AUTOMATION, HUMAN FACTORS AND UNICORNS

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DLR

Quelle: @brgfx, https://de.freepik.com

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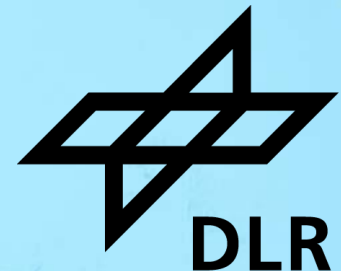
Leibnitz and the Unicorn Cave

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Quelle: Gottfried Wilhelm Leibniz, Porträt von Christoph Bernhard Francke, um 1700; Herzog Anton Ulrich-Museum, Braunschweig

Figura Sceleti prope Qvedlinburgum effossi.

N. Seelander. sc.

Quelle: Leibniz, „Protogaea" 1694 in Schneidt, 1749

Daten von OpenStreetMap - Veröffentlicht unter ODbL

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Unicorn vs. Automated Vehicle

	Unicorn	Automated Vehicle
Magic skills	Healing powers, protective powers, able to conjure up	Drives without a driver
Fields of application	Protection against poison, epilepsy,the plague, purifies water, aphrodisiac, riding, stories, toys	Transportation of people and goods
Natural Habitat	Mysterious creature, hard to find	Mysterious vehicle, hard to find, various research test-beds, USA
Target Group	Little girls	Everybody, public transportand carrier companies without drivers
Recognition value	High: Graceful horse appearance with a single spiraling horn, glitter	Medium: No steering wheel, a lot of Sensors
„Pull" factor	Bone collectors from all over Europe came to dig for the magic horns; Little girls all over the world want unicorns	Value of time, shared public transport 24/7, sustainable, livable cities, efficient freight transport

...does automated driving have a marketing problem?

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Automated driving might solve giant problems, a clear vision needs to be formulated.

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Creating a Beautiful Unicorn

- Think automation in the context of a mobility concept!

- Think about actual mobility needs and learn the perspectives of stakeholders!

- Be user-centered!

- Create positive experiences and communicate them to generate confidence!

- Think systemically and pay attention to important details!

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Scenario Public Transport: an essential field of action for sustainable mobility

Chances:

- AV might increase efficiency and greatly improve accessibility

- Expansion of public transport services in terms of time and space

- Long term perspective: Strengthen the network and reduce costs at the same time

- Small buses and minibuses with flexible routes on demand have the potential to improve mobility in (sub)urban and rural areas.
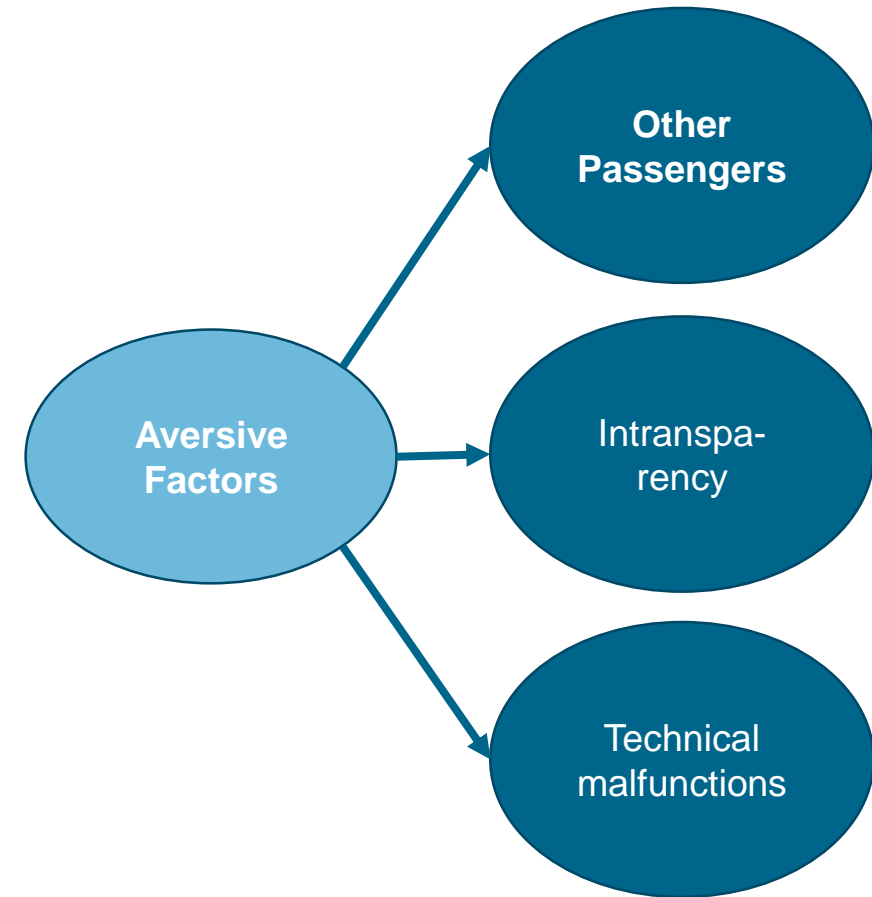
- No restrictions due to staff shortages.

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Scenario Public Transport: an essential field of action for sustainable mobility
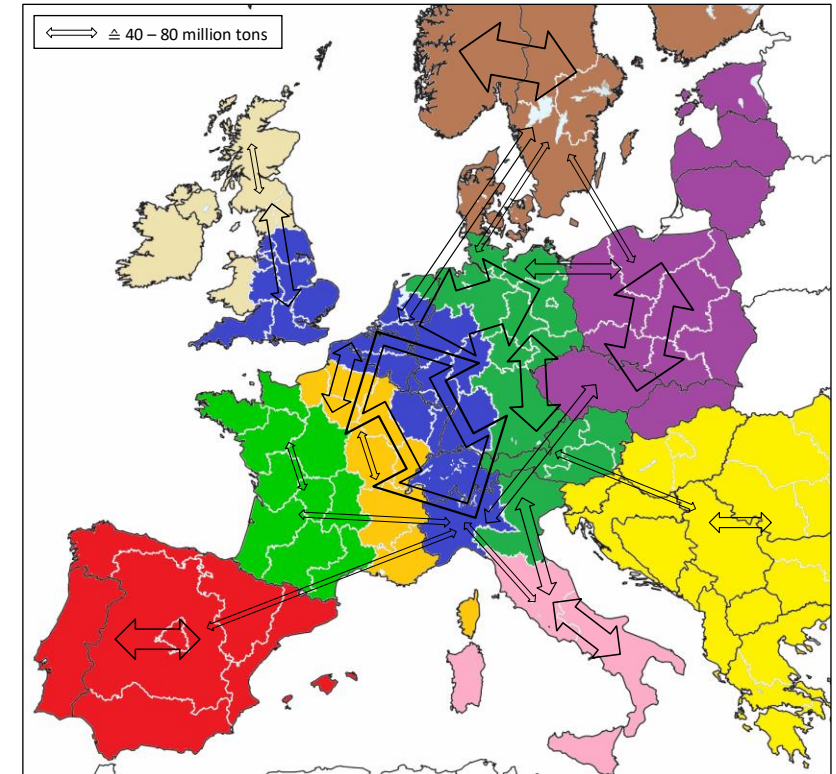
Challenges:

- Large number of actors, roles and institutions involved in planning, AV needs to be integrated in planning processes

- Affected Persons in mixed traffic: Who am I talking to? A person? AI? A remote driver? In India, in Flensburg?

- Perceived safety an security

- In urban environmets entering an on demand vehicle might be challenging

- Potential rebound effects of inducing more traffic

Aversive Factors → Other Passengers, Intranspa-rency, Technical malfunctions

Grippenkoven et al., 2018

Chances:

- AV might drastically reduce the resources needed, especially personnel involvement.

- Opportunities for efficiency gains benefiting producers, retailers, consumers, and logistics providers.

- Fewer stops and energy-efficient driving programs.

- *Why not?* → Envision all trucks driving exactly 60km/h on a dedicated lane on the motorway
  - Reduced energy consumption
  - Enhanced safety
  - Additional travelling time can be compensated by resting periods that are no longer necessary

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Freight transported within Europe more than 200 km distance

Scenario Long Distance Freight Transport

Challenges:

- Extensive reorganisation of processes and responsibilities

- Facilitating loading and unloading processes.

- Infrastructure adjustments required, e.g. suitable loading ramps

- Assistance with challenging manoeuvres at freight terminals

- Misuse potential: Ensuring security measures to prevent vehicle theft and robbery

→ **User centered design**: Logistics service providers and shippers must be actively involved in the development process
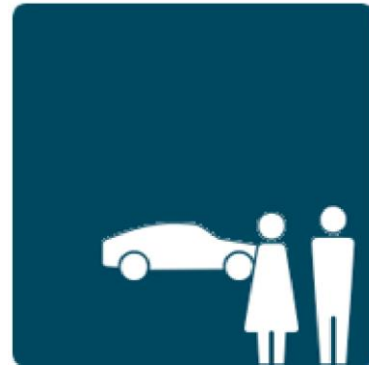

Source: private Illustration

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Acceptance of automated driving (Jipp & Gade, 2021)

Individual Acceptance:
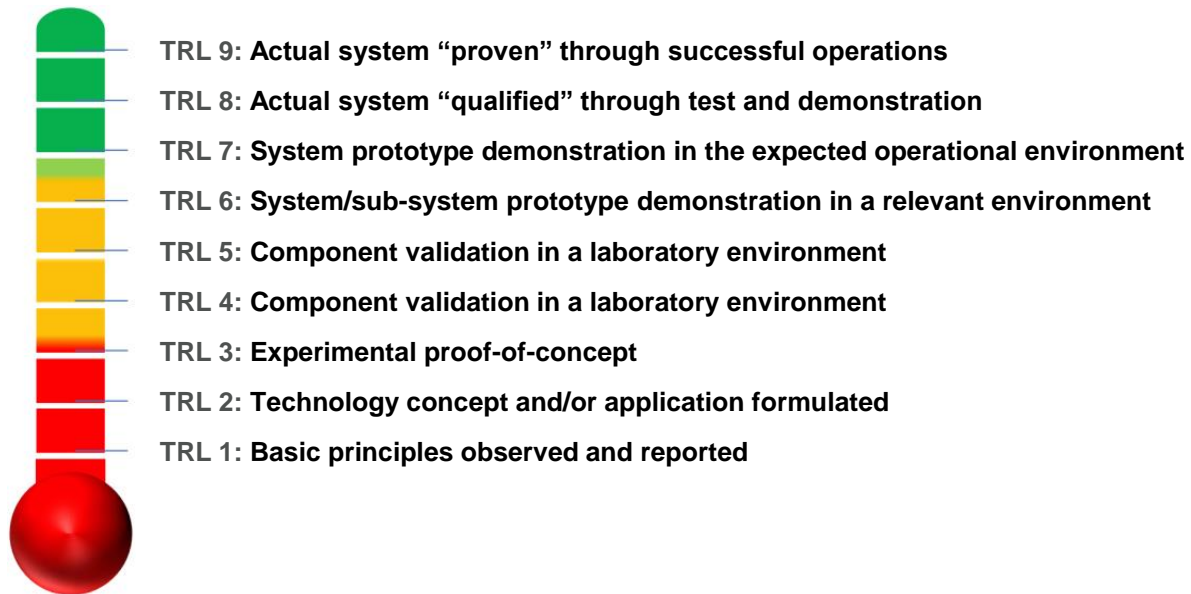Acceptance of technology by a person based of their own interests

Societal Acceptance:
Result of a negotiation process towards acceptable solutions taking into account different interests.

For a positive anticipation of automated driving, *individual and social* acceptance is necessary!
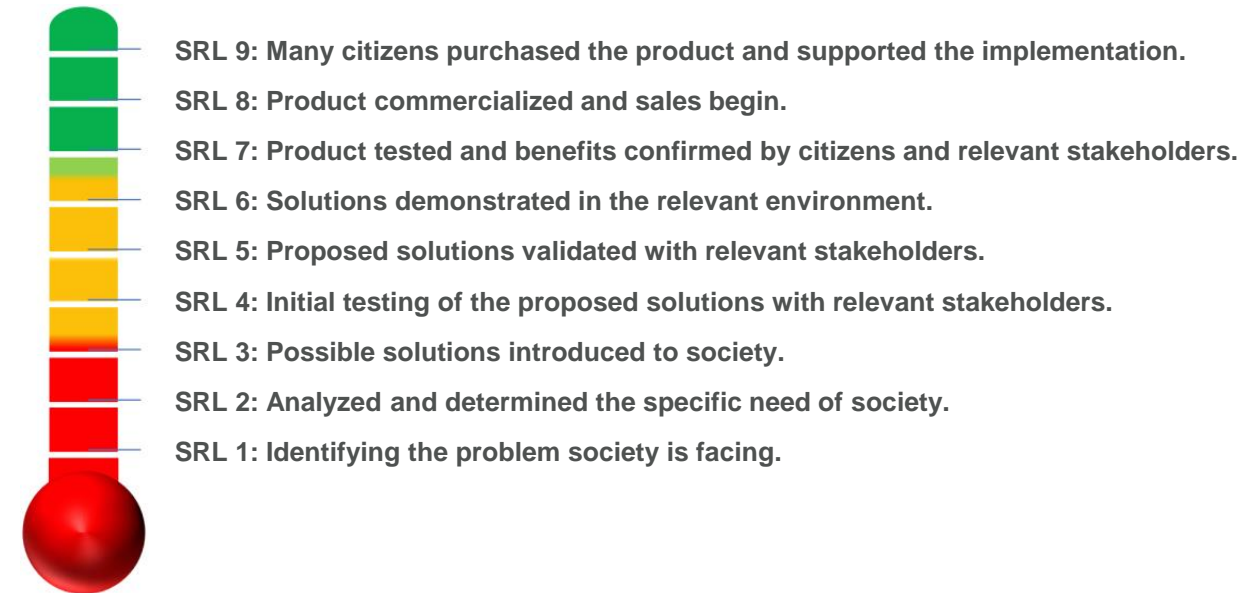
Societal Readiness Level as a supplement to Technology Radiness Level

TRL[1]

- **TRL 9:** Actual system "proven" through successful operations
- **TRL 8:** Actual system "qualified" through test and demonstration
- **TRL 7:** System prototype demonstration in the expected operational environment
- **TRL 6:** System/sub-system prototype demonstration in a relevant environment
- **TRL 5:** Component validation in a laboratory environment
- **TRL 4:** Component validation in a laboratory environment
- **TRL 3:** Experimental proof-of-concept
- **TRL 2:** Technology concept and/or application formulated
- **TRL 1:** Basic principles observed and reported

SRL[2]

- **SRL 9:** Many citizens purchased the product and supported the implementation.
- **SRL 8:** Product commercialized and sales begin.
- **SRL 7:** Product tested and benefits confirmed by citizens and relevant stakeholders.
- **SRL 6:** Solutions demonstrated in the relevant environment.
- **SRL 5:** Proposed solutions validated with relevant stakeholders.
- **SRL 4:** Initial testing of the proposed solutions with relevant stakeholders.
- **SRL 3:** Possible solutions introduced to society.
- **SRL 2:** Analyzed and determined the specific need of society.
- **SRL 1:** Identifying the problem society is facing.

"Societal readiness level is a scale for analyzing and evaluating the **readiness level of societal acceptance**; for example, a product or a technology to be integrated into society needs to be **accepted and desired** by its citizens."
(Bhatti, Danilovic und Nåbo, 2022, S. 19)

[1] Mankins (1995)
[2] Bhatti et al. (2022)

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→ **A clear political and social vision is needed to create a good unicorn!**

→ **Good practices and positive experiences of mobility services entailing AV need to be provided to create a desire!**

→ *Societal Readiness Level* **offers a promising framework to systematize stakeholder perspectives in the development process**

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