Institut français
des sciences et technologies
des transports, de l'aménagement
et des réseaux

How to anticipate lifestyles changes brought about by autonomous vehicles?

Insights from an analysis of methods

Thomas LE GALLIC

November 19 & 20, 2018

swiss mobility conference

IFSTTAR

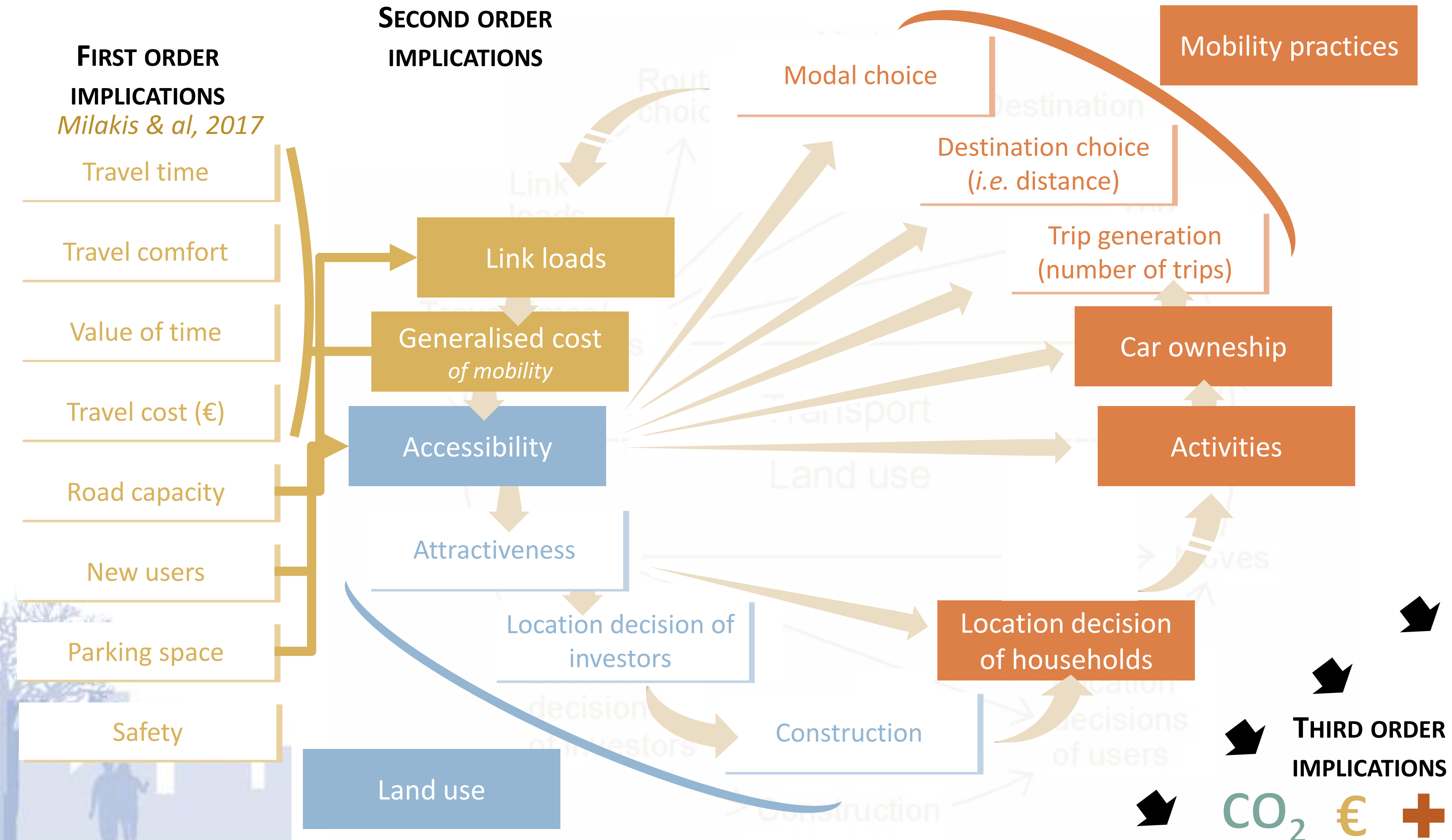
LVMT Laboratoire Ville Mobilité Transport

INTRODUCTION & READING GRID

WHAT MIGHT BE THE IMPLICATIONS OF AUTONOMOUS CARS FOR LIFESTYLES?

Direct and indirect implications

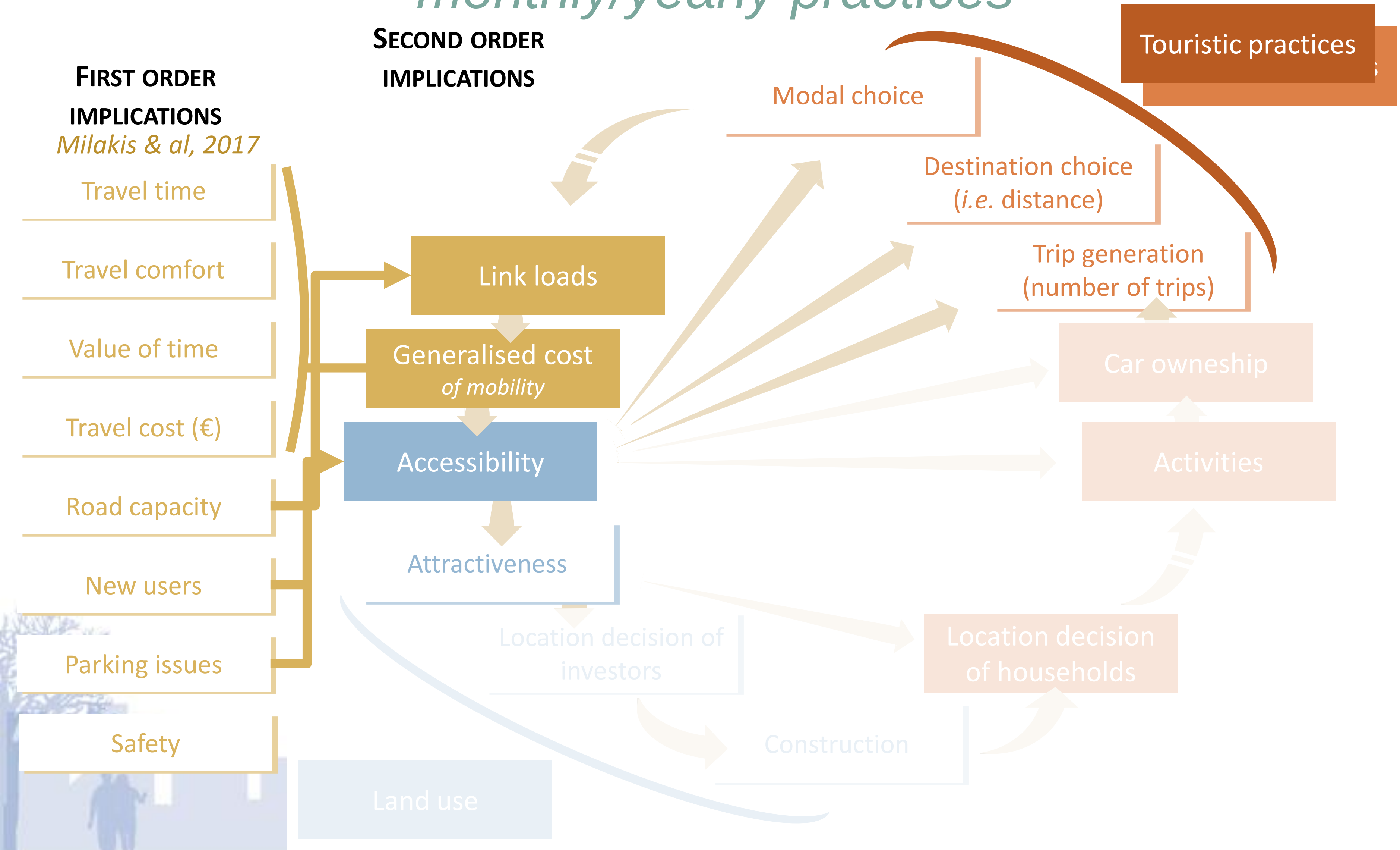
daily practices



Inspired by Wegener, 1994 and Milakis & al, 2017

Direct and indirect implications

monthly/yearly practices



Inspired by Wegener, 1994 and Milakis & al, 2017

A reading grid of these implications

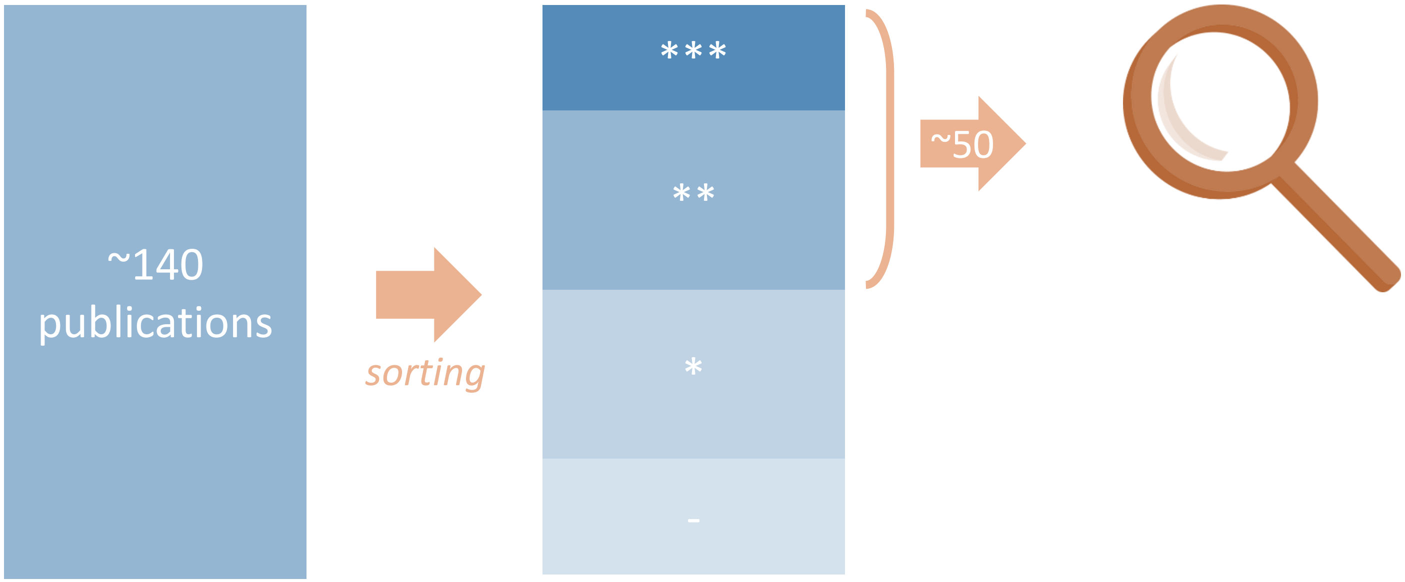
Five components of lifestyles

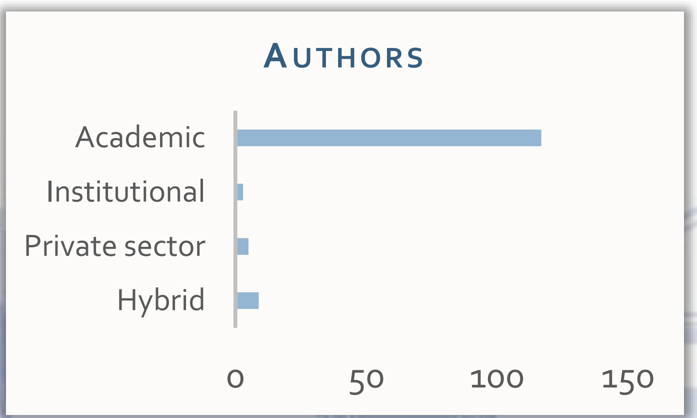
MOBILITY PRACTICES	
CAR OWNERSHIP	
RESIDENTIAL LOCATION	
ACTIVITIES	
TOURISTIC PRACTICES	

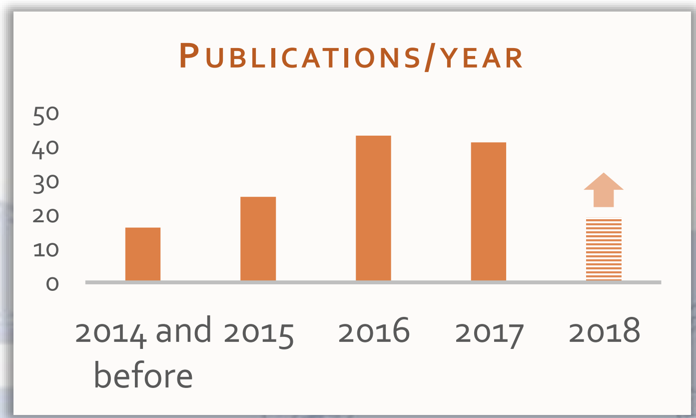
CORPUS

ANALYSING EXISTING RESEARCH

Corpus


~140
publications
sorting
***
**
*
-
~50


AUTHORS
Academic
Institutional
Private sector
Hybrid
0
50
100
150


PUBLICATIONS/YEAR
50
40
30
20
10
0
2014 and before
2015
2016
2017
2018

CHALLENGE | Anticipating **future human behaviors** and **social organisation**

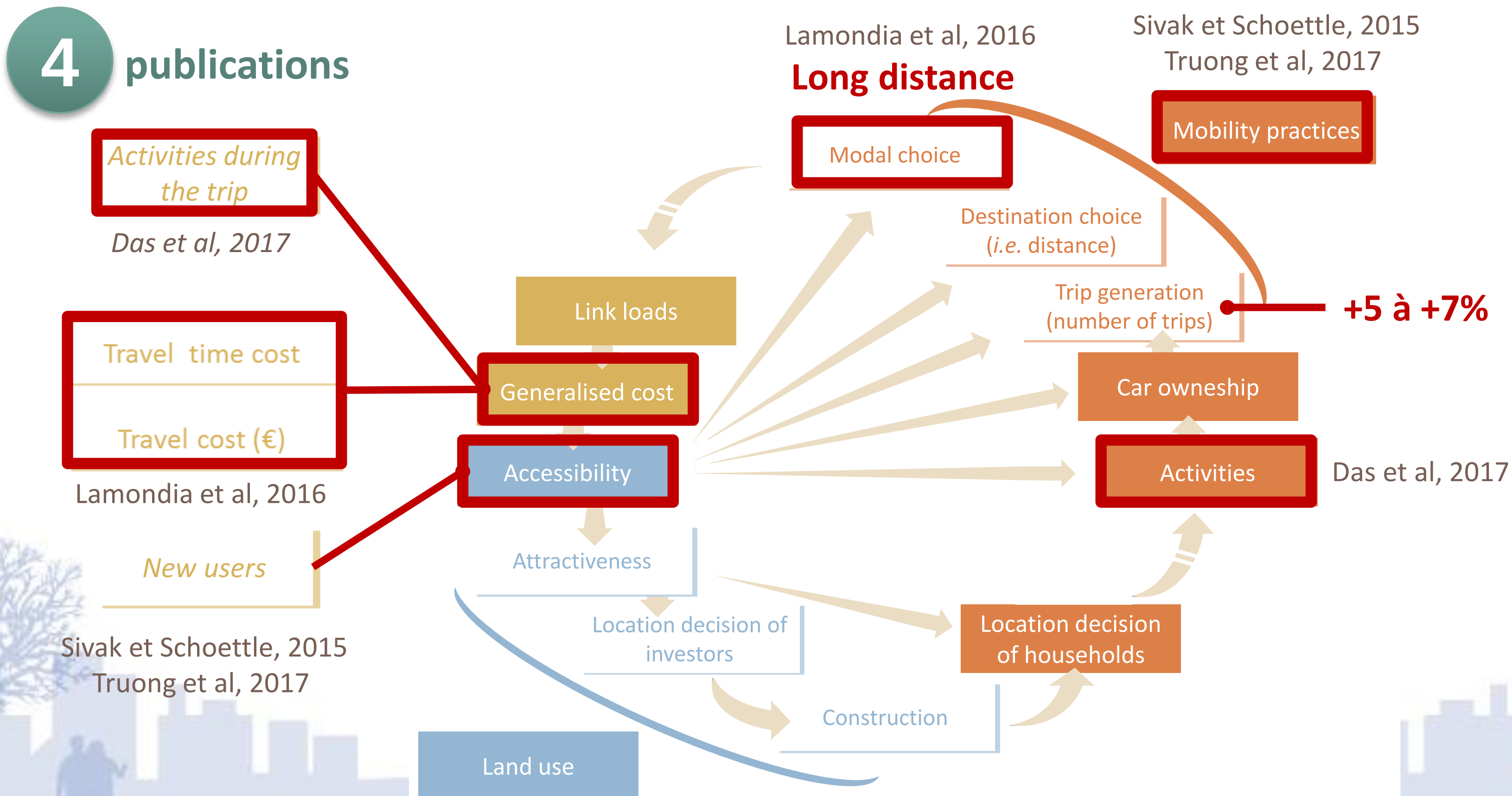
ANALYSIS

*HOW TO ANTICIPATE LIFESTYLE CHANGES BROUGHT ABOUT BY THE DIFFUSION OF AN **UNAVAILABLE** TECHNOLOGY?*

4 GROUPS OF METHODS

I. Extrapolations: *considering analogies*

Rationale: use of existing data on current behaviours in order to identify analogies, to consider current practices as **proxies** for future ones



II. Modelling approaches (1)

Rationale: simulating new services/new modes through modelling framework

TYPE 1

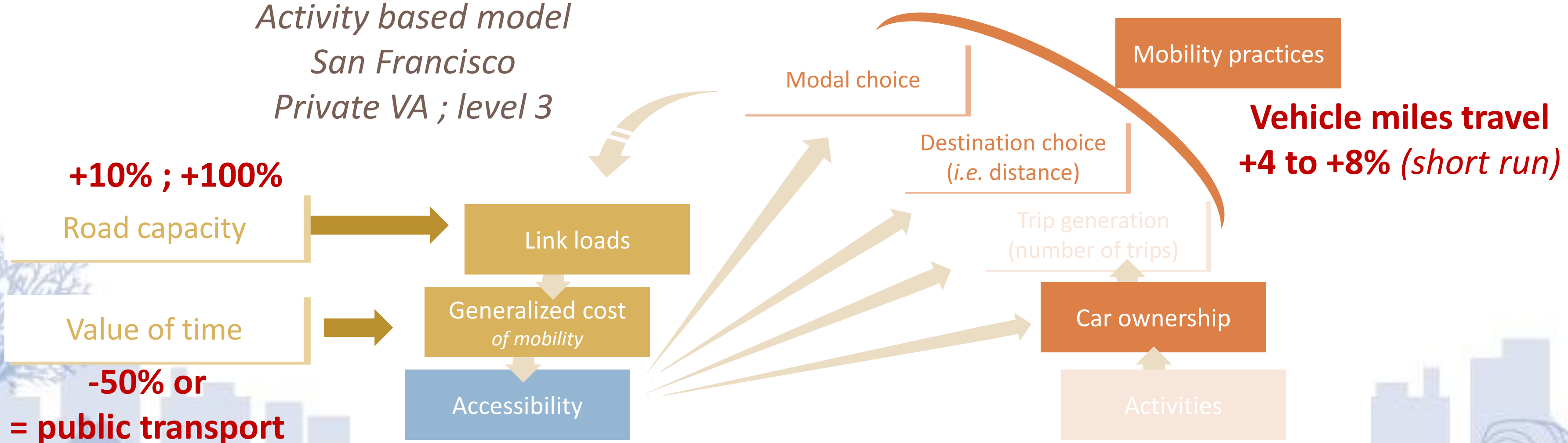
MOBILITY PRACTICES

New services are simulated with **mobility and transportation models**

- with new values to "value of time", "road capacity", "travel time" parameters
- Results are expressed in terms of **mobility practices**, and/or fleet size

Example

Gucwa, 2014
Activity based model
San Francisco
Private VA ; level 3



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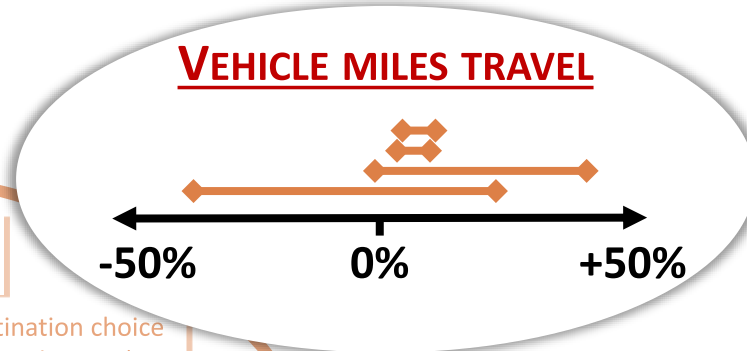
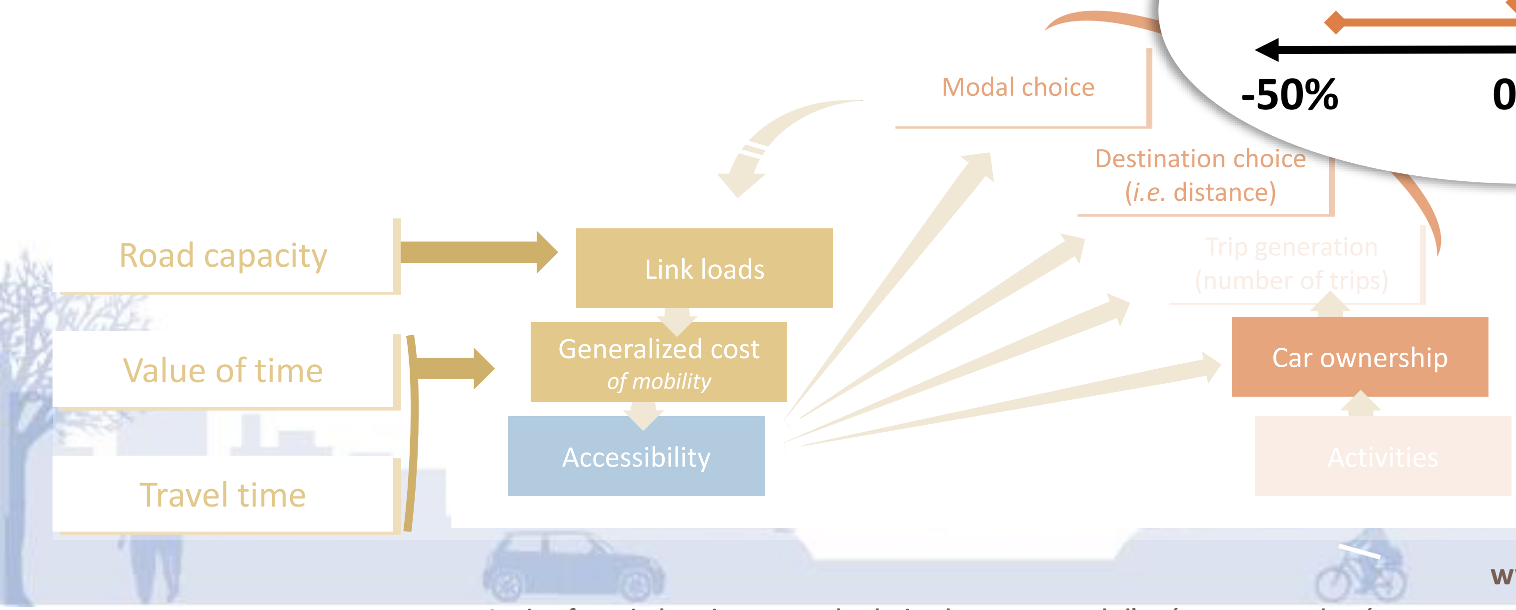
8 publications

Gucwa, 2014; Levin & Boyles, 2015; Childress et al, 2015; Liu et al, 2017; Kröger et al, 2018; Auld, 2018; Cyganski et al, 2018; Simoni et al, 2018





II. Modelling approaches (2)

Rationale: simulating new services/new modes through modelling framework

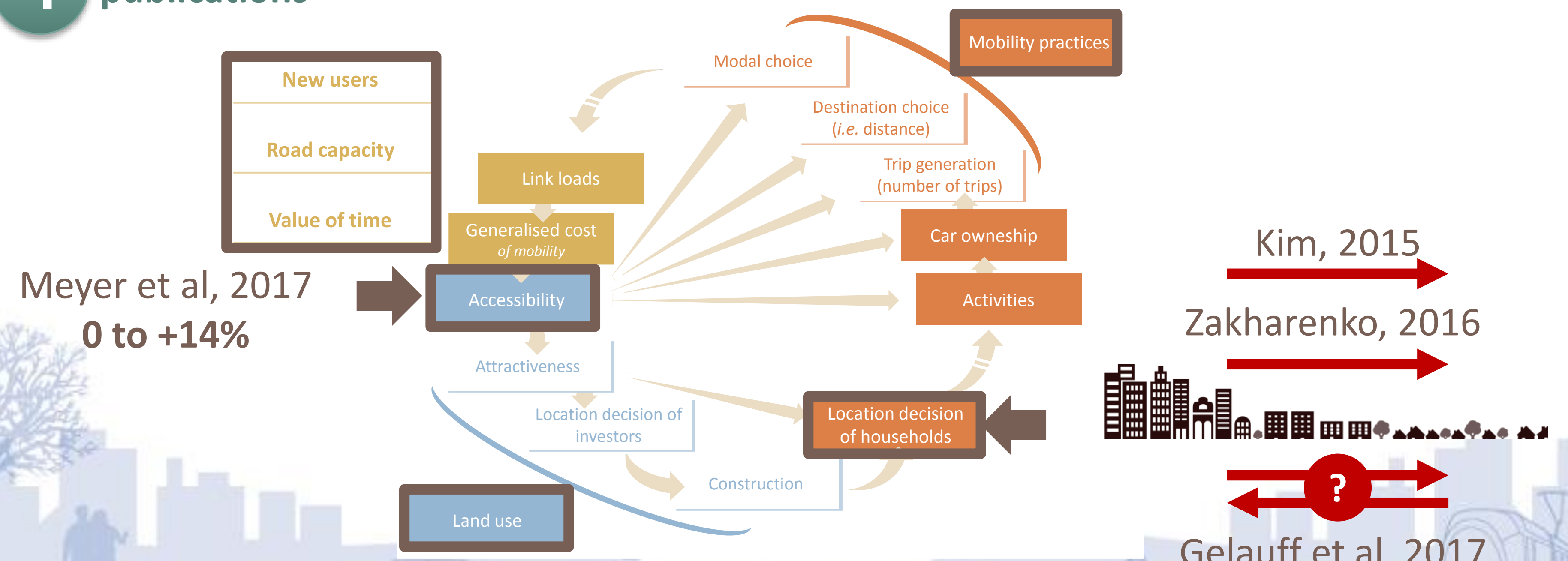
TYPE 2

SPATIAL IMPLICATIONS

New services are simulated with **land use / transportation models**

- new values for "value of time", "road capacity" parameters (and "new users")
- Results are expressed in terms of **spatial dynamics**, **residential location,** or **accessibility**

4 publications



II. Modelling approaches (3)

Rationale: simulating new services/new modes through modelling framework

Type 3

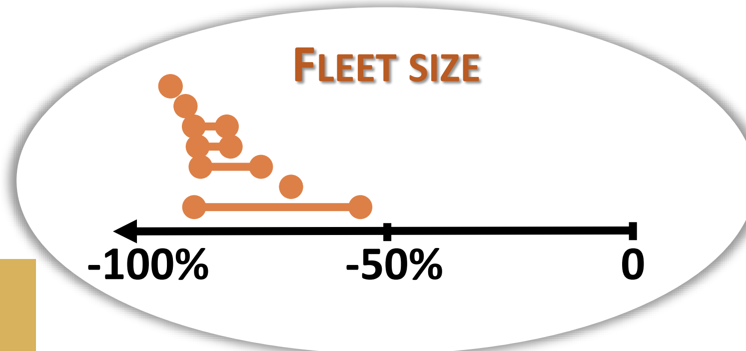
Optimising new services

New services are simulated through **operationnal research**

- The simulated service have to satisfy a mobility demand (which is an input)
- Results are expressed in terms of **fleet size**, performance of the service: **travel time**, waiting time, empty vehicule-miles, economic profitability, …

11 publications

Fagnant et Kockelman, 2014; Spieser et al, 2014
Itf, 2015; Zhang et al, 2015
Liang et al, 2016 ; Correia et al, 2016; Boesch et al, 2016; Chen et al, 2016; Fagnant et Kockelman, 2016
Masoud et Jayakrishnan, 2017
Kong et al 2018



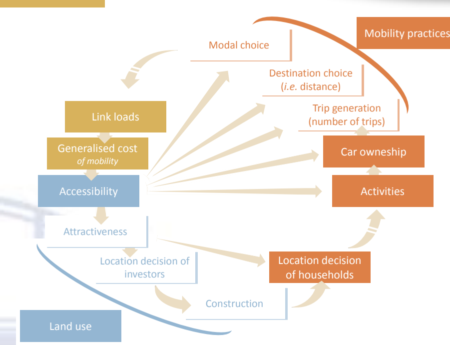
Link loads

Travel time

Travel cost (€)

Parking issues

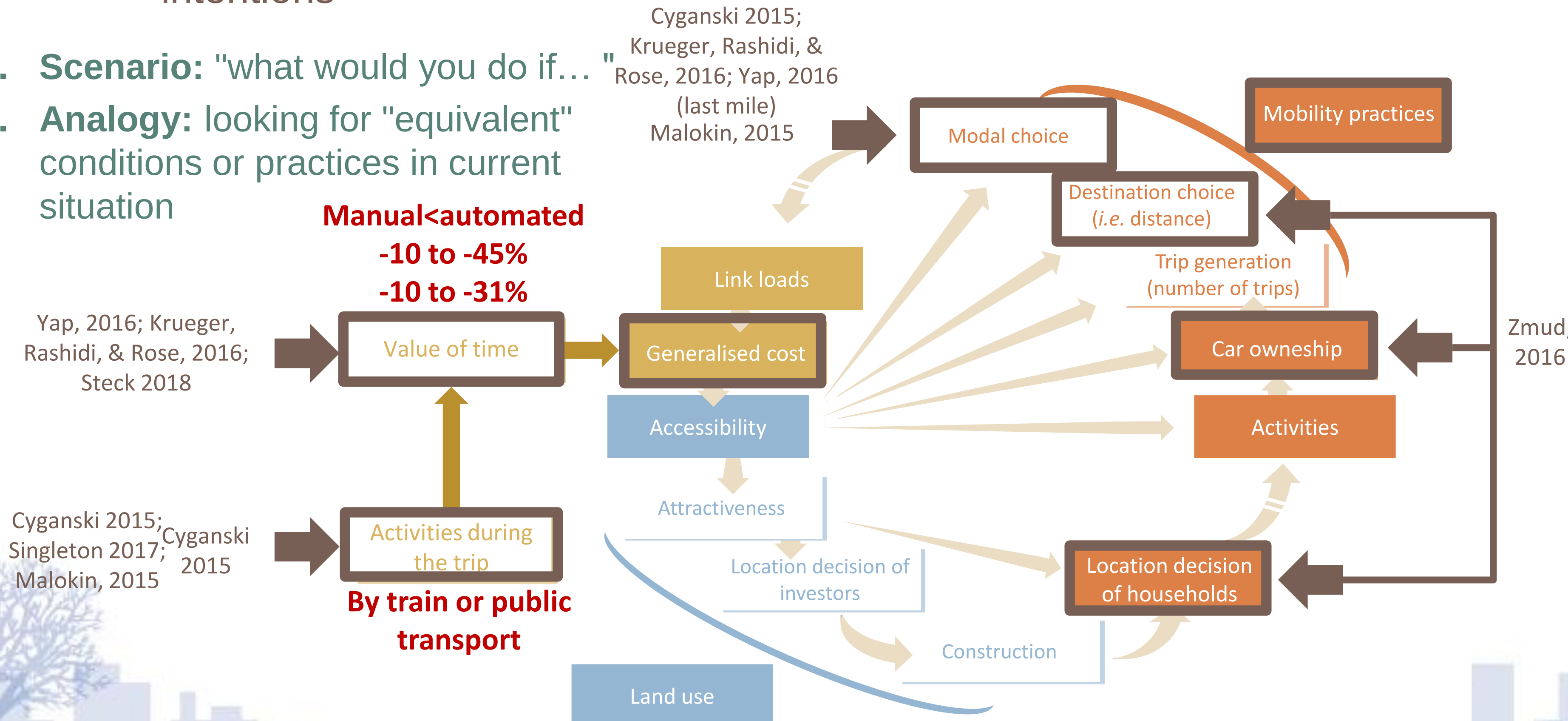
Car owneship



III. Surveys: *"asking people of today"*

- **Rationale:** surveying people about their current practices, perceptions and intentions

1. **Scenario:** "what would you do if… "
2. **Analogy:** looking for "equivalent" conditions or practices in current situation



8 publications

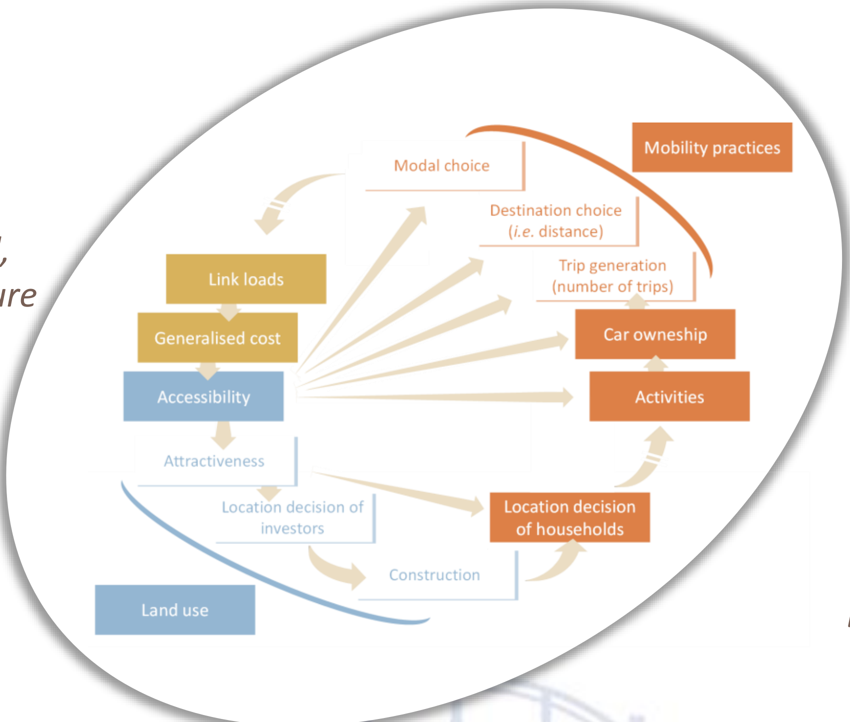
IV. Scenario planning methods

Rationale: developping a conceptual representation of the system in order to discuss and assess implications of the widespread automous car deployment

5 publications

INPUT

Expertise, questions, method, conceptual framework, literature review, weak signals



OUTPUT

Risk analysis *(Saujot et al, 2018)*
Quantitative estimations *(Brenden et al, 2017; Milakis et al, 2017b)*
Identification of critical decisions *(Papa and Ferreira, 2018)*
Qualitative analysis *(Gruel and Stanford, 2016)*

Better understanding of the system

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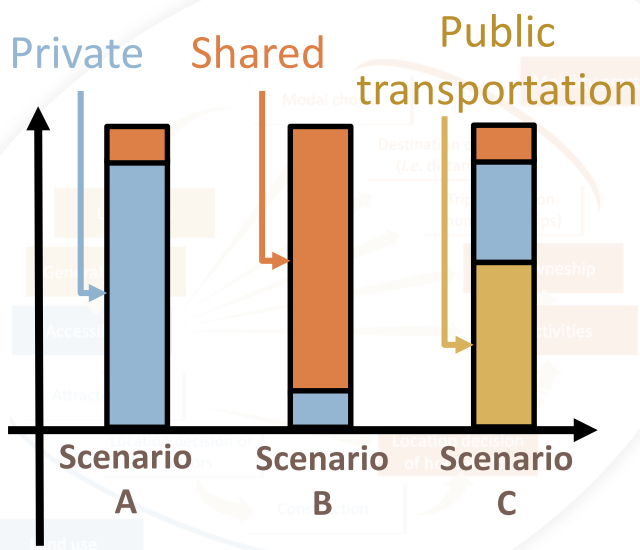

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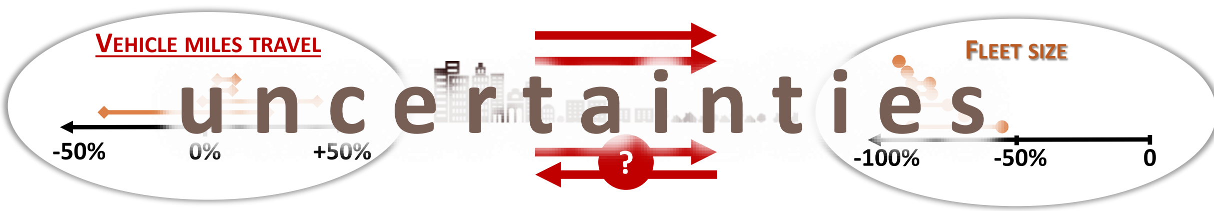
CONCLUSION

Conclusion

- MOBILITY PRACTICES
- CAR OWNERSHIP
- RESIDENTIAL LOCATION
- ACTIVITIES
- TOURISTIC PRACTICES



? Exploratory

Conclusion

*We have to wonder **IF** and **HOW** autonomous vehicles could contribute to better and more sustainable mobility and lifestyles.*

Cyganski et al, 2015
-10 to -45%
Uncertainties
Car sickness
Diels et Bos, 2016
Value of time
Singleton, 2017, 2018
Debate
-10 to -31%
Manual<automated

Mobility practices	
Car ownership	
Residential location	
Activities	
Touristic practices	

u n c e r t a i n t i e s

New services
Personal car
Families
Public transport
Level 4
Public space
Future organization
Ride sharing
Level 5
Dedicated lanes
Car sharing

New services
New uses
Taxis
Public space
Level 4
Scenarios
Going further
Emerging practices
Pricing policies
Current perception
New methods
Uber like

THANK YOU FOR YOUR ATTENTION

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