Autonomous vehicles – looking beyond the technology

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Challenges in public transport

Main challenges:
• Capacity (urban)
• Efficiency /Financial viability
• Accessibility (rural)
• First- & last mile accessibility

Scheltes et al. 2019
Technology trends

Automation

Elektrification

Information

Sharification
New modes
Access and egress
What is the optimal mix?
Automation in Transport

• Much attention to automation
• First years: mainly (individual) cars
• Much focus on technology

Gartner Hype Cycle for Emerging Technologies, 2019

Expectations

Innovation Trigger

Peak of Inflated Expectations

Trough of Disillusionment

Slope of Enlightenment

Plateau of Productivity

Plateau will be reached:

○ less than 2 years

□ 2 to 5 years

○ 5 to 10 years

○ more than 10 years

□ obsolete before plateau

As of August 2019

gartner.com/SmarterWithGartner

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Challenge the future

Driverless Public Transport

“Driverless PT is a form of PT which can be operated without the required presence of a driver or attendant in the vehicle.”

- New routing/service options (e.g. dynamic in stead of fixed)
- A higher capacity
- Supply and demand coordination
  - Reduction of operational costs
  - Improved financial viability
- Efficient operation and fleet management
- Passenger oriented services

- Increased safety
- Reduction of costs
- Increase of flexibility/control
- Increased passenger experience
“Autonomous vehicles will reshape the public transport landscape. It is important to jointly investigate what their role in the total mobility mix will be and how they could improve public transport quality and efficiency.”

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Team Automation in Public Transport

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On demand PT: passenger preferences

Flexibility

LC 1: MaaS-ready individuals
- 32%

LC 2: Mobility neutrals
- 25%

LC 3: Technological car lovers
- 22%

LC 4: Multimodal PT supporters
- 15%

LC 5: Anti new-mobility individuals
- 6%

Alonso-Gonzalez et al. (2019)
On demand PT: passenger preferences
Sharing

**RECAP**

- "It's my ride" 29%
- "Sharing is saving" 28%
- "Time is gold" 24%
- "Cheap and half empty, please" 19%

**Most important attribute**

- 4 add. pax
- (4 add. pax)
  Alonso-Gonzalez (2019)
Expectations authorities
SWOT

Flexible
On demand
Driverless (EU)

Low speed
Customer focus lacking
Slow development

Access rural areas
First & last mile
Inclusive mobility

Interaction bicycles/pedestrians
Unions
Social safety
Willingness to invest

**DO**
- Improving accessibility and liveability
- Clear added value, societal benefits

**DON’T**
- Unsafe/unreliable
- Lack of business case
- No added value
Rural vs. Urban

Accessibility and social inclusion

First and last mile
Missing links

Challenge the future
Short vs. Long term

**Long term**
- Policy goals
- Maximum efficiency
- Focus on the end user

**Mid term**
- Innovation and research
- Focus on vehicles + infrastructure
- First- & last mile applications on mixed infra

**Short term:**
- Pilots and demonstrations
- Separated infrastructure
- Technology driven
Challenge

*Chicken-egg problem:*

*Big scale application: reliable system*

*Developing reliable system: big scale application*
Pilots and implementations in NL
(Future) research directions AVs+PT

- Lessons learnt pilots and projects
  - User experience and preferences
  - Operations
  - Safety
- Simulation and operations
- Passenger acceptance and choice behaviour
- Interaction other modes
- Contribution to societal benefits
- Network design; hybrid networks?
Forum on integrated and sustainable transportation systems

http://forum-ists2020.org/

Connected Automation · Sharification · Electrification
Contact/questions

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