

SHARING AS A KEY TO RETHINK MOBILITY: INVESTIGATING AND MODELING SHARED MOBILITY

F. Ciari

May 2016

 Institut für Verkehrsplanung und Transportsysteme
Institute for Transport Planning and Systems

ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Context

Societal Context

Sharing

- Information, pictures, video, etc.
- Objects

“Servicizing”

- Access to resources instead owning them

Car culture (no more)

- Young generations less interested in owning a car

Shared Mobility Services

- The world of shared mobility is **evolving fast** and **new services** are coming to the market to **challenge/complement** the **old ones**
 - Round trip-based carsharing
 - One-way (station based) carsharing
 - Free-floating carsharing
 - Peer-to-peer carsharing
 - Bikesharing
 - Carpooling
 - (Dynamic) ridesharing
 - Slugging
 - ...

Modeling shared mobility

Why do we need to model shared mobility demand?

Because...

- The **actors** involved are increasingly **large** → Able to have a “big bang” approach, implies **large investments**
- The level of **competition** on the market is increasing → **Higher investment risk**
- The world of shared mobility is **evolving fast** → Uncertainty about **integration/competition** among different modes/systems
- Automation → Additional **boost** for shared modes, **convergence** of various concepts (i.e. taxi and carsharing)

Methodology: Observations

- Inherent **limitations** of **traditional models** representing carsharing – the importance of CS **availability** at **precise points** in **time** and **space** is not fitting with vehicles per hour flows
- **Travel** is the result of the **individual need** performing out-of-home **activities** at different locations – this matters for carsharing even more than for other modes! (according to the length / location of the activities)

Methodology: Agent-Based Simulation

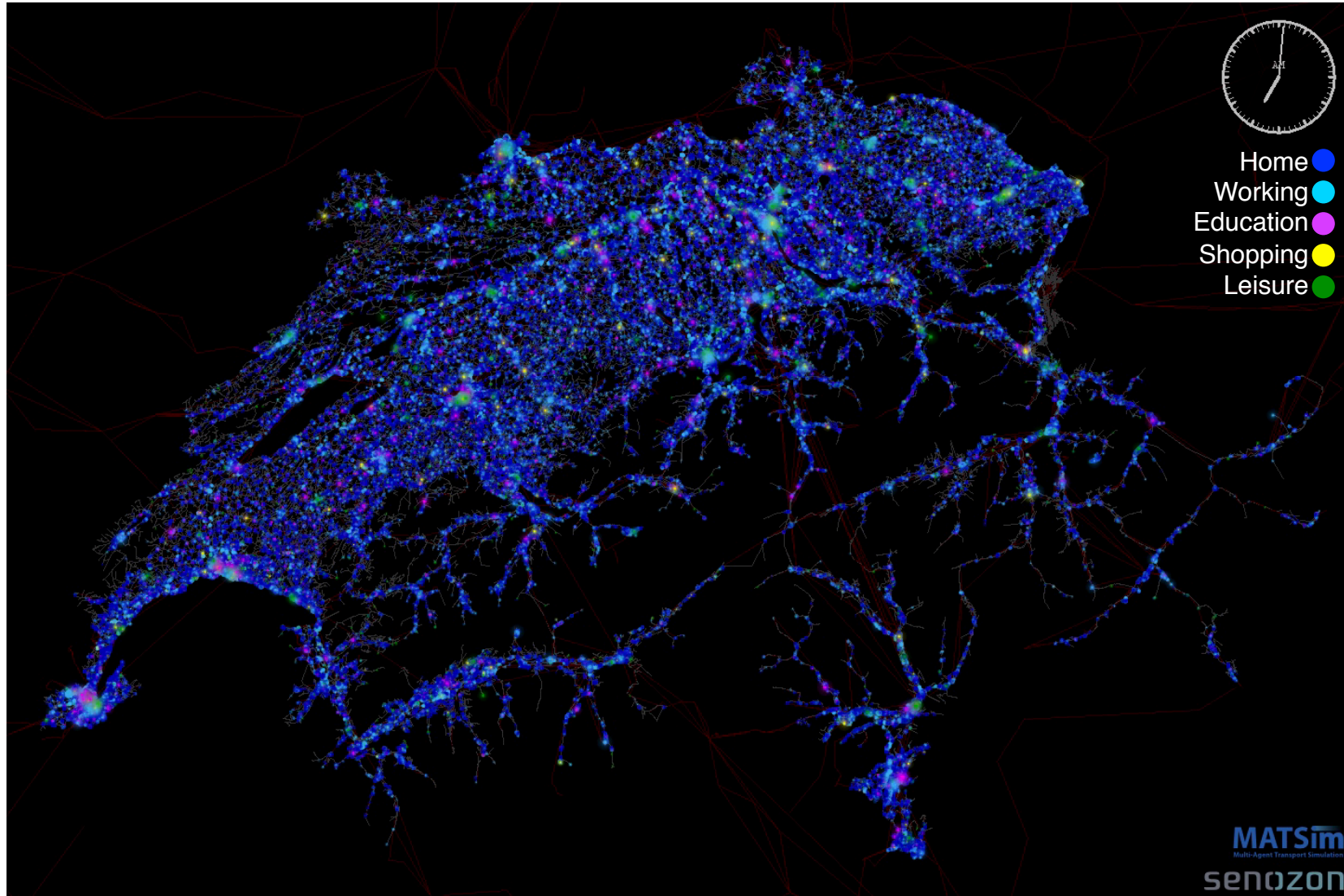
MATSim (Multi-agent transport simulation, www.matsim.org)

It sketches **individuals' daily life** using the agent paradigm.

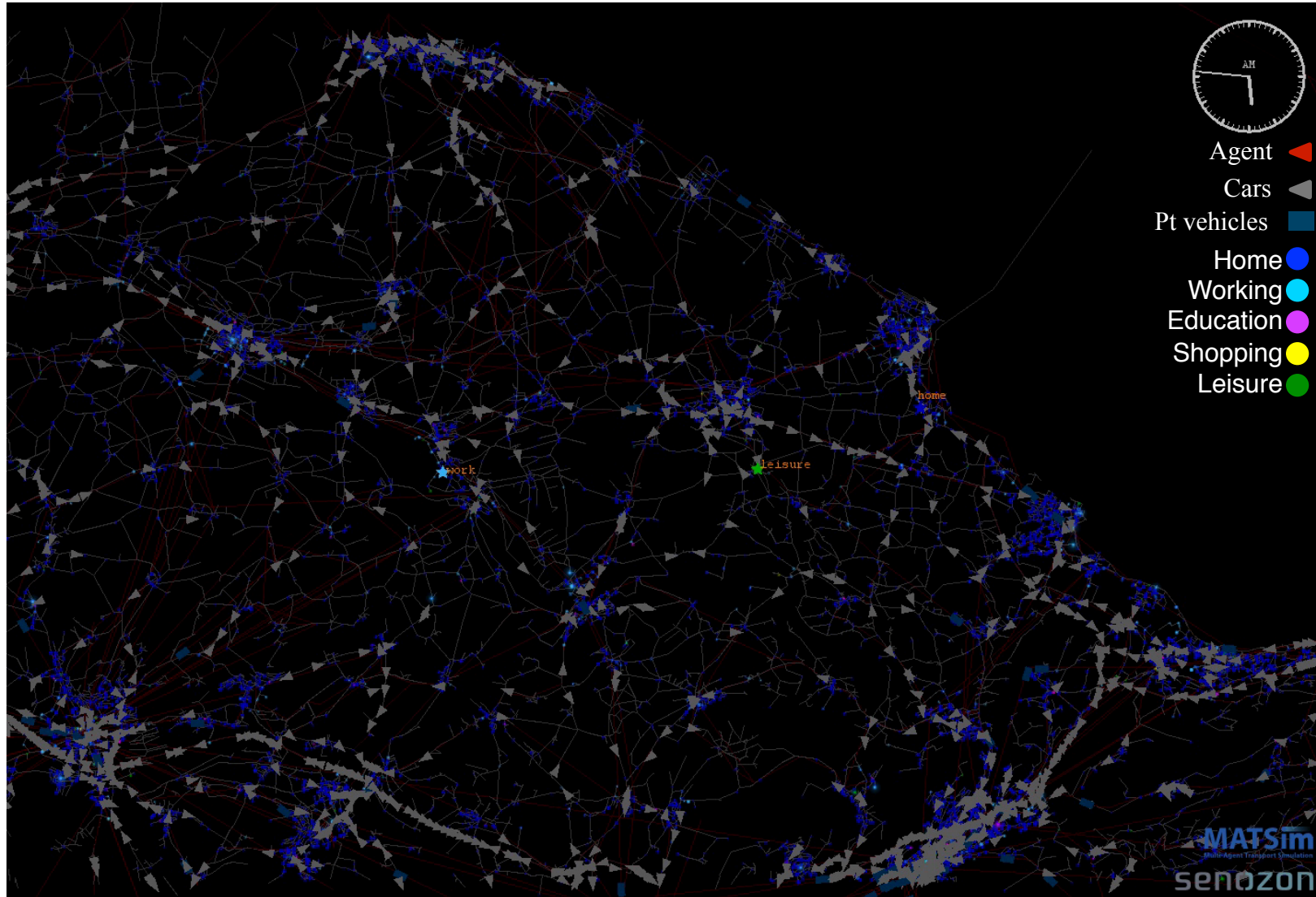
Agents have **personal attributes** (age, gender, employment, etc.)
which influence their behavior

Agents **autonomously** try to **carry out a daily plan** as well as they
can being able to **modify** some dimensions of their **travel** (time,
mode, route, activity location)

Visualisation: Activities



Visualisation: Day plans



Some recent research on shared mobility

Modeling carsharing with the agent-based simulation MATSim: state of the art, applications and future developments (Ciari et al., 2016, Transportation Research Record)

Evaluating the influence of parking space on the quality of service and the demand for one-way carsharing (Balac et al. 2016, TRB Proceedings)

Modeling the effect of different pricing schemes on free-floating carsharing travel demand: a test case study for Zurich, Switzerland, (Ciari et al., 2015, Transportation)

Carsharing demand estimation: Case study of Zurich area (Balac et al., 2015, TRR)

Enhancement of the carsharing fleet utilization (Balac and Ciari, 2015, STRC Proceedings)

Carpooling: some findings for Switzerland

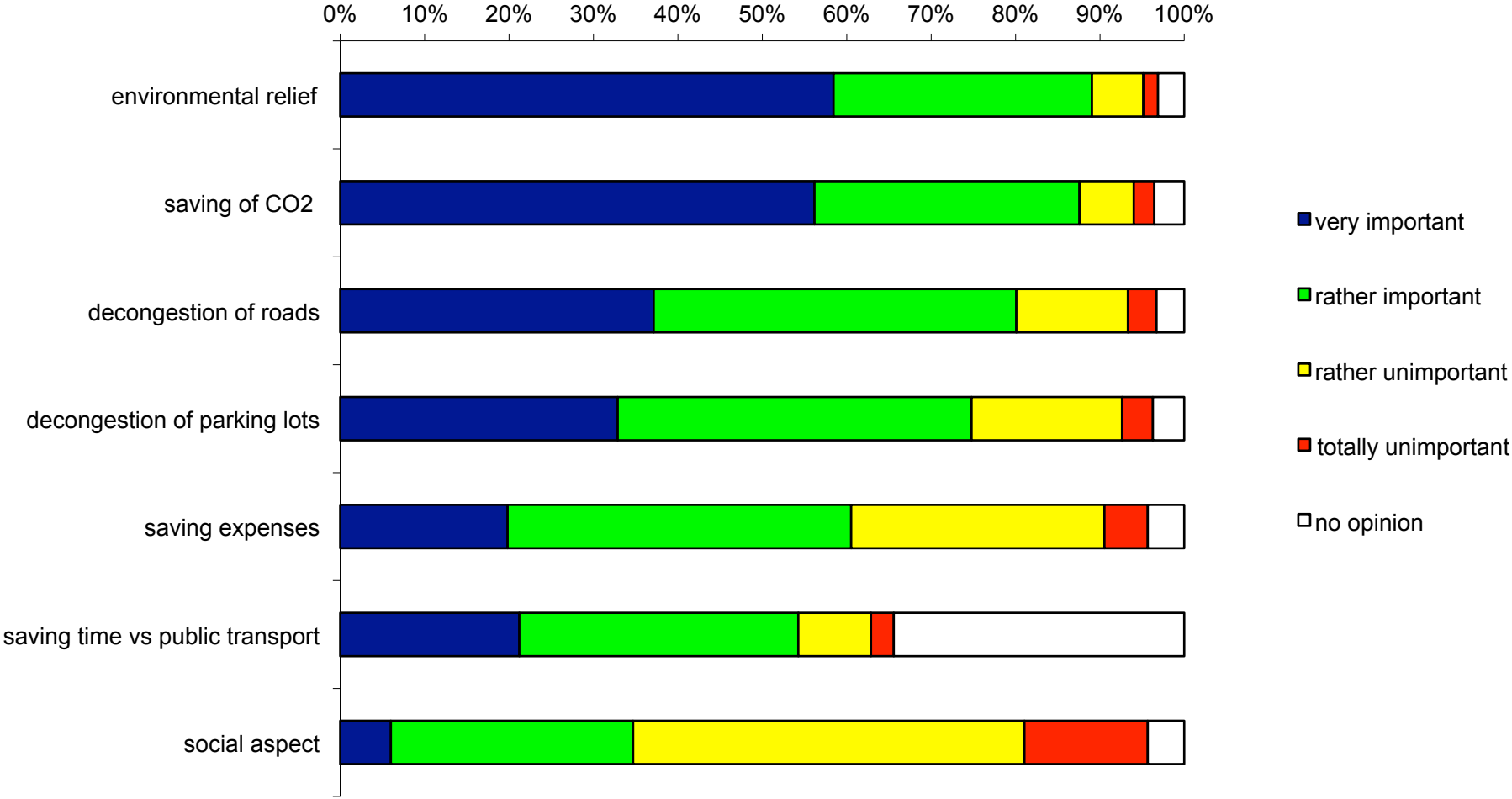
The study

- Goal
 - Understand and model the attitude toward carpooling of the Swiss public
- Methodologies
 - Discrete choice modeling
 - Qualitative and cluster analysis
- Data
 - Survey with stated choice exercise and qualitative questions
 - Stated choice exercise based on reported trips
 - 1683 persons recruited in Switzerland (51% response rate)
 - Stated choice on carsharing as benchmark

Attitude toward carpooling

- Positive Attitude: 76% Positive
- Readiness to participate: 51% would participate
- Most important characteristics of the trip-mate: Driving style, Smoker, Appearance/Demeanor
- Basis for sharing the costs: Gasoline cost (70%)
- Maximal deviation for the Driver: up to 10 Minutes (83%)
- Barriers: Time adjustments, Fixed working time, Risk not being picked up
- Preferred incentives: Back-to-home guarantee, Pooling Platform, Financial incentives

What motivate potential carpoolers?



Cluster analysis

- **Not interested / Negative (4.5%)**
 - No factors
 - Older, small HH, high or low Income, Retired
- **Pragmatic (18.8%)**
 - Egoism and Convenience
 - Young, avg. to high Income, Employed
- **Skeptical environmentalist (45%)**
 - Environment / Altruism and Reliability / Safety
 - Female, avg. to low Income, PT oriented
- **Enthusiastic environmentalist (31.7%)**
 - Environment / Altruism
 - Young to middle age, avg. to high Income, Well educated, Employed

Main Findings

- Overall, the existence of a good unexploited potential for carpooling in Switzerland is suggested.
- In general the public shows interest in innovative transport solutions
- Technology might help exploiting this potential

Summary

- Modeling shared mobility is necessary
- Some tools exist, but there is limited awareness
- The context is positive for innovation in transport and for all forms of “shared mobility”
- A time full of opportunities, but policies are sometimes lagging behind the (r)evolution

Thank you for your attention!

ciari@ivt.baug.ethz.ch

www.matsim.org