



VERNETZUNGS-  
VERANSTALTUNG  
CARSHARING

Prof. Dr. Wolfgang Gruel

Don't worry about car-sharing. It will be gone before it actually took off.

W h y ?



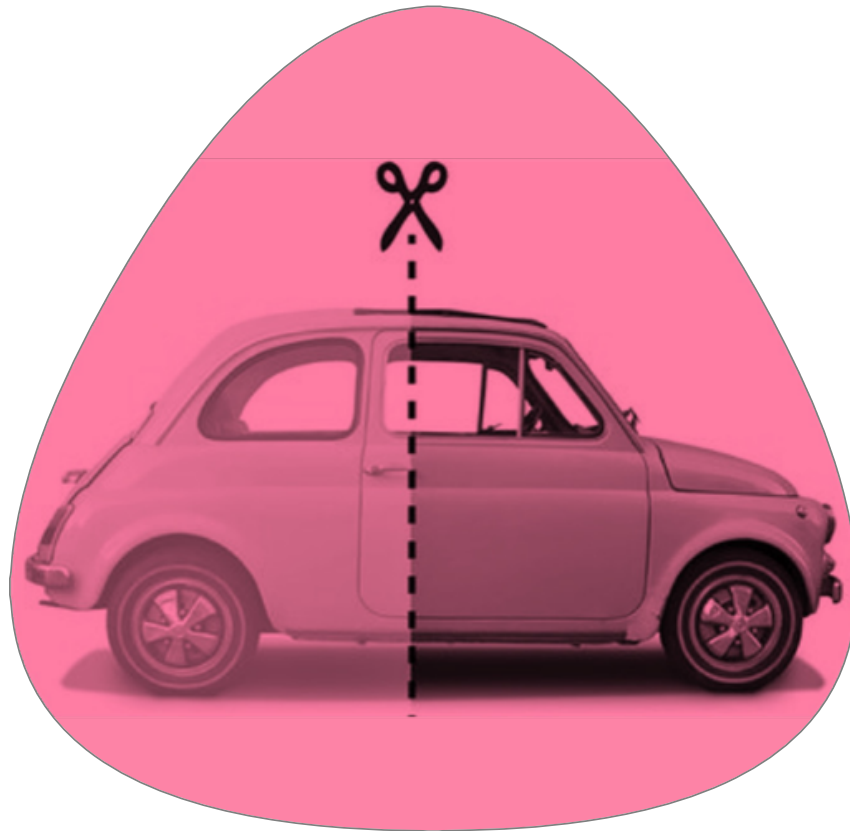
Image source: wired.com

## The Reason: Autonomous Vehicles Will Change Everything

And they are at our doorsteps

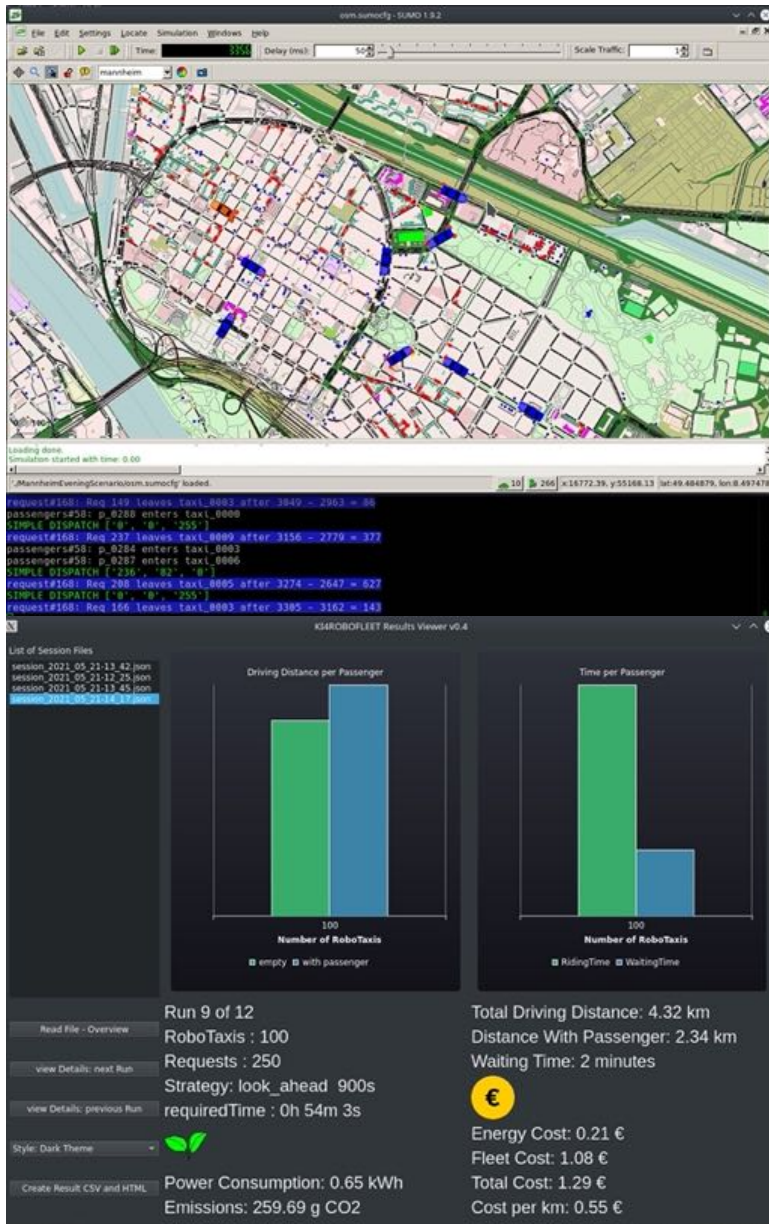


Business models of taxis and car-sharing  
(and ridepooling, ...) converge.



## Vehicle Sharing

- access to a fleet of vehicles; use vehicle on demand; pay only for use
- autonomous vehicles help to mitigate distribution problems that car-sharing services have today
- better service than own car at lower price



# Simulating Autonomous Driving

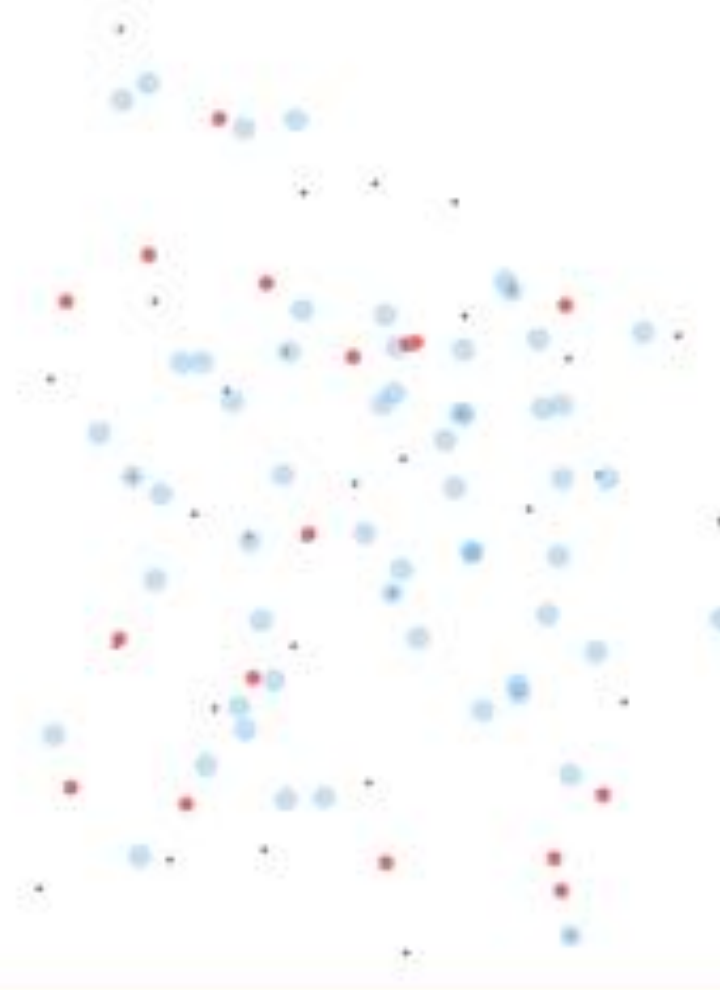


07:18



# walk-aways: 32

07:18



# walk-aways: 5

Spieser, Samaranyake, Gruel, Frazzoli (2016): Shared Vehicle Mobility-on-Demand Systems – A fleet operator’s guide to rebalancing empty vehicles



What if everybody  
uses these  
vehicles?

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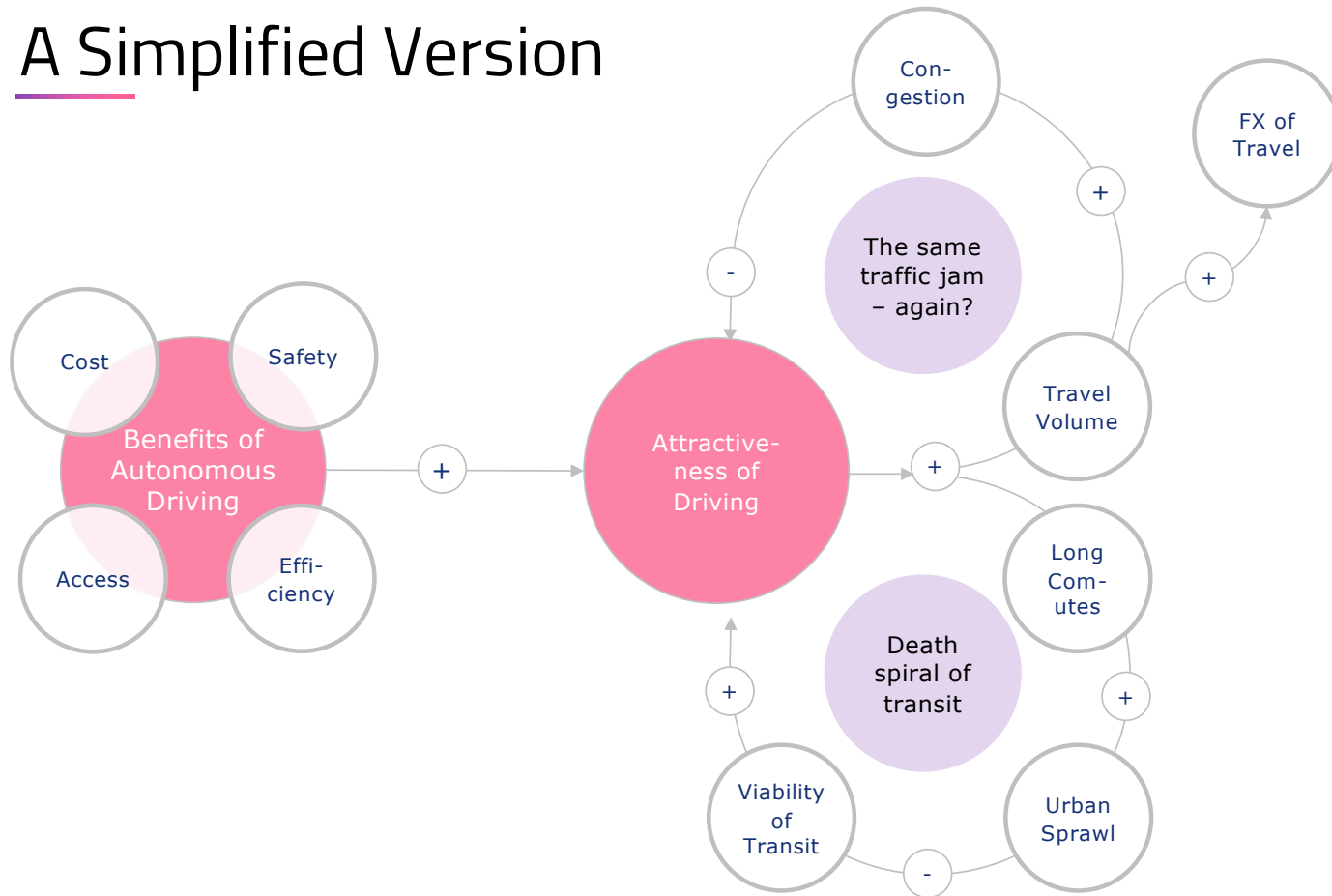


# A Complex Model With Many Dependencies



see Gruel, Stanford (2016): Assessing the Long-Term Effects of Autonomous Vehicles...

# A Simplified Version



see Gruel, Stanford (2016): Assessing the Long-Term Effects of Autonomous Vehicles...

## But What If We All Use These Vehicles?

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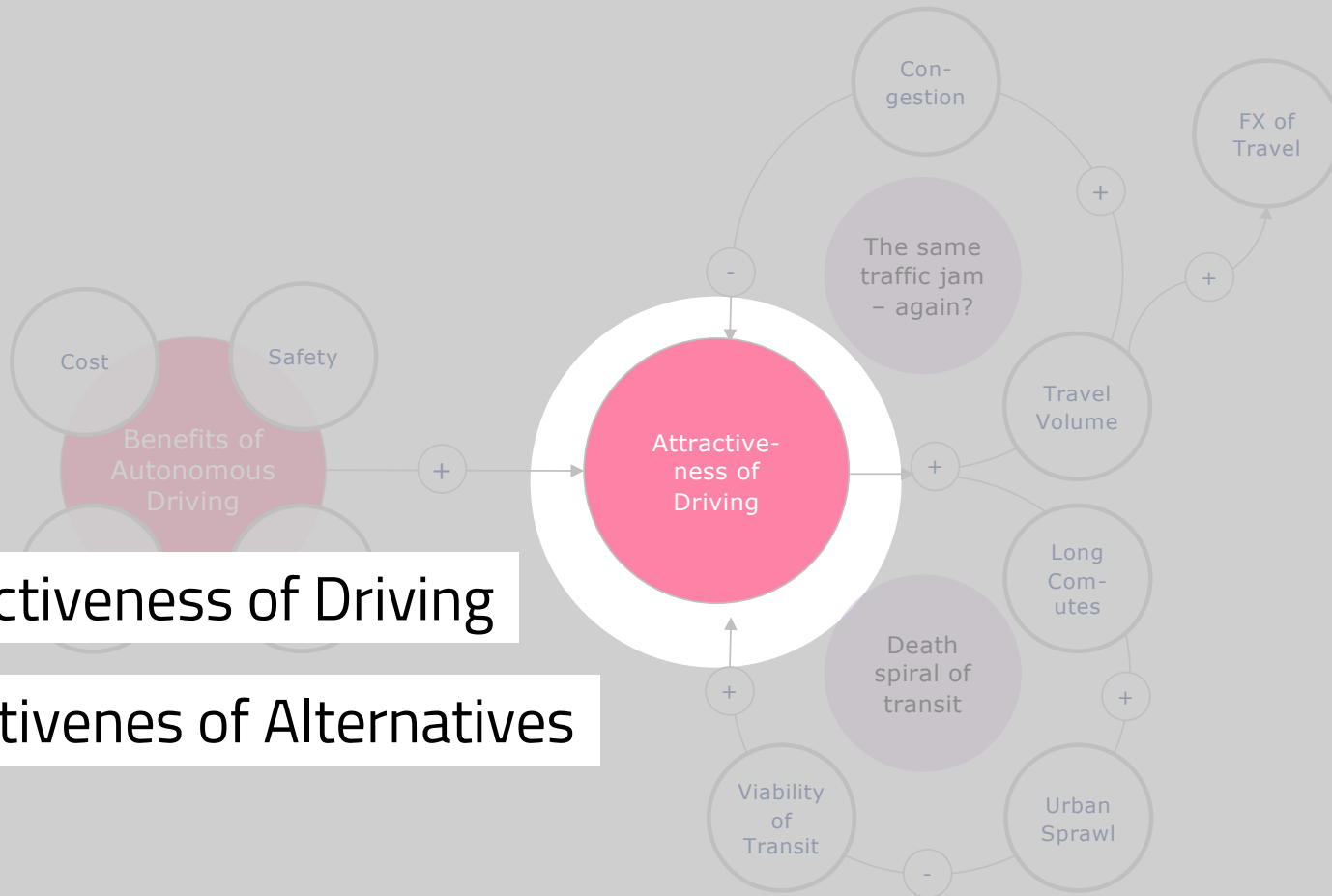
- Asking People about their current and future mobility behavior
- Create scenarios based on a System Dynamics Model considering factors such as mode choice, trip length and frequency, land use, ...
- Discuss the outcome

That's (probably) Not What We Want!

WHAT CAN WE DO?

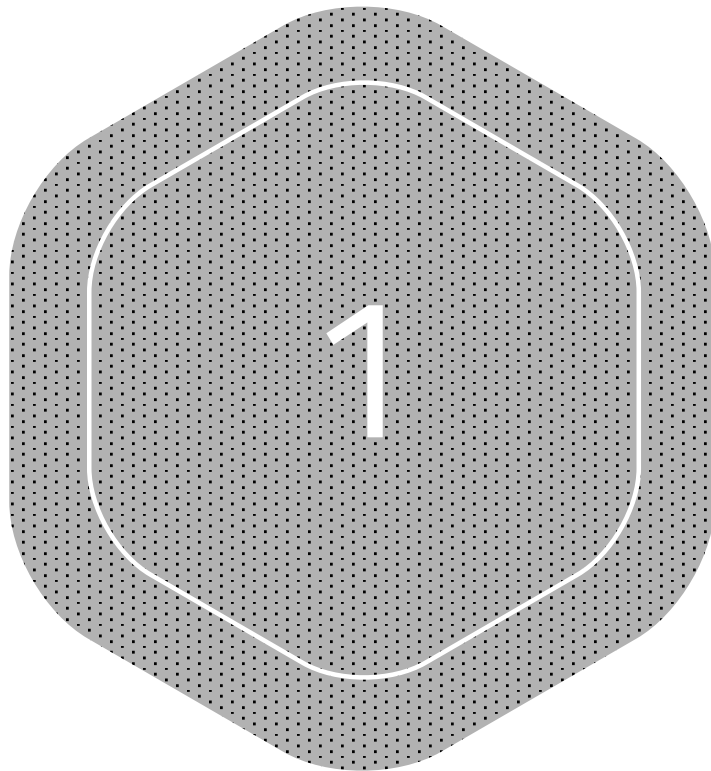


We'd better **get**  
**prepared!**



Decrease Attractiveness of Driving

Increase Attractiveness of Alternatives



# Make Autonomous Vehicles an Integral Part of Public Transit

Foster pooled use

Use them as feeders for mass transit



# Experiments With Shuttles As Part Of Public Transit



SSB FLEX



PROJEKT AMEISE



IOKI

The race is on: Other companies are working on other use cases



## THE INTRODUCTION IS CRUCIAL

Expectations depend on comparison with current systems. Acceptance high for introduction as Taxi, Car replacement or transit. Expectations to service different (open/close, level of control, ...).

→ Big opportunity to introduce autonomous vehicles in pooled mode might make own car obsolete and increase occupancy.

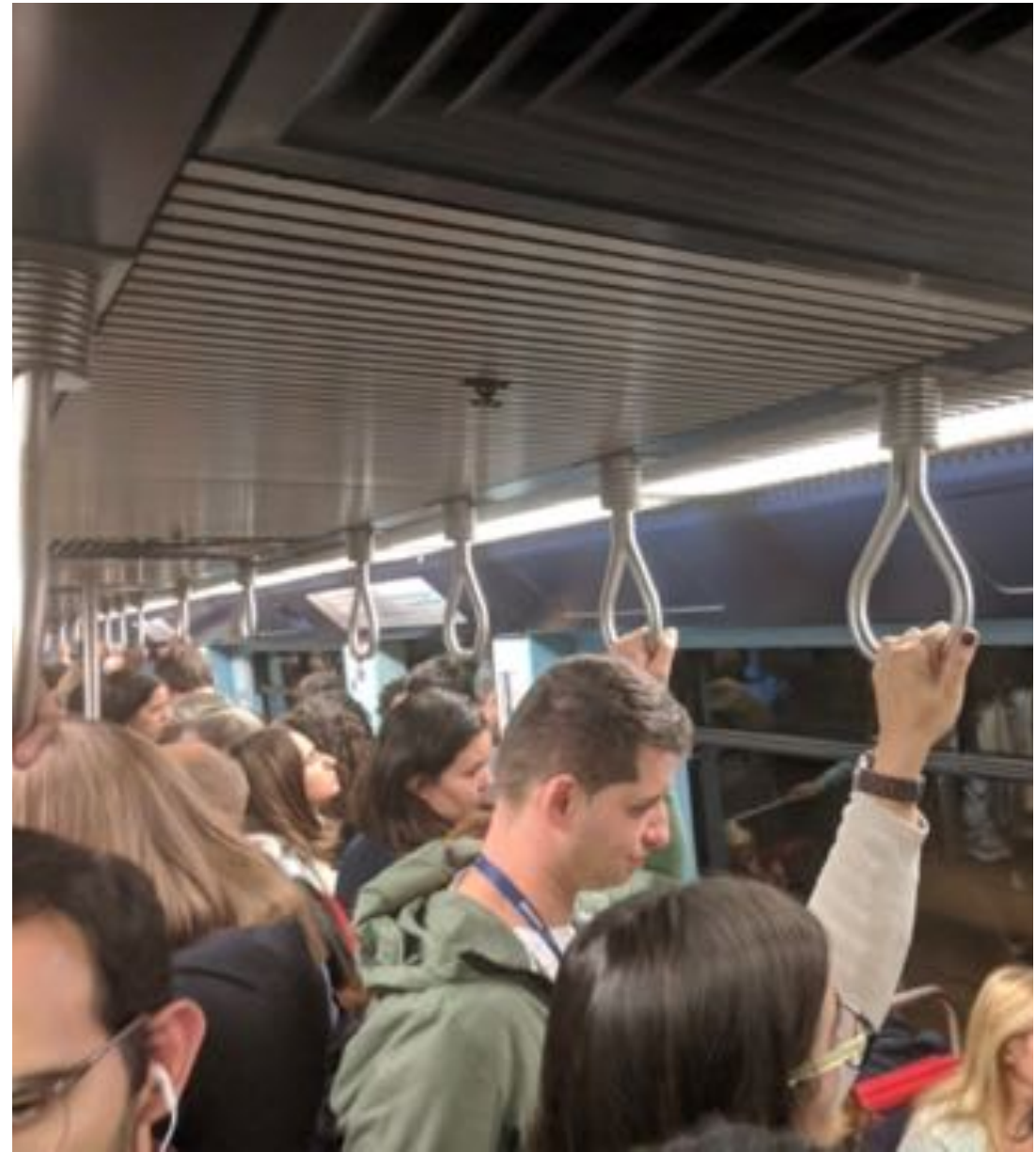
In test one the shuttle started driving automatically after a certain period of time.

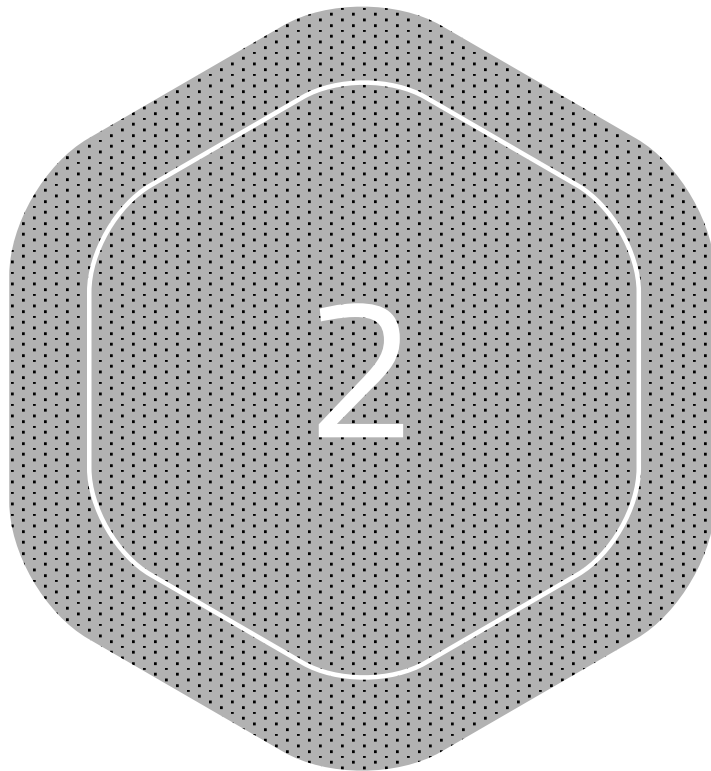
# SOCIAL ASPECTS MAKE OR BREAK IT

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People are usually scared of strangers.

What can we do about it?





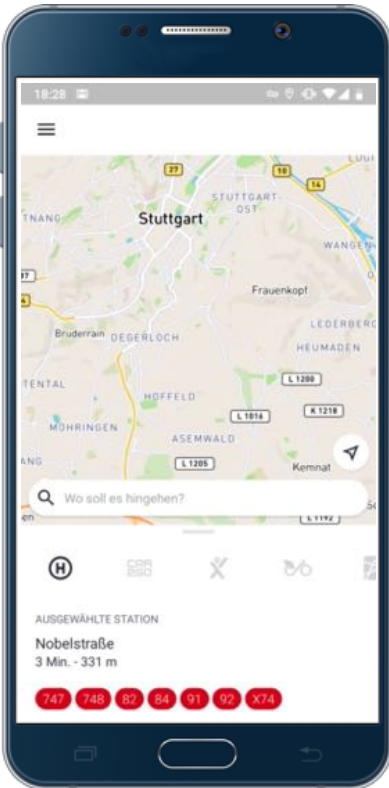
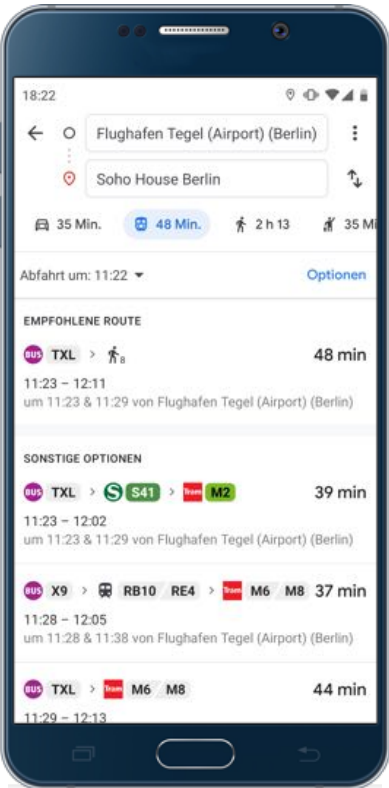
## Better Connect Different Modes to Create Better Alternatives

Establish Software-Interfaces

Create attractive Hardware-Interfaces (mobility hubs with high quality of stay)

Overcome business-/domain-silos and foster collaboration across modes,

# Software Interfaces

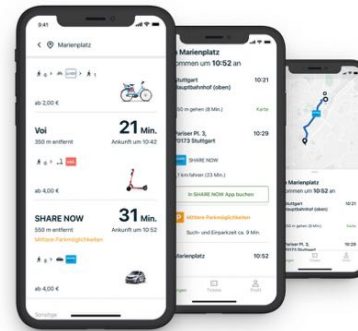




# Projects Bring Together Different Mobility Offers



JELBI



MOBIMEO



ECO FLEET SERVICES

There is no lack of standards: NeTeX, Siri, IXSI, Casix, ... to just name a few

An aerial, monochromatic view of a city intersection. The scene is populated with various vehicles, including cars and a truck, some of which appear to be autonomous or smart vehicles. The infrastructure is modern, featuring digital billboards and information displays. The overall aesthetic is clean and futuristic, representing a smart city environment. The text 'Hardware Interfaces' is overlaid on the lower-left portion of the image, underlined.

# Hardware Interfaces



# Foster Sustainable Business Models Between Mobility Companies

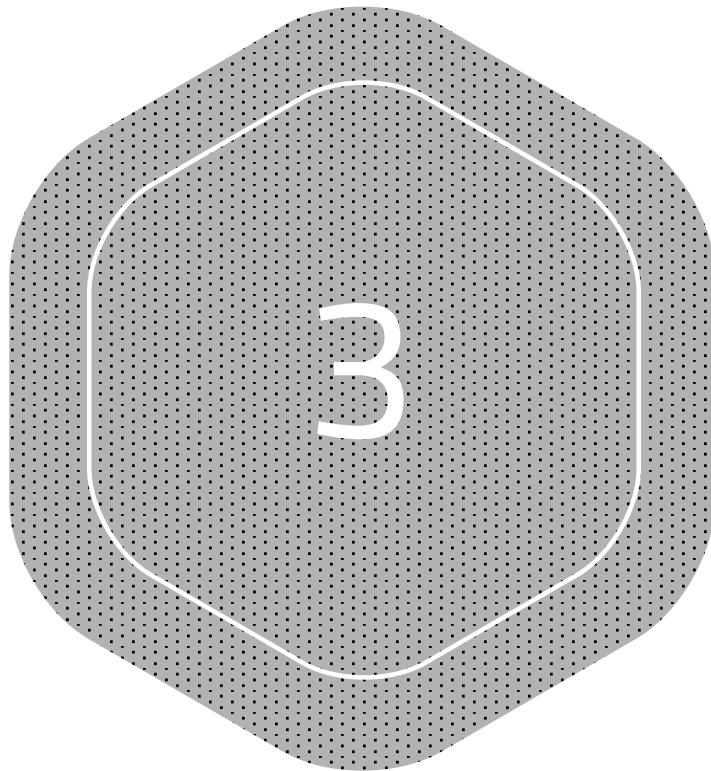
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- ✓ Break Silos
- ✓ Encourage Collaboration
- ✓ Foster Data Sharing



# AnoMoB

Anonymisierte Erfassung und Nutzung von Mobilitäts- und Bewegungsdaten



## Establish New Mobility Habits

Get people used to alternatives to using an own car today, so that it becomes a habit to not have an own vehicle

# Approaches Addressing Corporate Mobility



**MOBILITY BUDGETS**



**FLEETMANAGEMENT AND CHARGING SOLUTIONS**



**ECO FLEET SERVICES**

Car-sharing is important. Not only today. But also to be prepared for a a future with autonomous vehicles.

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