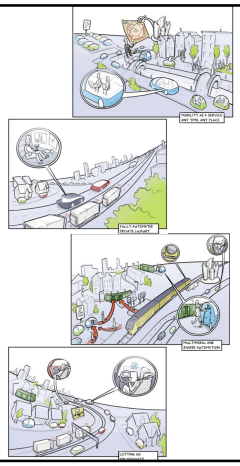


Ministry of Infrastructure and the Environment

Driver at the wheel?

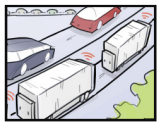
Self-driving vehicles and the traffic and transport system of the future

George Gelauff

KiM | Netherlands Institute for Transport Policy Analysis

Research program

1. Scenarios for a future traffic and transport system with automated vehicles
   - Vision and interactions
   - Uncertainties and implications
   - Broad societal consequences
   - No specific time horizon: four final stages
2. Transition paths (backcasting)
3. Perspective on policy options



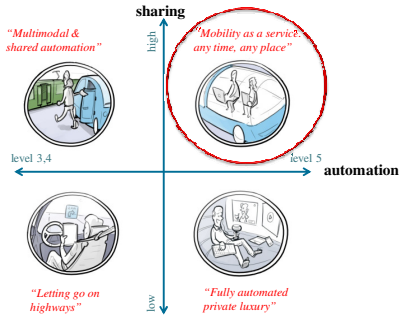
Building blocks

- Main uncertainties in transport system
  - Level of automation
  - Level of sharing (car ownerships and rides)
- Main drivers
  - Technology (*market / industry*)
  - Preferences / acceptance /attitude (*consumer / citizen*)
  - Policy and regulation (*government*)
- Impact
  - Other transport modes: PT, walking / cycling, transportation of goods
  - Society: safety, social inclusion, spatial planning, environment, economy
  - Transport demand: trips, kilometres

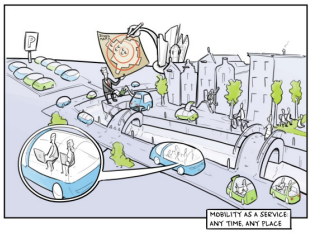
Definition: SAE-levels of automation

Level	Name	Example
Human driver monitors the driving environment		
0	No automation	Lane Departure Warning
1	Driver assistance	Adaptive Cruise Control
2	Partial automation	Parking Assistance
Automated driving system monitors the driving environment		
3	Conditional automation	Highway Chauffeur
4	High automation	Parking Garage Pilot
5	Full automation	Robot Taxi

Uncertainties and scenarios



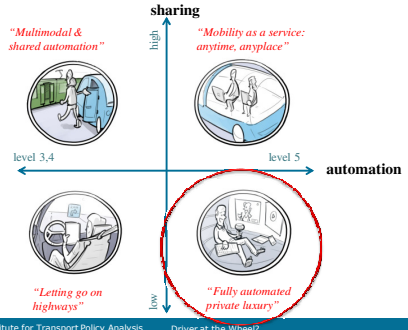
Mobility as a service: Any time, Any place



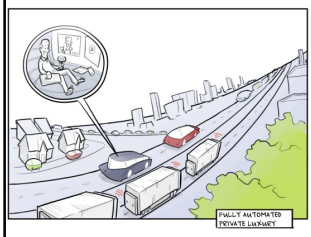
- Door to door travel by automated people movers
- Sharing flourishes: car ownership (large fleet owners) and rides
- Most traditional public transportation abolished
- Cars park themselves in parking areas on the outskirts of the city
- People opt to walk and cycle whenever possible
- Price/km within the city increases

Mobility as a service: other modes and society

Uncertainties and scenarios

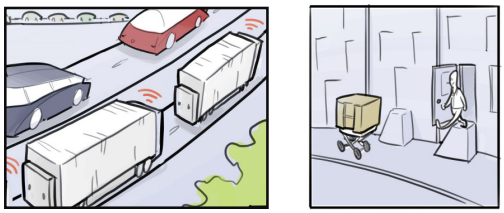


Fully automated private luxury

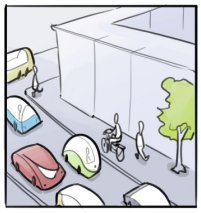


- 'Fully connected' cocoon, without a steering wheel
- Sharing car and rides only within household
- Most traditional public transportation abolished
- Uber-like system for people with no car
- Cars parked in front of the door
- People buy cars at car dealers
- Truck platoons on highways; no compartments for drivers

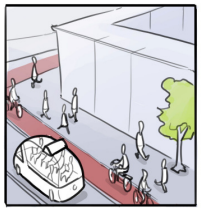
Goods transport



Cars and active modes in the city

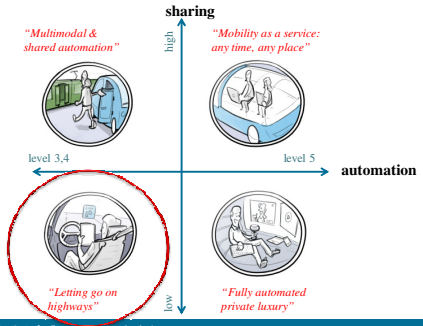


Fully automated private luxury

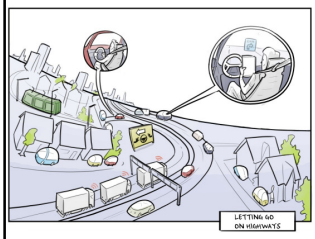


Mobility as a service: any time, any place

Uncertainties and scenarios



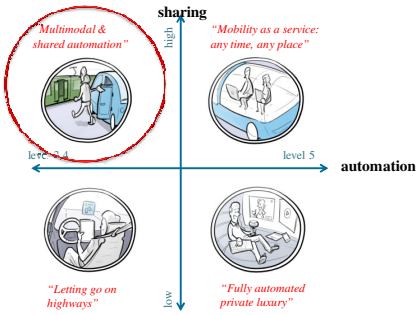
Letting go on highways



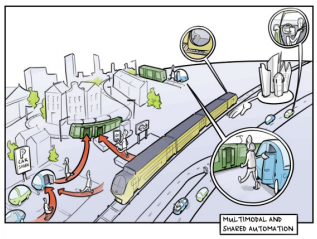
- 'No hands' on highways (level 3/4)
- 'Hands on' within the city, driver assistance systems available (level 1)
- 'Transition zone' from highway to city
- Automated parking in car parks
- Cars parked in front of the door
- Truck platoons on highways; drivers can rest

Letting go on highways: societal consequences

Uncertainties and scenarios

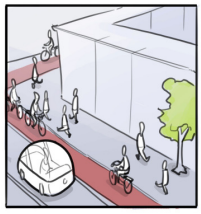


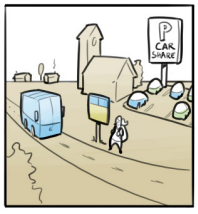
Multimodal and shared automation



- 'No hands' on highways (level 3/4)
- High level of sharing (cars and rides)
- Public transportation popular
- Trains/trams/metros without a driver and high frequency
- Government supports large-scale public transport in the city
- Efficient multimodal trips and transfers
- Digital travel assistant arranges the journey

Multimodal & shared automation: City and village





First indication effects automated driving	Mobility as a service: any time, any place	Automated private luxury	Letting go on highways	Multimodal and shared automation
Capacity and car traffic				
Road capacity	+	+	0/+	0/+
Volume car traffic	+	++	0/+	0
Other modes of transport				
Public transport	--	--	0	0/+
Bicycle use	0/+	-	0	+
Automated freight transport	++	++	+	+
Societal consequences				
Number of parking places	--	0	0	-
Spatial distribution	+	++	0	0/-
Social inclusion	++	+	0	0
Traffic safety	++	++	+	+
Environment and liveability	+	-	0/-	0/+
Auto makers market	-	+	0	--
Car dealers	--	0	0	--
Drivers	--	--	0	0

Thank you for your attention

Publication at:

WWW.KIMNET.NL/EN/