Preferred citation style

Axhausen, K.W. (2022) Dilemma of transport policy, the e-bike city and can we model all of the changes*?*, TUM Seeon Symposium on Activity Based Modelling, Kloster Seeon, September 2022.

Dilemma of transport policy, the e-bike city and can we model all of the changes?

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IVT Institut für Verkehrsplanung und Transportsysteme
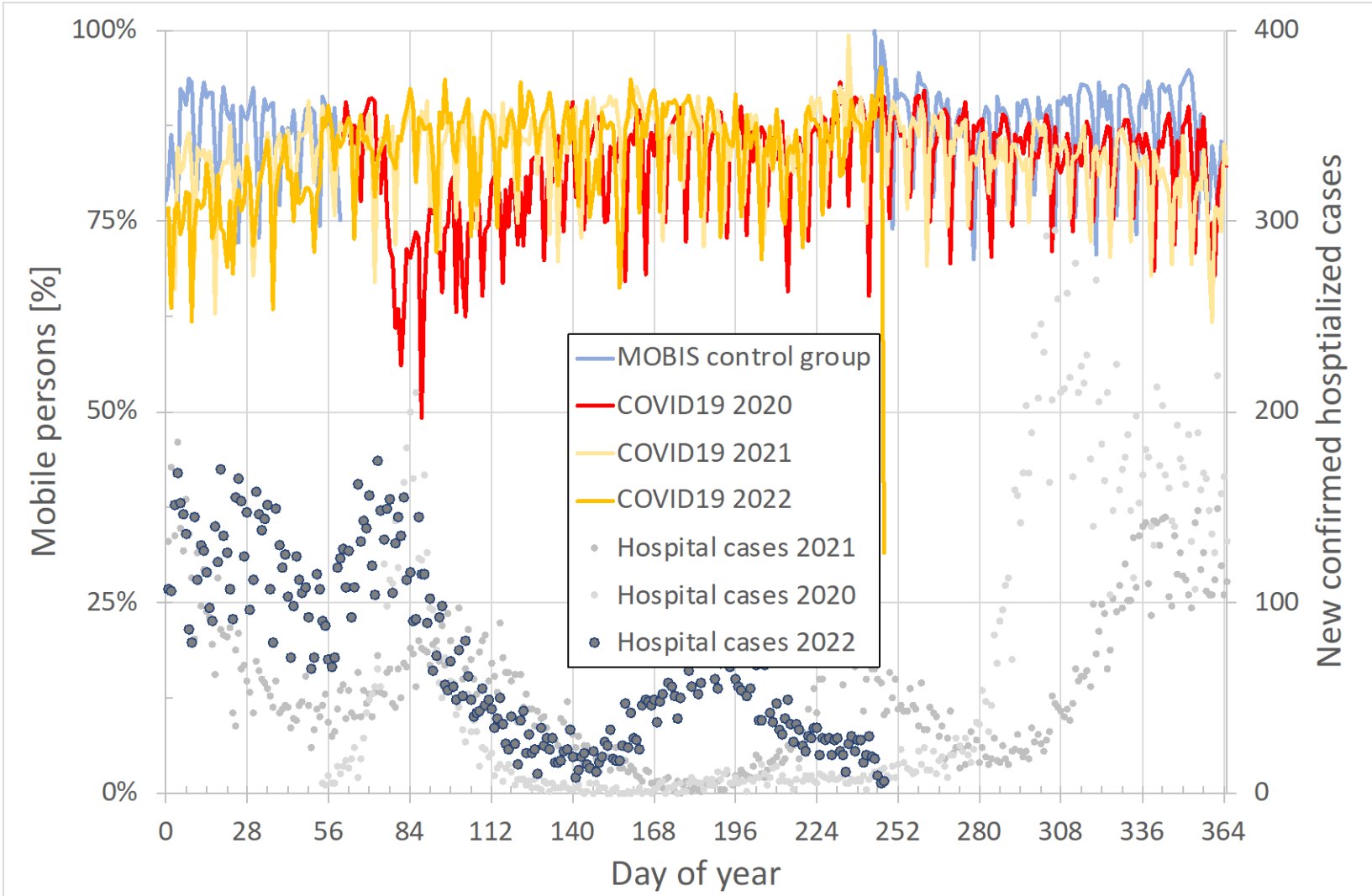Institute for Transport Planning and Systems

ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

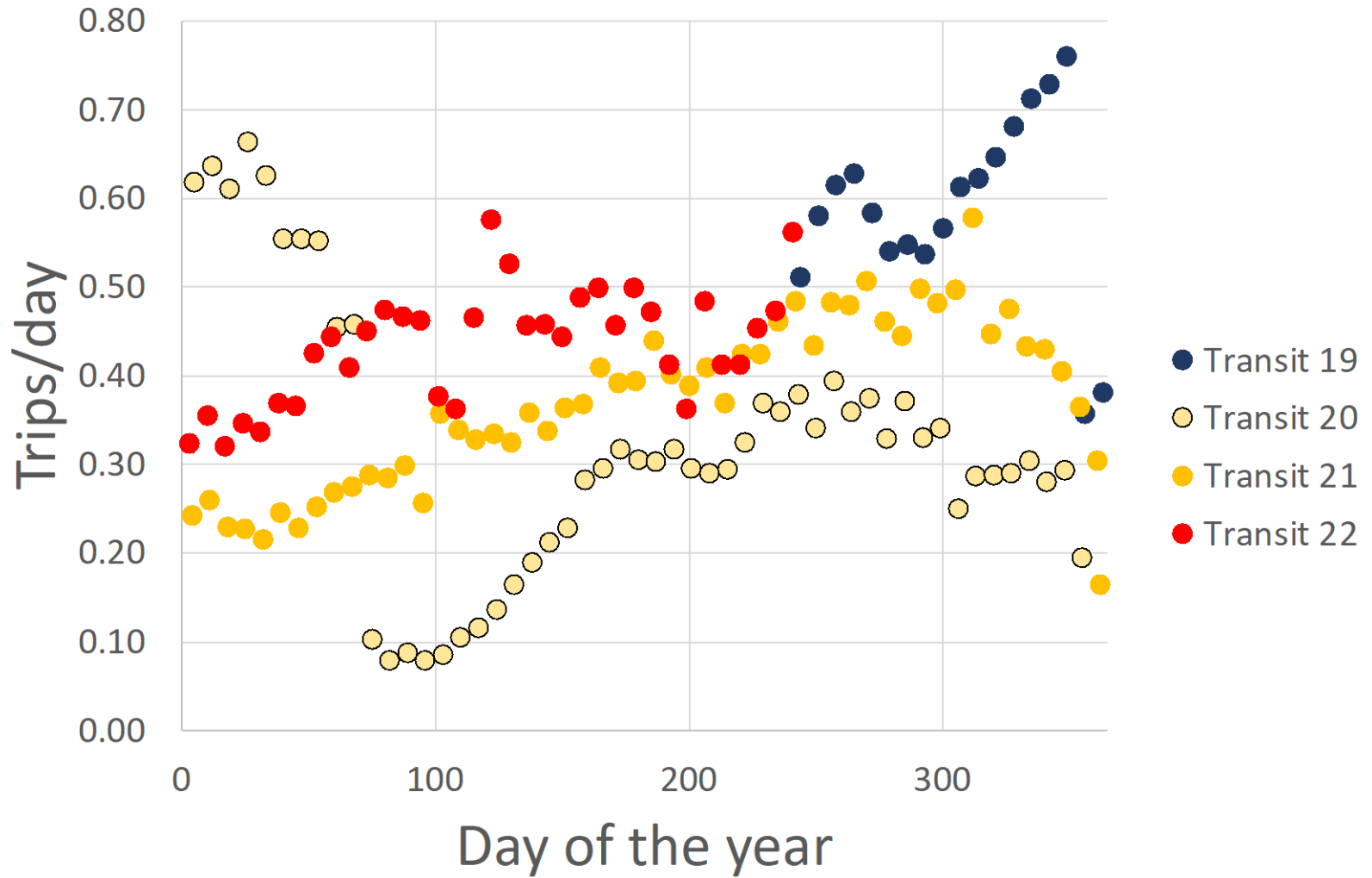# Prelude: Changability of travel behaviour

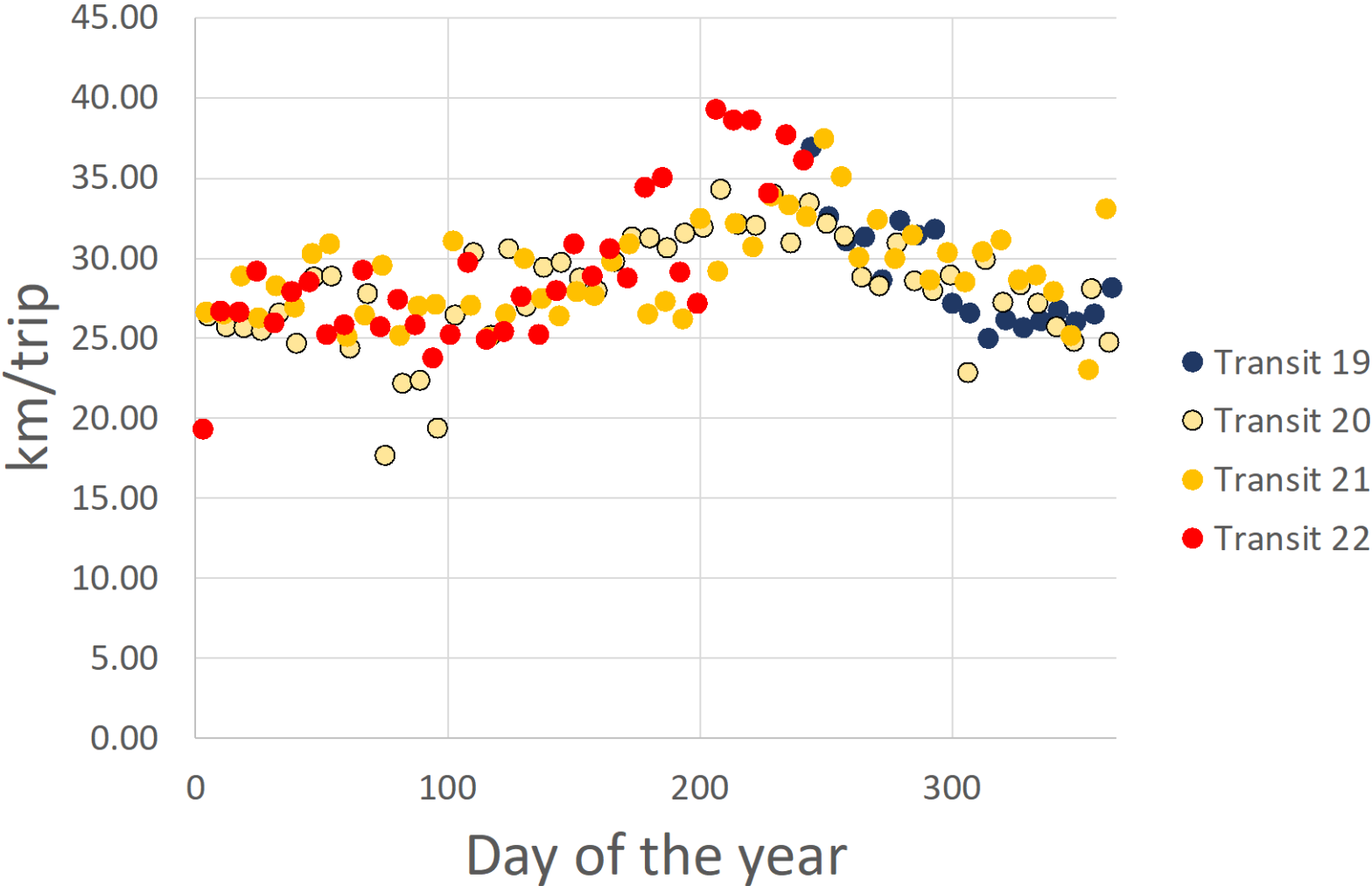# Share of mobiles since September 2019

Source: MOBIS/COVID19 GPS panel

Mobile persons [%]

New confirmed hosptialized cases

Day of year

- MOBIS control group
- COVID19 2020
- COVID19 2021
- COVID19 2022
- Hospital cases 2021
- Hospital cases 2020
- Hospital cases 2022

Seeon 22/09

Average number of transit trips since fall 2019

Seeon 22/09

Average transit trip length since fall 2019

Seeon 22/09

Average number of cycle trips since fall 2019

Seeon 22/09

Average cycle trip length since fall 2019

Seeon 22/09

Dilemma of transport policy

Transport

is a

Normal (private) good

i.e.. it has a negative generalized cost elasticity

Demand elasticities with respect to

|		
Accessibility	Share of mobiles	0.61
	Number of trips	0.44
	Trips per hour	0.24
	Out-of-home time	0.10
	Total distance travelled	1.14
Transport price index	Share of mobiles	-0.06
	Number of trips	-0.19
	Trips per hour	-1.66
	Out-of-home time	-1.95
	Total distance travelled	-0.84

Seeon 22/09

What dilemma ?

What dilemma ?

- Higher accessibility improves productivity and social capital

- Underused unpriced off-peak capacity due to (additional) capacity for population (growth) in the peak (roads, parking, transit) encourages overuse otherwise

- Induced demand due to the lower GC of electric and automated private and public transport

- Working from home making PT less relevant for many

- CO_2 reduction requirements

- Sprawl

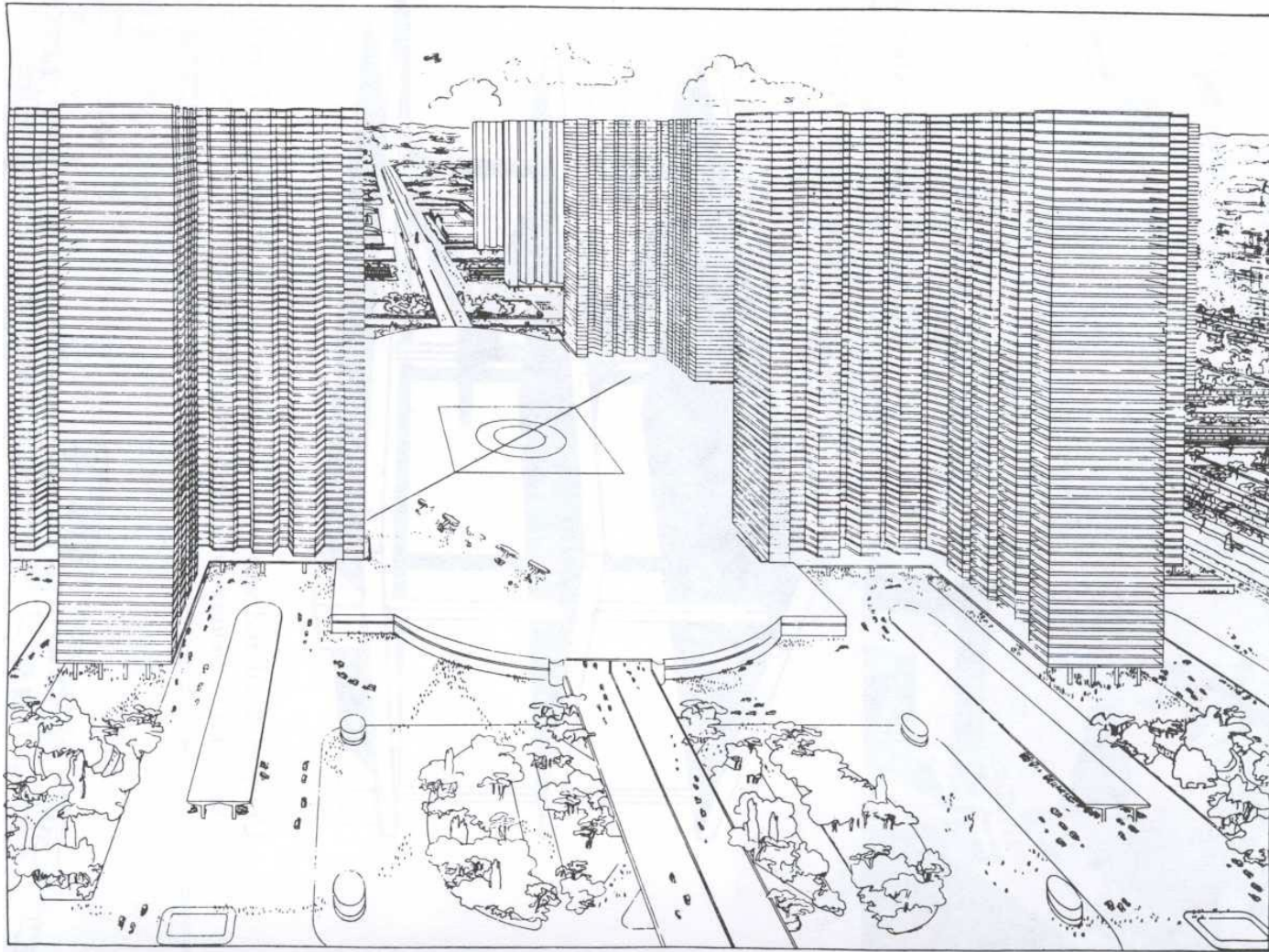- VMT growth and congestion

Nearly fixed urban network capacity =
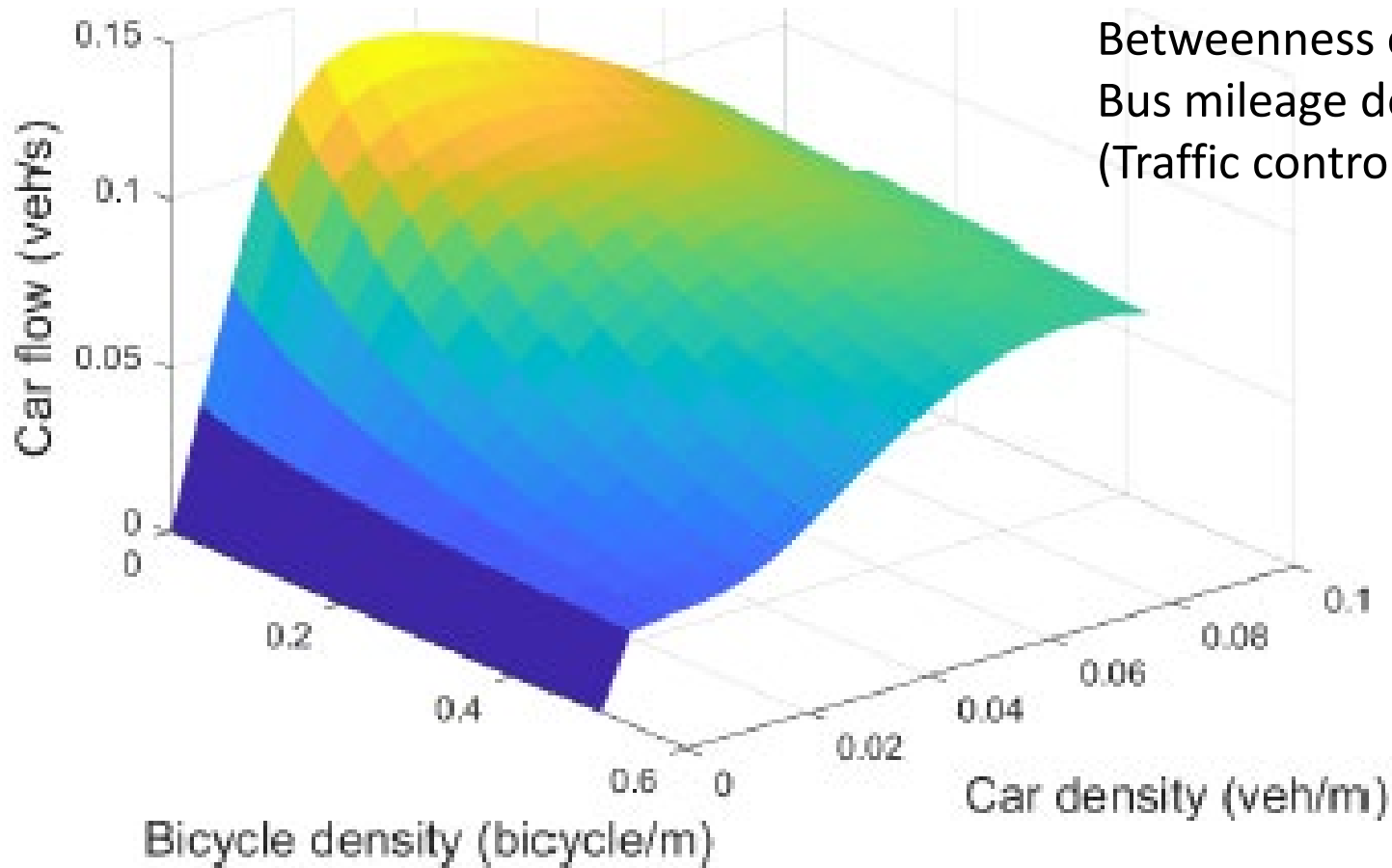
Junction density,
Lane miles density
Betweenness centrality,
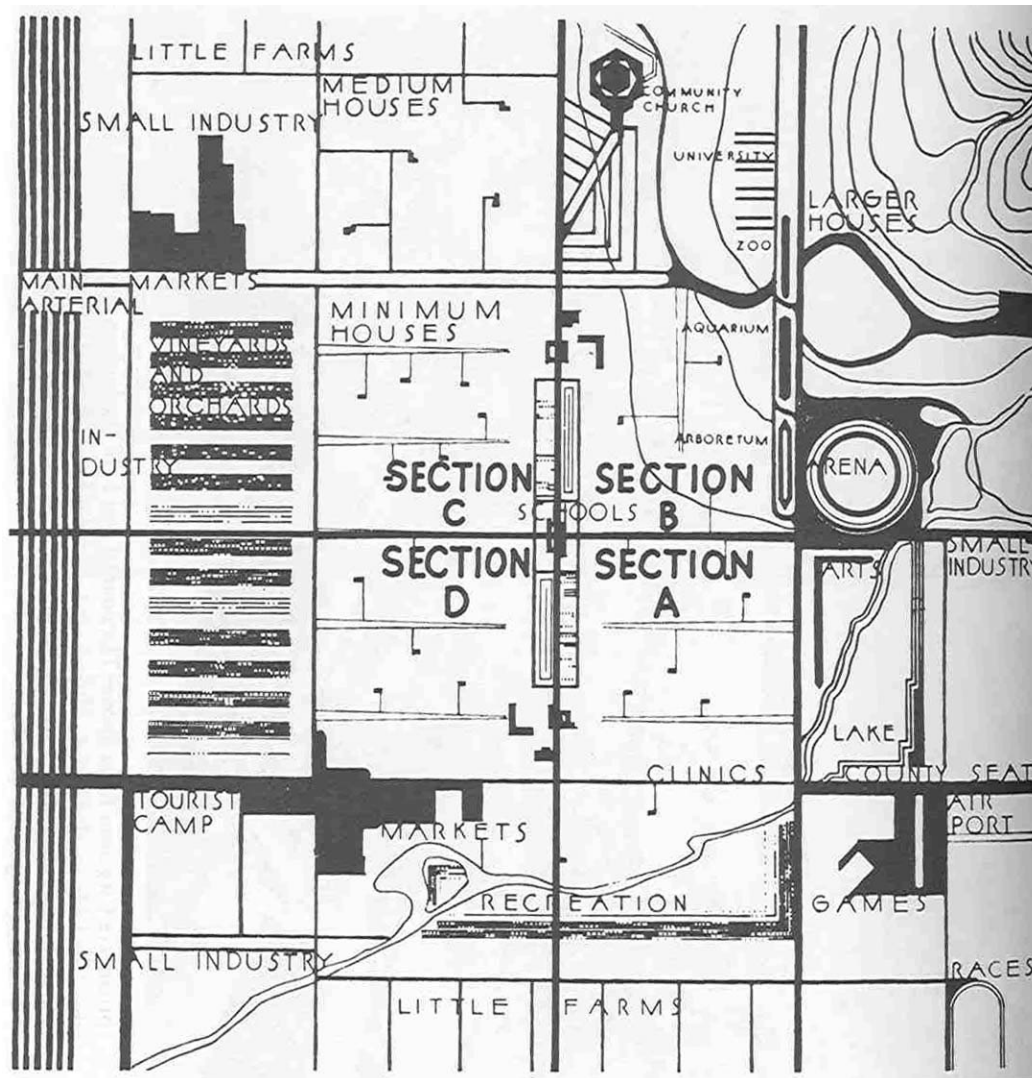Bus mileage density
(Traffic control)

What were the past visions ?

Radical dreams: Le Corbusier's City radieuse

Past radical dreams: Lloyd Wright's Usonia

Past radical dreams: Motorways

Seeon 22/09

Which future are we discussing?

A managed/co-ordinated one

A managed/co-ordinated one

- *Mobility pricing*
  - Two-part tariffs for infrastructure
    - Option fee
    - Pay-as-you-go for usage
  - Congestion pricing
  - (Demand responsive) parking pricing
  - CO_2 pricing
  - Local emission pricing

- MaaS improved shared mobility

A managed/co-ordinated one? Comparison of MOBIS GC
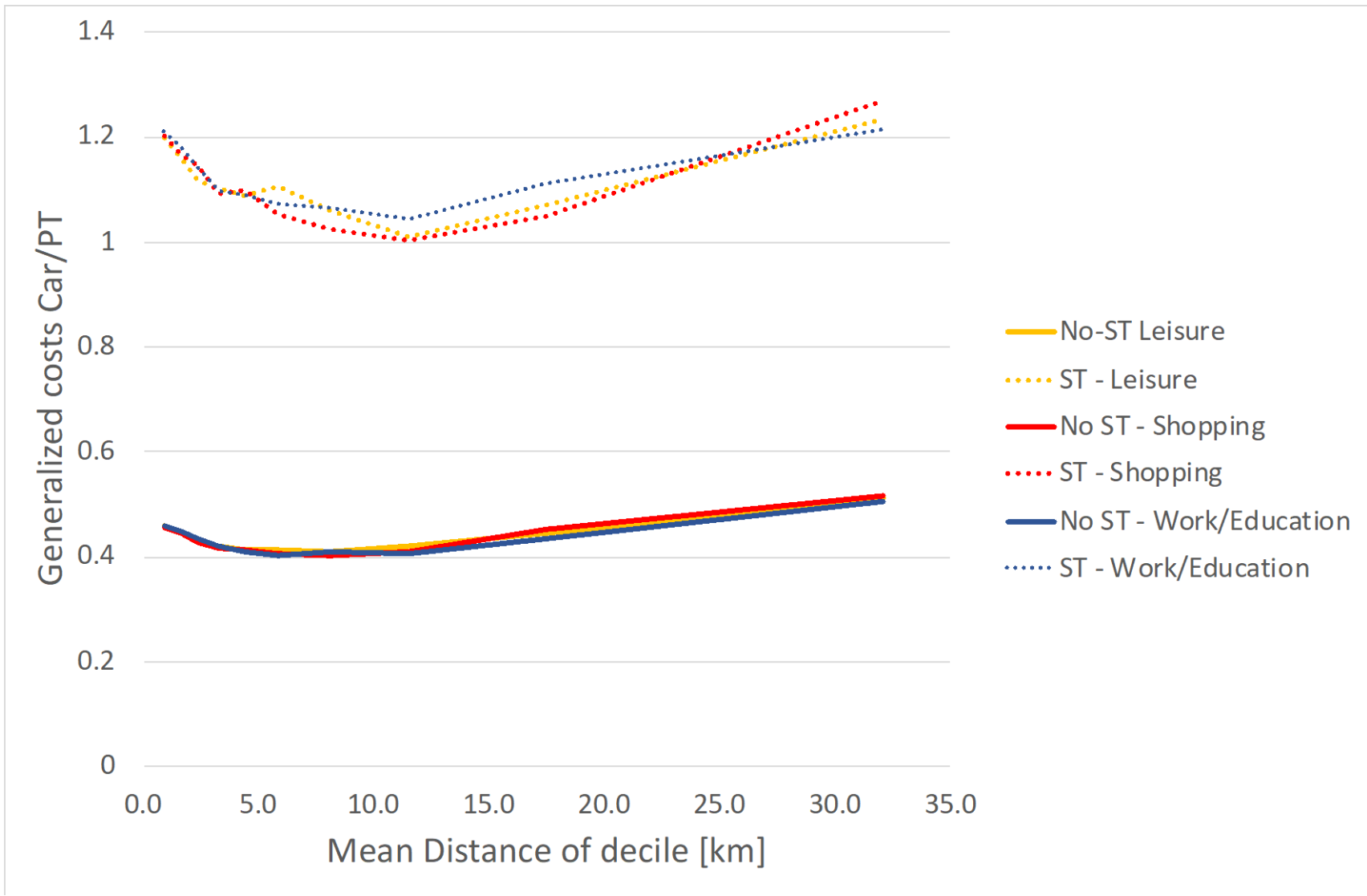
An automated one? First robust cost estimates

Structure of the pkm full costs for today's usage levels

Seeon 22/09
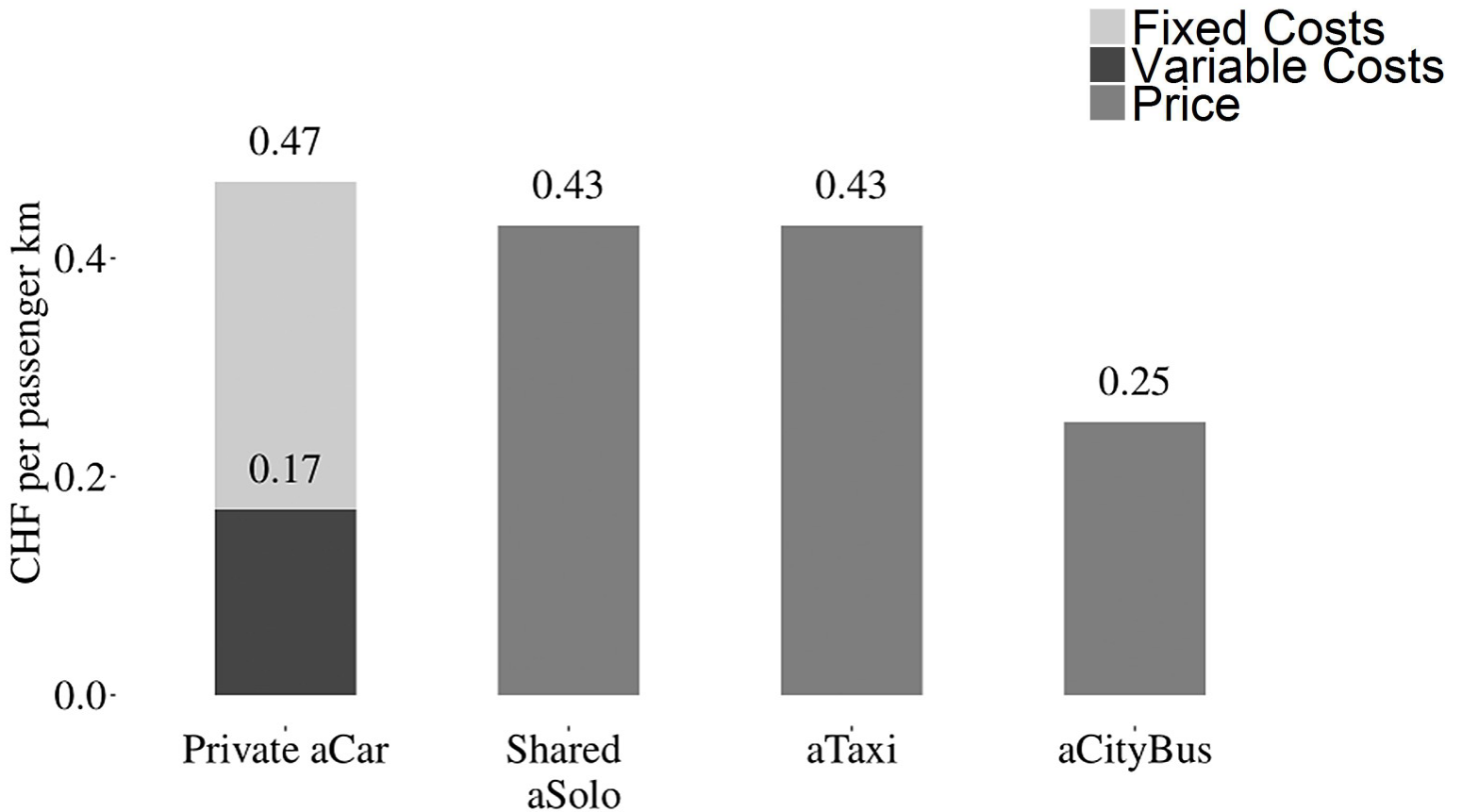
A car free/reduced one,

A car free/reduced one,

- a 15 min city ?

- a net-zero CO_2 city ?

- an e-Bike city ?

An e-bike city?

The idea of an e-bike city

- 50% of road space for slow vehicles (e-bike, bike etc.)

- Maintaining of current accessibility levels (for all)

- Integration with shared services for the larger demand variations

Can we model such radical changes?

Supply side dimensions

- Change of building uses (Residential, Third-spaces, social, commercial)
- Densification
- New buildings
- "Rückbau" (demolition and reuse)

- Road space allocation
- One-way-street optimisation
- Placement of additional road links/bridges/tunnels

- Placement of bus-lanes/tram/light rail alignments and of stops
- Sizing of "Large vehicle"/"Small vehicle" public transport fleets
- Timetable and service network design
- Sizing of active mode "shared" vehicle fleets
- Repositioning of shared fleets

- Optimal pricing

Activity scheduling dimensions

Time use (especially WFH, secondary activities and e-shopping)
Number and type of (out-of-home) activities
Sequence of (out-of-home) activities

- Start and duration of activity
- Composition of the group undertaking the activity
- Expenditure division
- Location of the activity
  - Location of parcel pickup/delivery

  - Movement between sequential locations
    - Location of access and egress from the mean of transport
      - Parking type
      - Parking search
    - Vehicle/means of transport
    - Route/service
    - Group travelling together
    - Expenditure division

Activity scheduling dimensions: Data needs (examples)

- Joint survey/tracking of time use, location, expenditure and group composition
  - TimeUse+ survey
- Number of deliveries and the delivery points
  - MSc Mesaric
  - Small surveys (MOBIS/COVID19 survey)
- Parking behaviour
  - Search
  - Location and price paid
- Mobility tool ownership
  - Car
  - Season ticket
  - Sharing "memberships"
- Location quality
  - "Value for money"
  - Crowding and service levels

Questions?

- www.ivt.ethz.ch

- ivtmobis.ethz.ch/mobis/covid19/

- www.ivt.ethz.ch/forschung/mobis.html

Data needs and IVT examples: Papers

Becker, H., A. Loder, B. Schmid and K.W. Axhausen (2017) Modeling car-sharing membership as a mobility tool: A multivariate Probit approach with latent variables, *Travel Behaviour and Society*, **8**, 26–36.

Erath, A. (2006) Value of travel time savings for shopping trips in Switzerland: Conference paper STRC 2006, paper presented at the *6th Swiss Transport Research Conference*, Ascona, March 2006

Mesaric, R., A. Meister, C. Winkler, T. Schatzmann and K.W. Axhausen (2021) How many people come to our door?, paper presented at the *100th Annual Meeting of the Transportation Research Board (TRB 2021)*, online, January 2021.

Tchervenkov, C. and K.W. Axhausen (2022) Measuring parking search behaviour using GPS data, paper presented at the *22nd Swiss Transport Research Conference (STRC 2022)*, Ascona, May 2022.

Winkler, C., A. Meister, B. Schmid and K.W. Axhausen (2022) TimeUse+: Testing a novel survey for understanding travel, time use, and expenditure behavior, paper submitted for presentation at the *102nd Annual Meeting of the Transportation Research Board (TRB 2023)*, Washington, D.C., January 2023.