Human- and Society-Centered Mobility Systems for Attractive Cities

Prof. Dr. Meike Jipp
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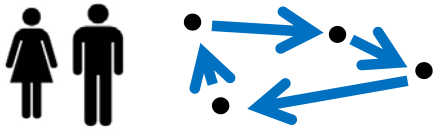
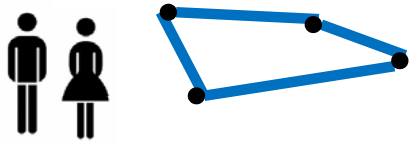
Traffic in Germany

Volume of Traffic (2017)



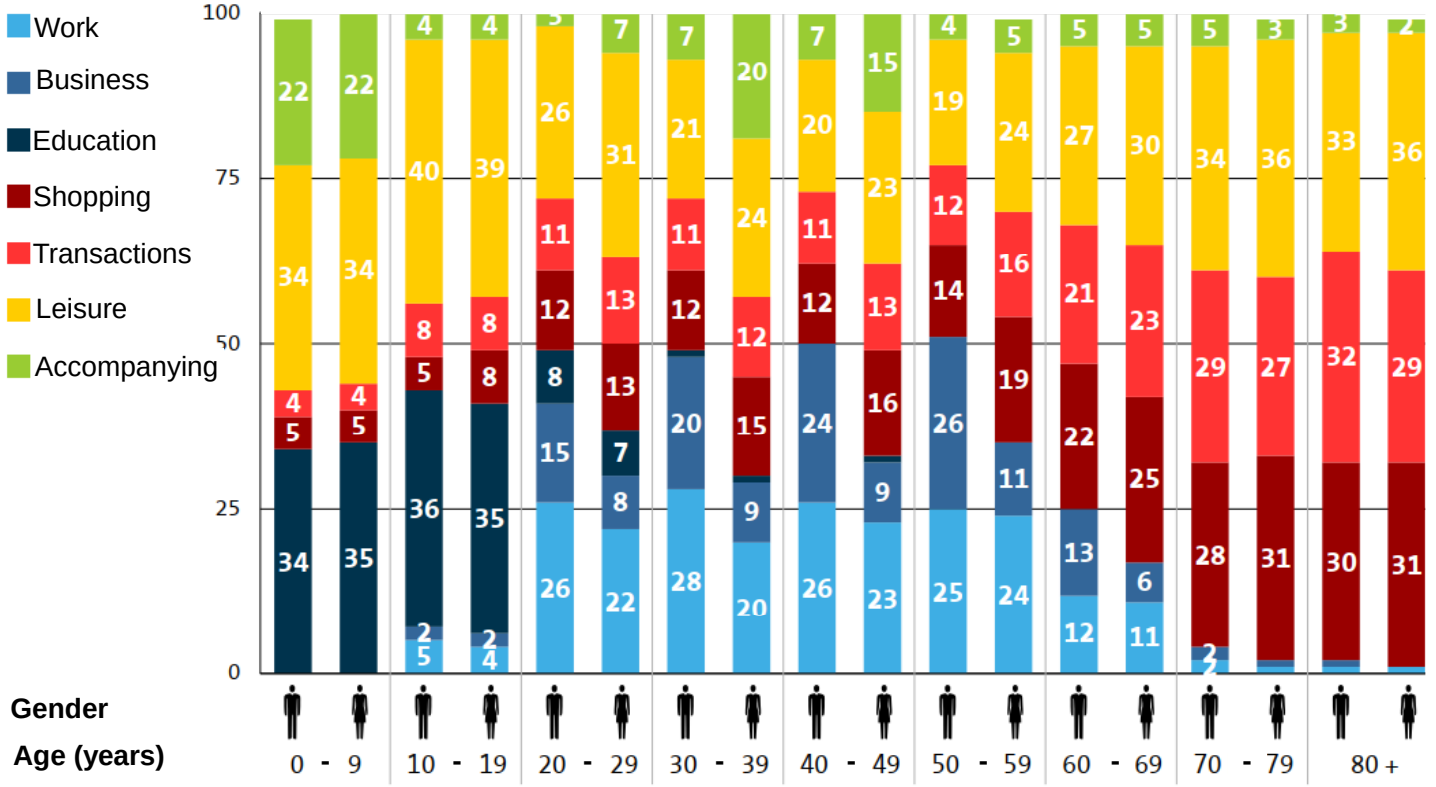
about 3.1 ways per person and day

Traffic Performance (2017)



about 39 km (24 miles) per person and day

Purpose of travelling



MiD (2017)

Traffic in Germany

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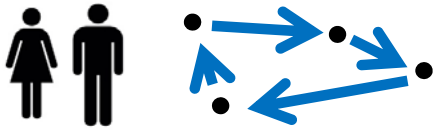

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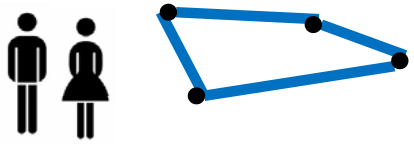

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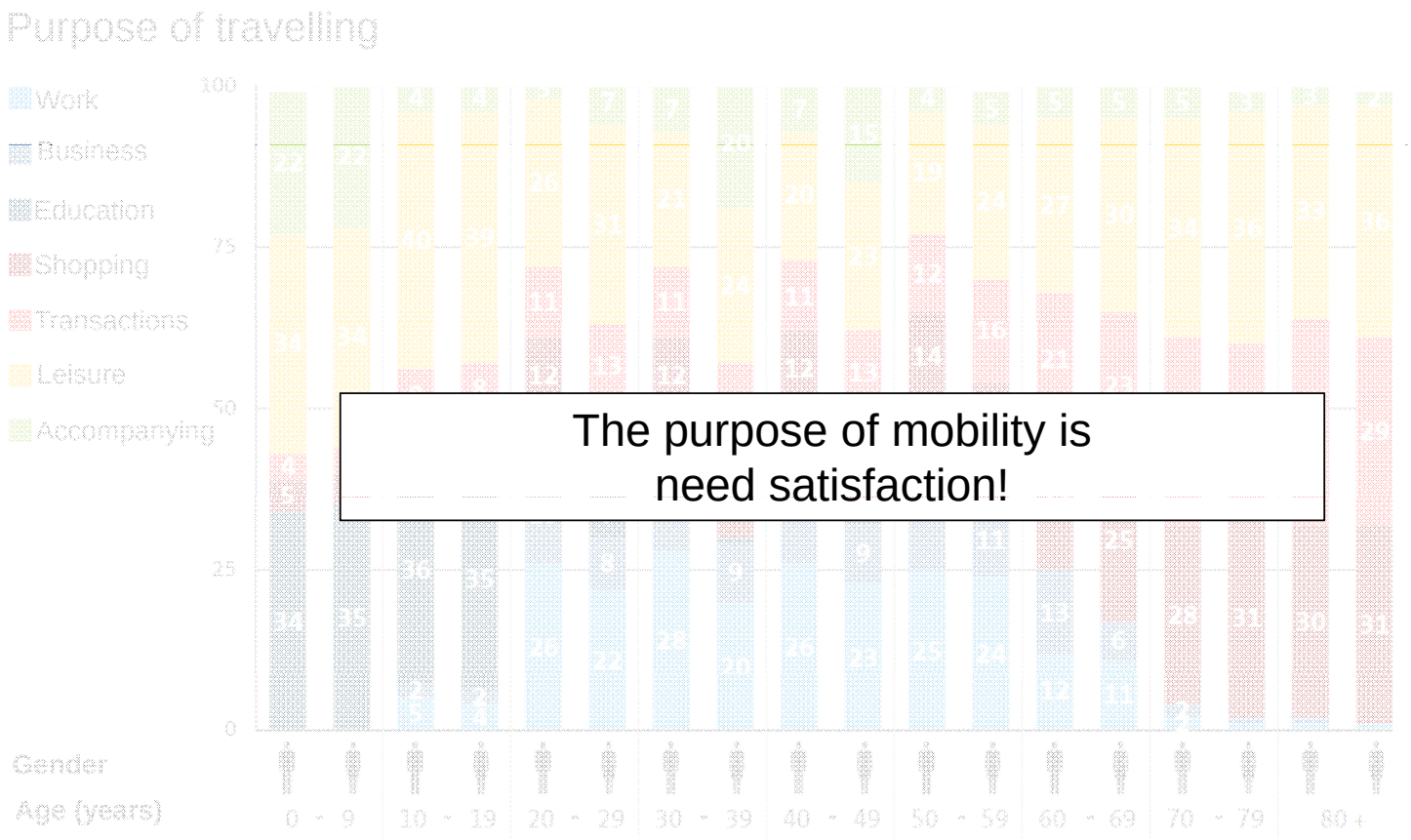

MiD (2017)

Human Needs

Needs
Provision of the power necessary to act — Hull (1952)
Expression of what humans need for their survival and development — Lebeder (1980)

Deficiency Needs	Growth Needs
• Need to be satisfied in order to survive • The motivation decreases when the needs are met. — Maslow (1970)	• Desire to grow as an individual • The motivation increases when the needs are met. — Maslow (1970)
Precondition for life & satisfaction	Precondition for happiness

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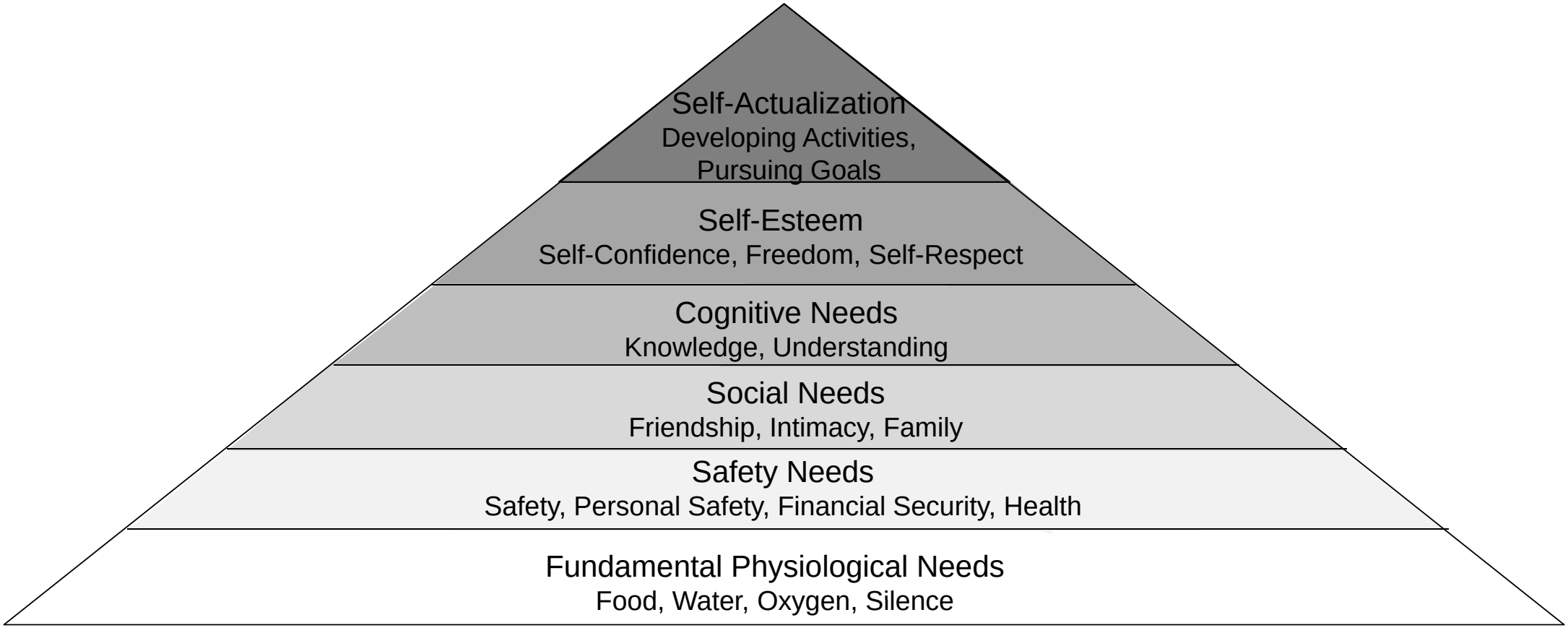
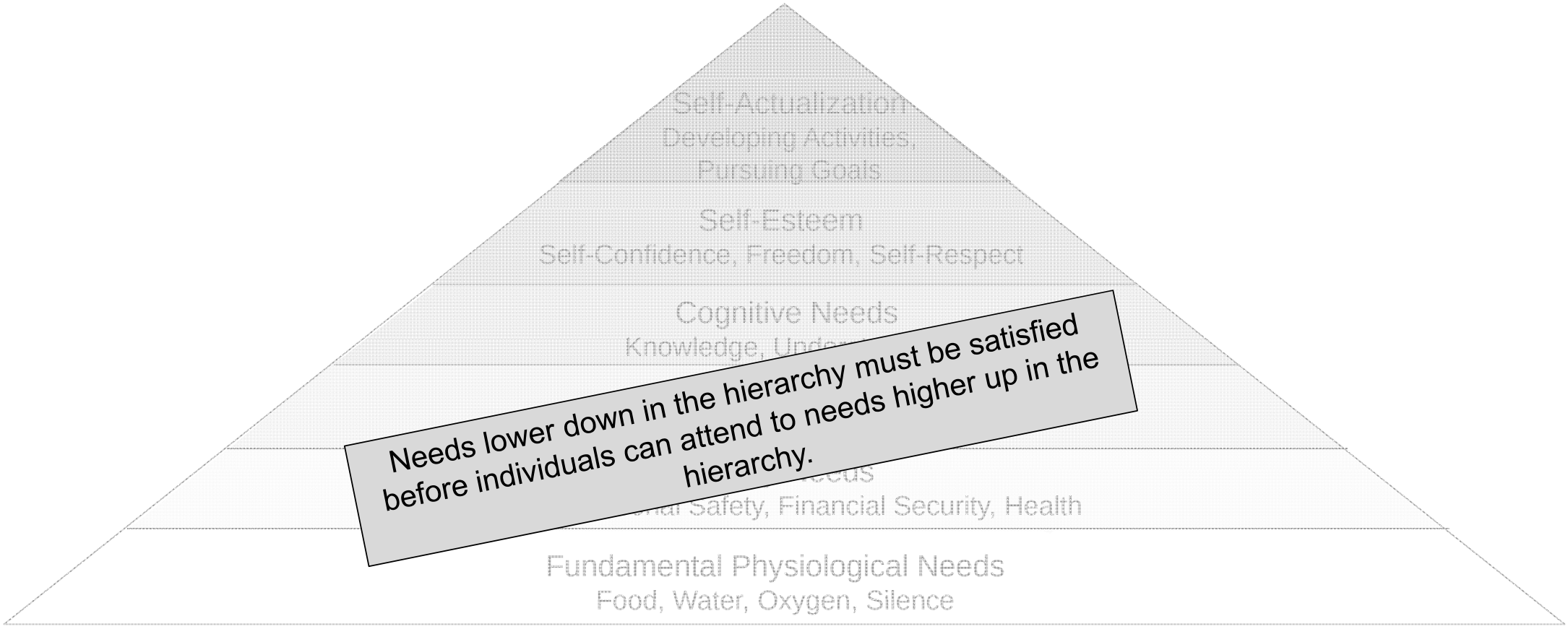
Human Needs



Maslow (1971)

Human Needs



Maslow (1971)

Human Needs

Traffic participants are no transport objects.
Instead, they are individuals making their own decisions!

e.g., Hildebrandt et al. (2001)

Satisfactors

Means used by individuals to satisfy their needs Mallmann (1980)

Work Equipment

Primary

© Partytram Leipzig © DPA

Secondary

© Stefanie Herbst

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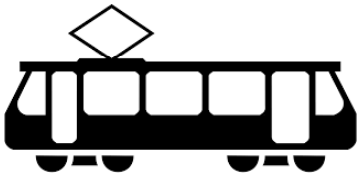
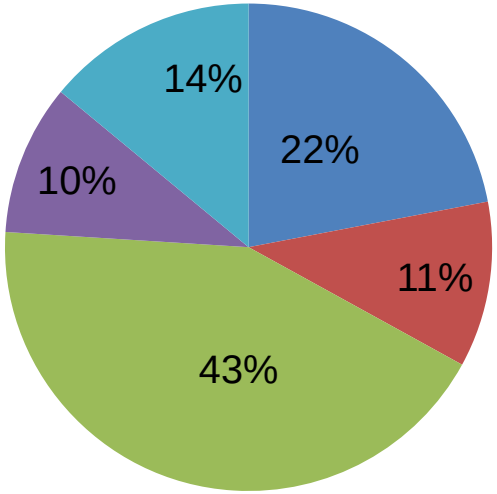
Means to an End

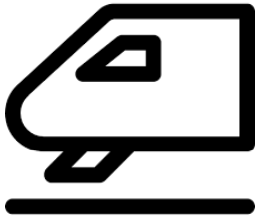
Humans select their means of transportation,
- which allows the satisfaction of primary needs or
- which makes the satisfaction of secondary needs more likely.

Modal Split of the Traffic Volume





- Walking
- Cycling
- Driving by car
- Using pubic transportation
- Being a passenger



MiD (2017)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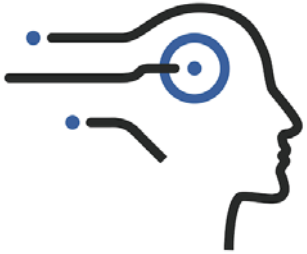
Technological Progress

Digitalisation

Automation

Artificial Intelligence



Self-Driving Cars


DLR
DLR

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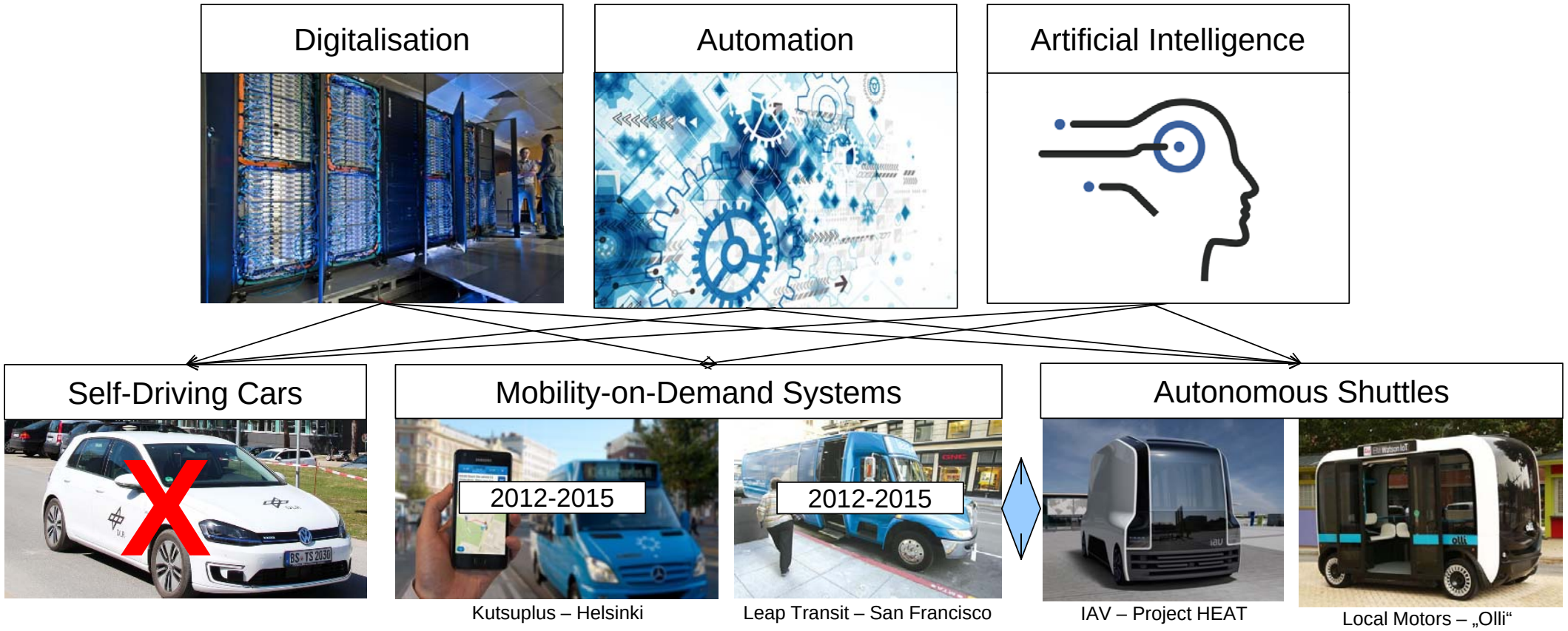
Technological Progress



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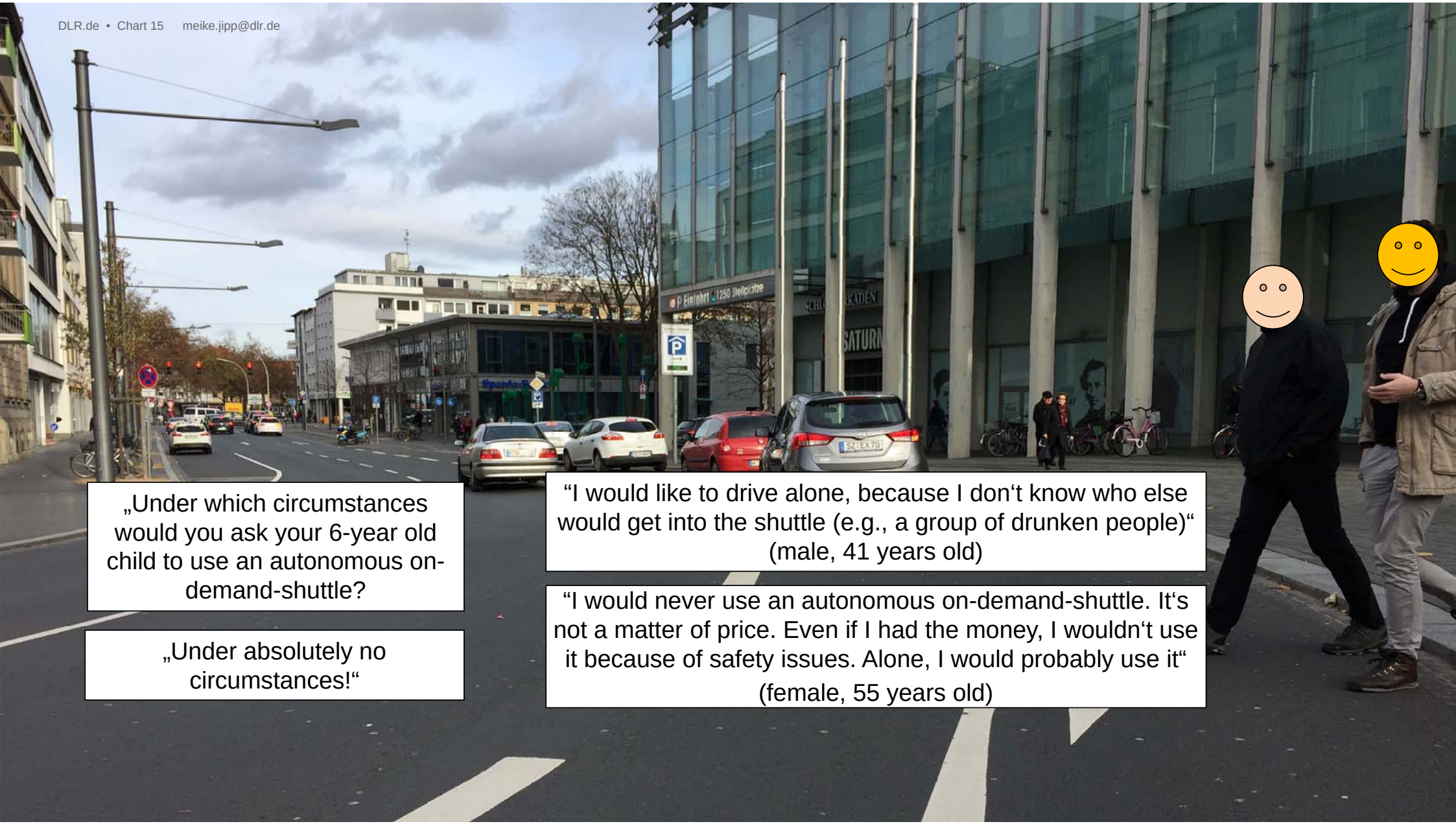


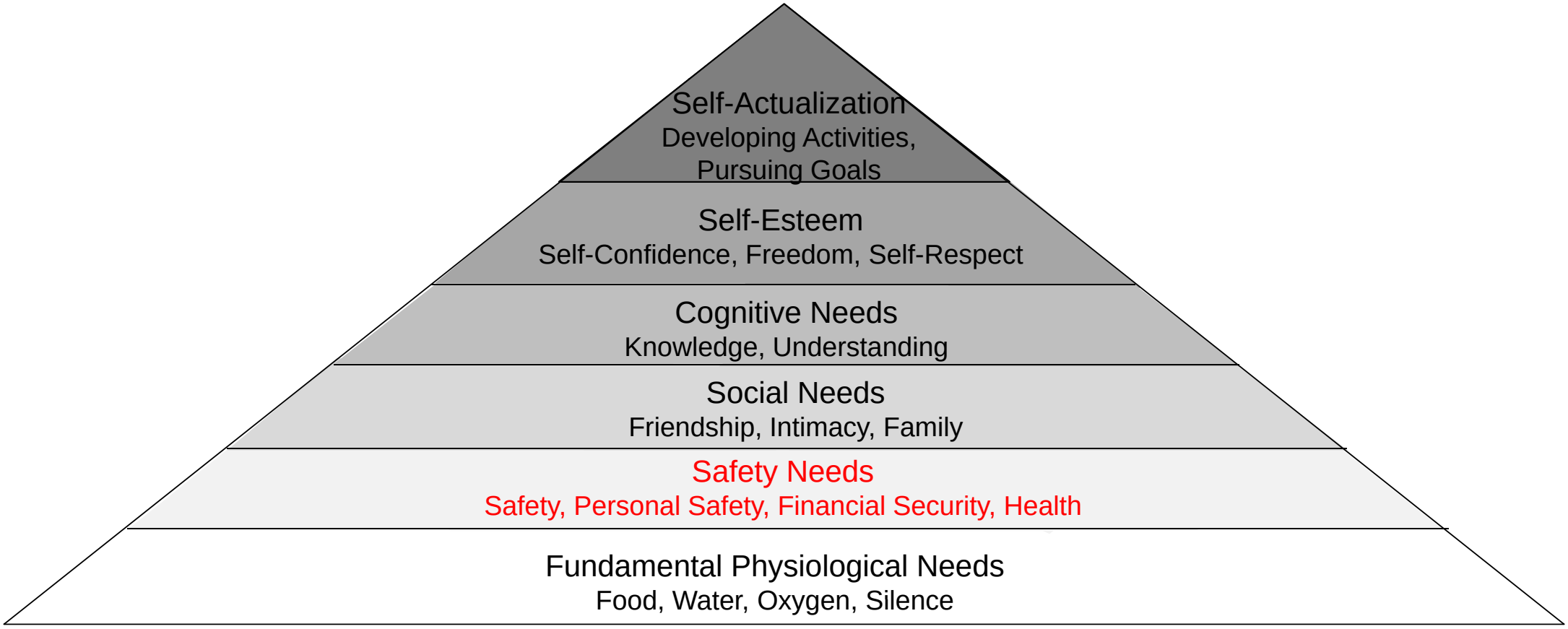
„Under which circumstances would you ask your 6-year old child to use an autonomous on-demand-shuttle?

„Under absolutely no circumstances!“

“I would like to drive alone, because I don‘t know who else would get into the shuttle (e.g., a group of drunken people)“ (male, 41 years old)

“I would never use an autonomous on-demand-shuttle. It‘s not a matter of price. Even if I had the money, I wouldn‘t use it because of safety issues. Alone, I would probably use it“ (female, 55 years old)

Human Needs



Maslow (1971)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Safety Issues

Experiencing an autonomous shuttle → Introduction of the envisioned system → Identification of difficulties

Category	Description	
Other Passengers	Negativ group dynamics (e.g., hooligans)	Vandalism
	Harassment	Crowded bus
	Theft	No help from others
Intransparent System	Unexpected stop of the system	Unclear whether obstacle will be recognized
	Unpunctuality	Unknown neighbourhood
	Route through a bad neighbourhood	
Technology	Inability to intervene	Missing emergency exit
	Bad maintenance	

Grippenkoven et al. (2018)

Safety Issues

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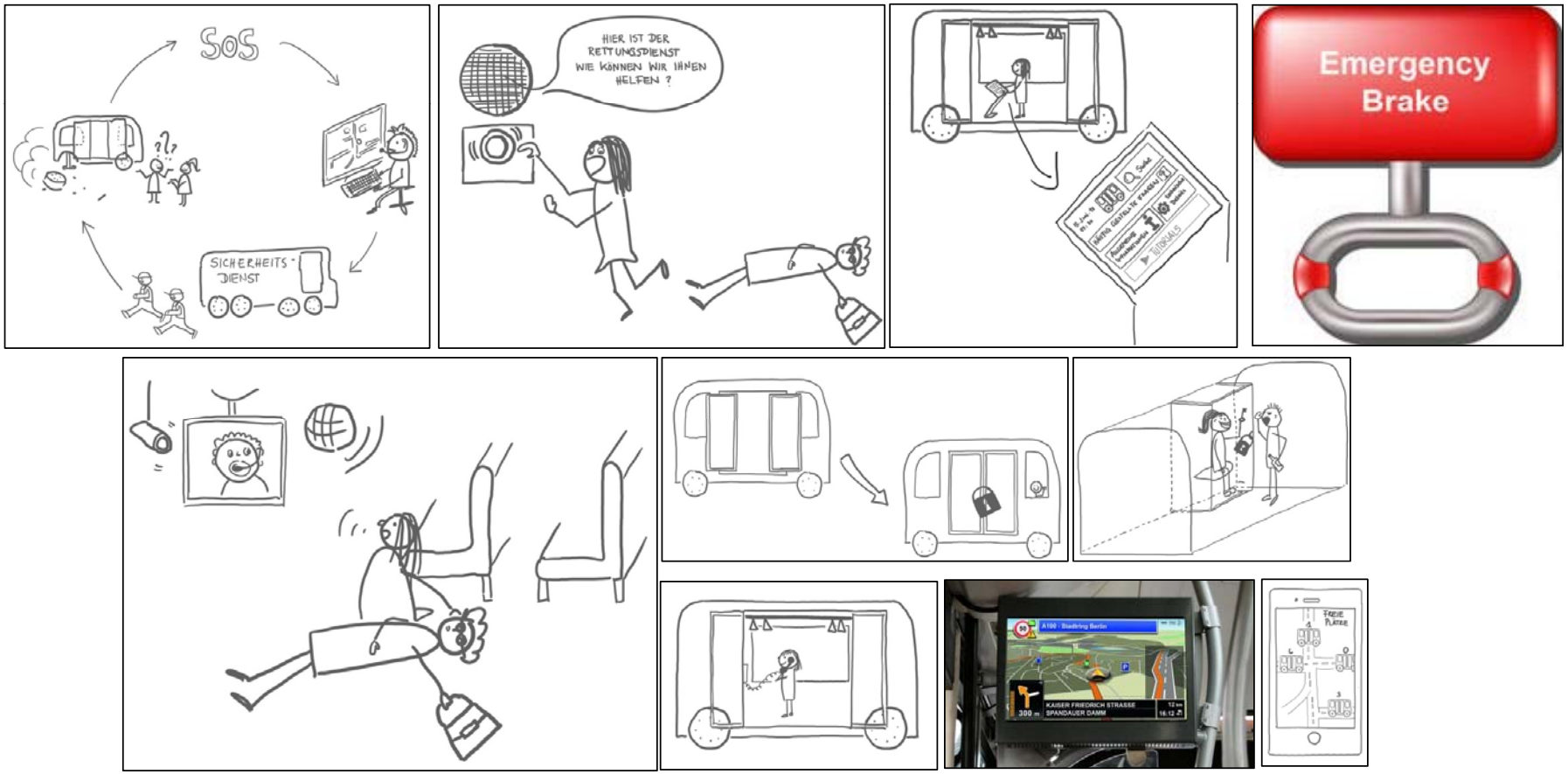
$p < .001$, $d > 0.8$

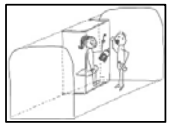
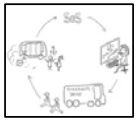
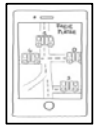
Grippenkoven et al. (2018)

Improvement of Feeling of Safety



Grippenkoven et al. (2018)

Do These Measures Improve the Feeling of Safety?

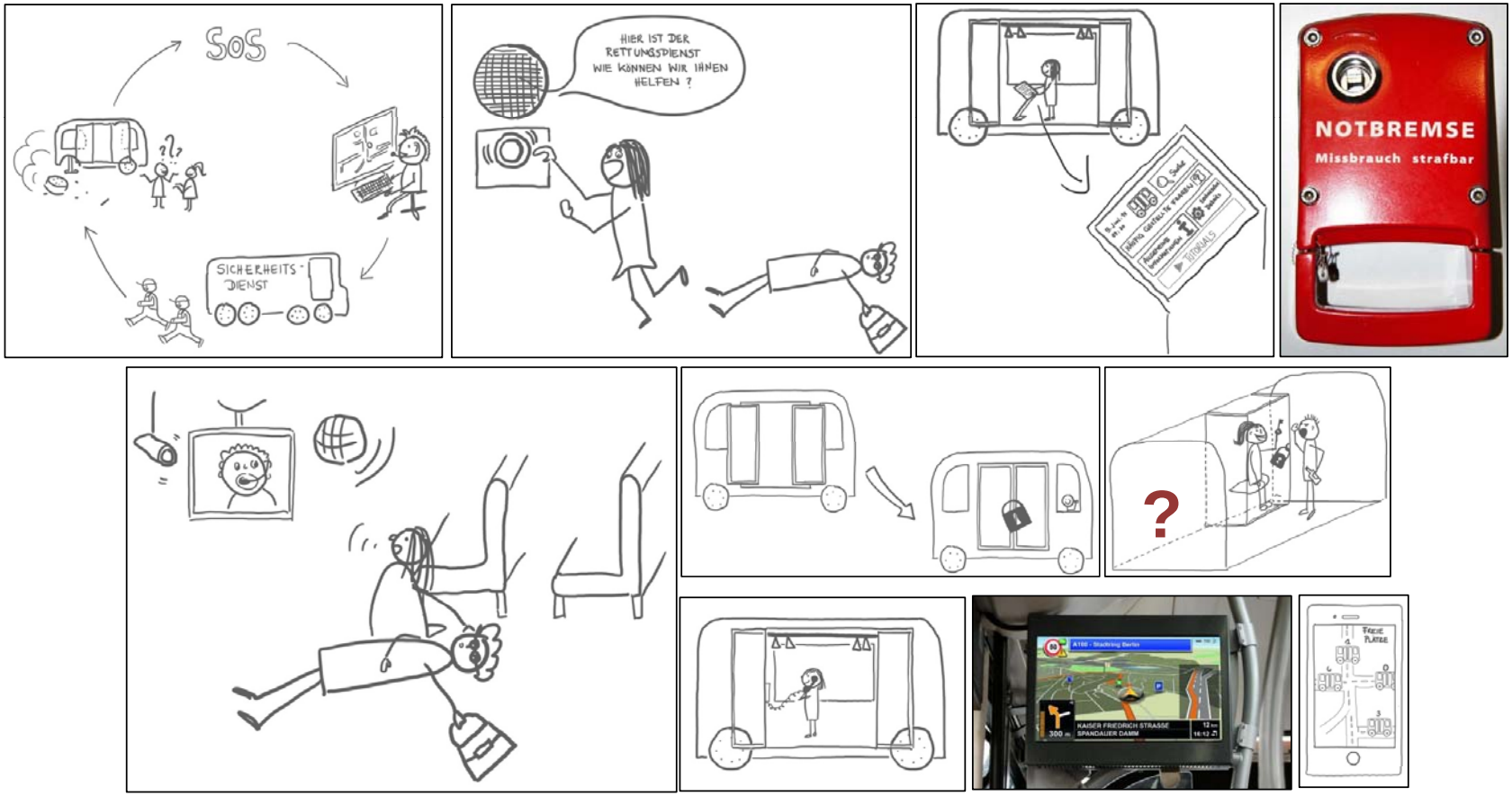
Means / Scenarios	Indiv. cabin	Emerg. brake	Mobile security service	Video assistance system	Mobile app-lication	Panic button	Info System
No help	😐	☺	☺	☺	😐	☺	😐
Missing emerg. exit	😐	☺	☺	☺	😐	☺	😐
Group dynamics	☺	☺	☺	☺	☺	☺	😐
Vandalism	☺	☺	☺	☺	😐	☺	😐
Theft	☺	☺	☺	☺	☺	☺	😐
							

☺ = significant, $p < .001$

😐 = not significant

Grippenkoven et al. (2018)

Measures to Improve the Feeling of Safety



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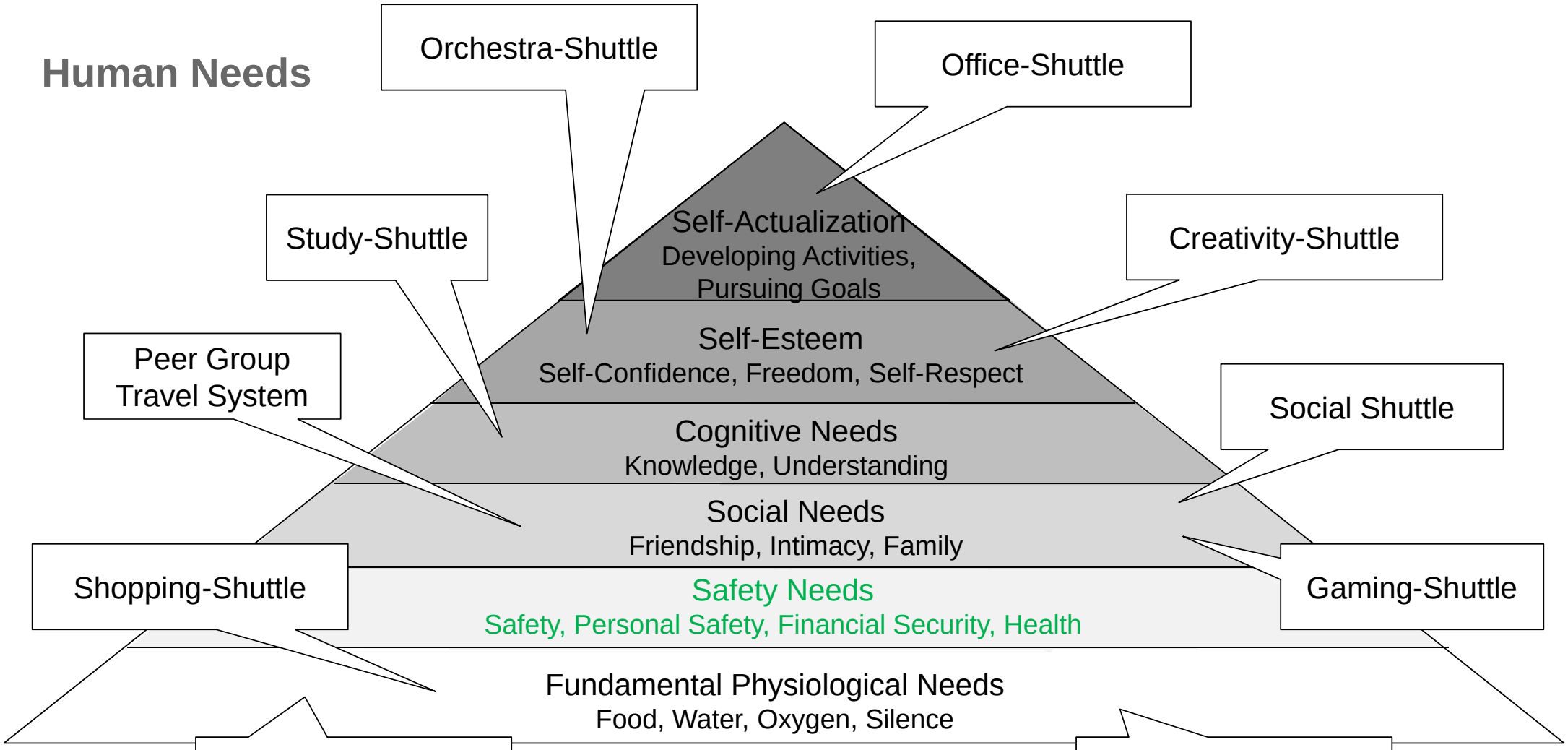
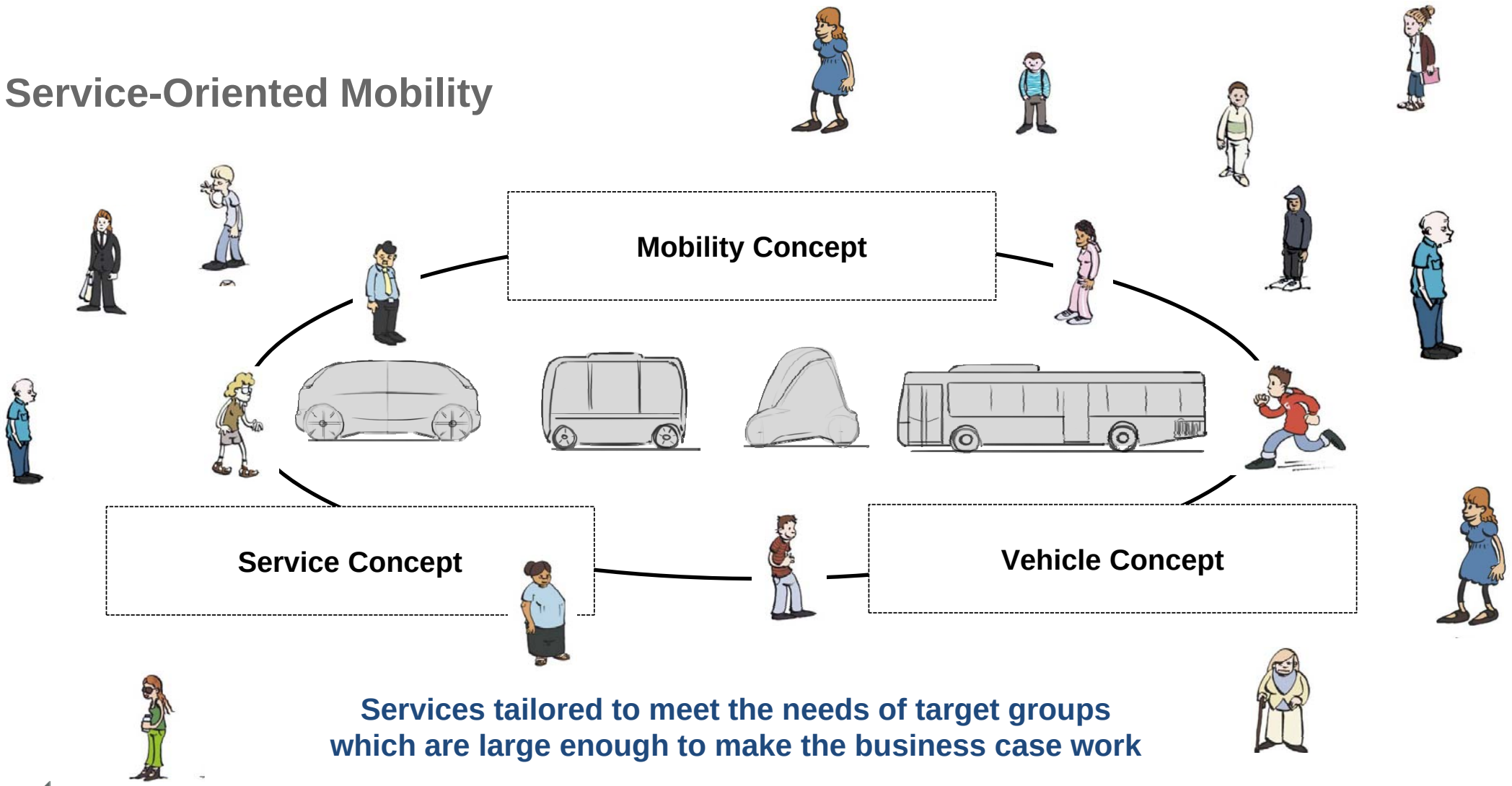
Human Needs



Maslow (1971)

Service-Oriented Mobility



Services tailored to meet the needs of target groups which are large enough to make the business case work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SATURN

Yes, technology can help create attractive cities

…if human needs are considered when designing mobility!

Thank you for your attention!

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