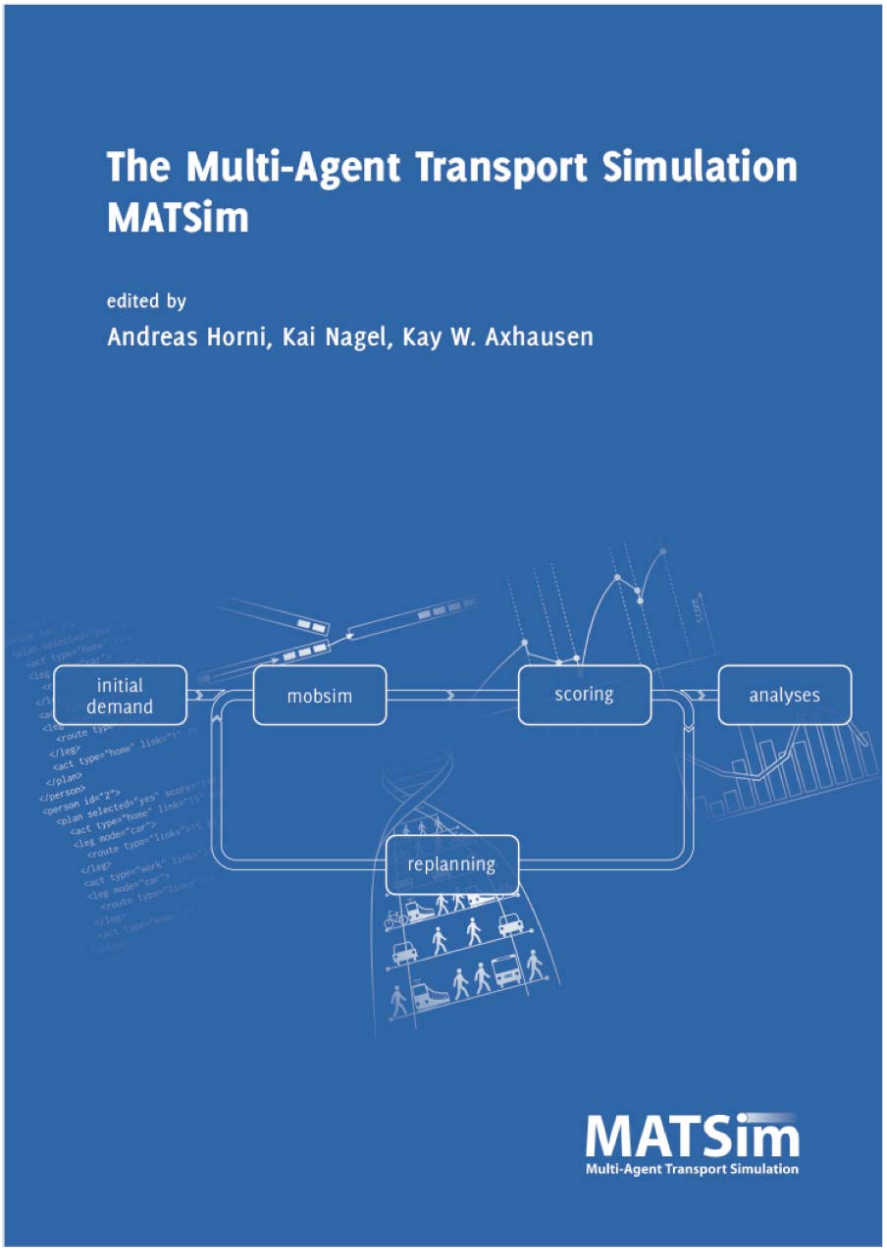


What next?

What is next?

- Accessibility targets
  - Locations/housing markets
  - Population groups/equity goals
- Speed targets versus capacity additions
- AV preparations
  - Road space allocation
  - Market structure
  - Pricing for the different population groups

Questions?


The Multi-Agent Transport Simulation
MATSim
edited by
Andreas Horni, Kai Nagel, Kay W. Axhausen
initial demand
mobsim
scoring
analyses
replanning
MATSim
Multi-Agent Transport Simulation