

# Analysis of the delayed roll-out of fully automated vehicles

Felix Andlauer & Adam Laurell

**MOBILITY**SERVICE

# AGENDA

- Scope
- Market
- Ecosystem
- Key challenges & solutions
- Recommendations



## Analysis of the delayed roll-out of fully autonomous vehicles













2024-04-18  
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This report is the authors' attempt at analysing and explaining the reasons behind the delayed rollout of autonomous vehicles on a large scale. The report delves into technical, commercial, and regulatory challenges and provides suggestions on how to overcome those.

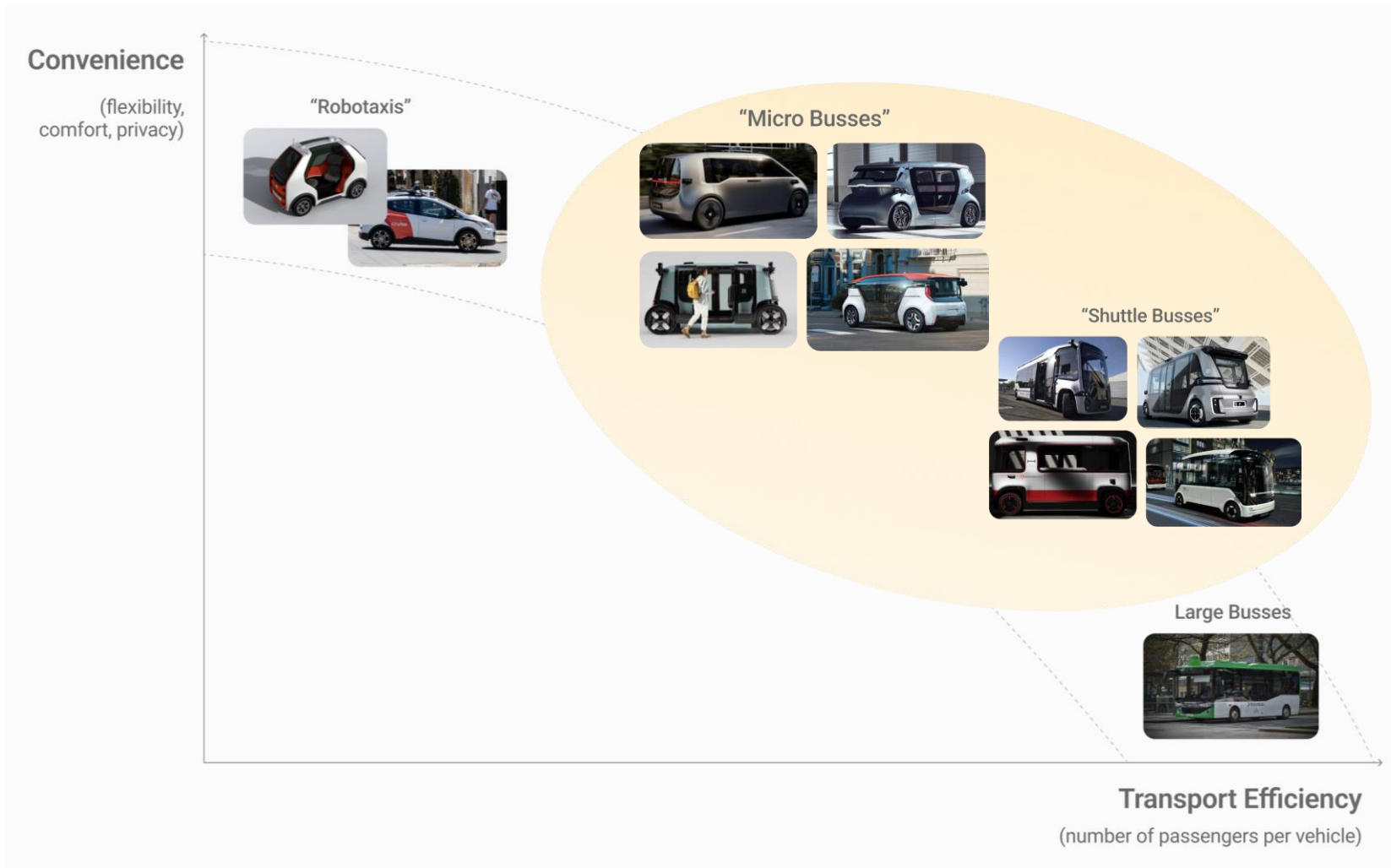
DRIVE SWEDEN

With support from  
VINNOVA  
Swedish Innovation Agency  
Swedish Energy Agency  
FORMAS  
Strategic innovation programmes

# SCOPE

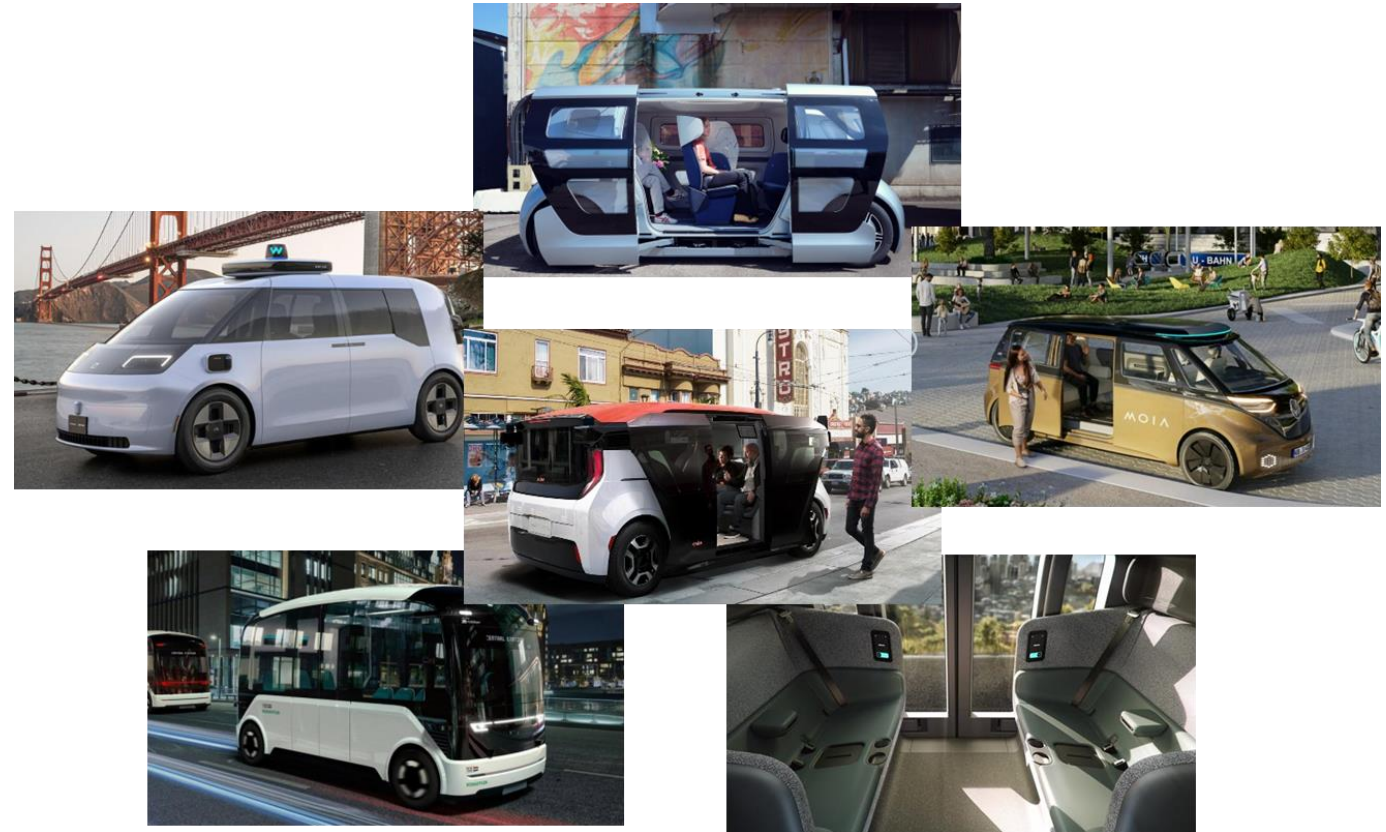
	Small	Medium	Large	Extra Large
Passenger transport	 <p>Pod/Robotaxi Capacity: 1-2</p>	 <p>Micro Busses Capacity: 4-8</p>	 <p>Shuttle Busses Capacity: 8-16</p>	 <p>Full Size Bus Capacity: 15-100</p>
Goods transport	 <p>Delivery Robot Capacity: &lt;1 pallet</p>	 <p>Small LCV Capacity: 2 pallets</p>	 <p>Large LCV Capacity: 6 pallets</p>	 <p>Full Size Truck Capacity: 30 pallets</p>
Speciality vehicles	 <p>Warehouse Robots</p>	 <p>Baggage Tractor</p>	 <p>Terminal Tractor</p>	 <p>Container Tractor</p>

# SCOPE

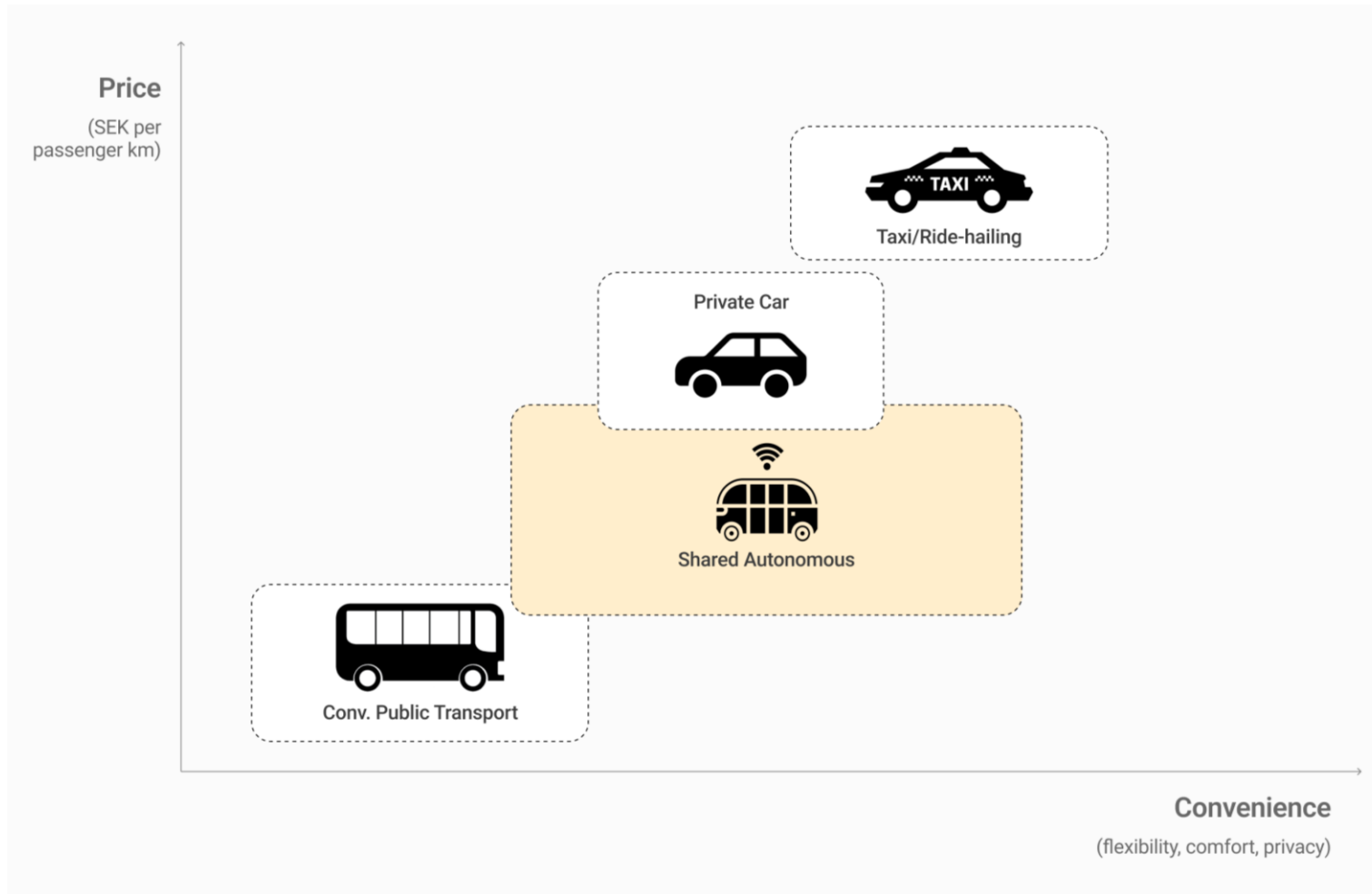


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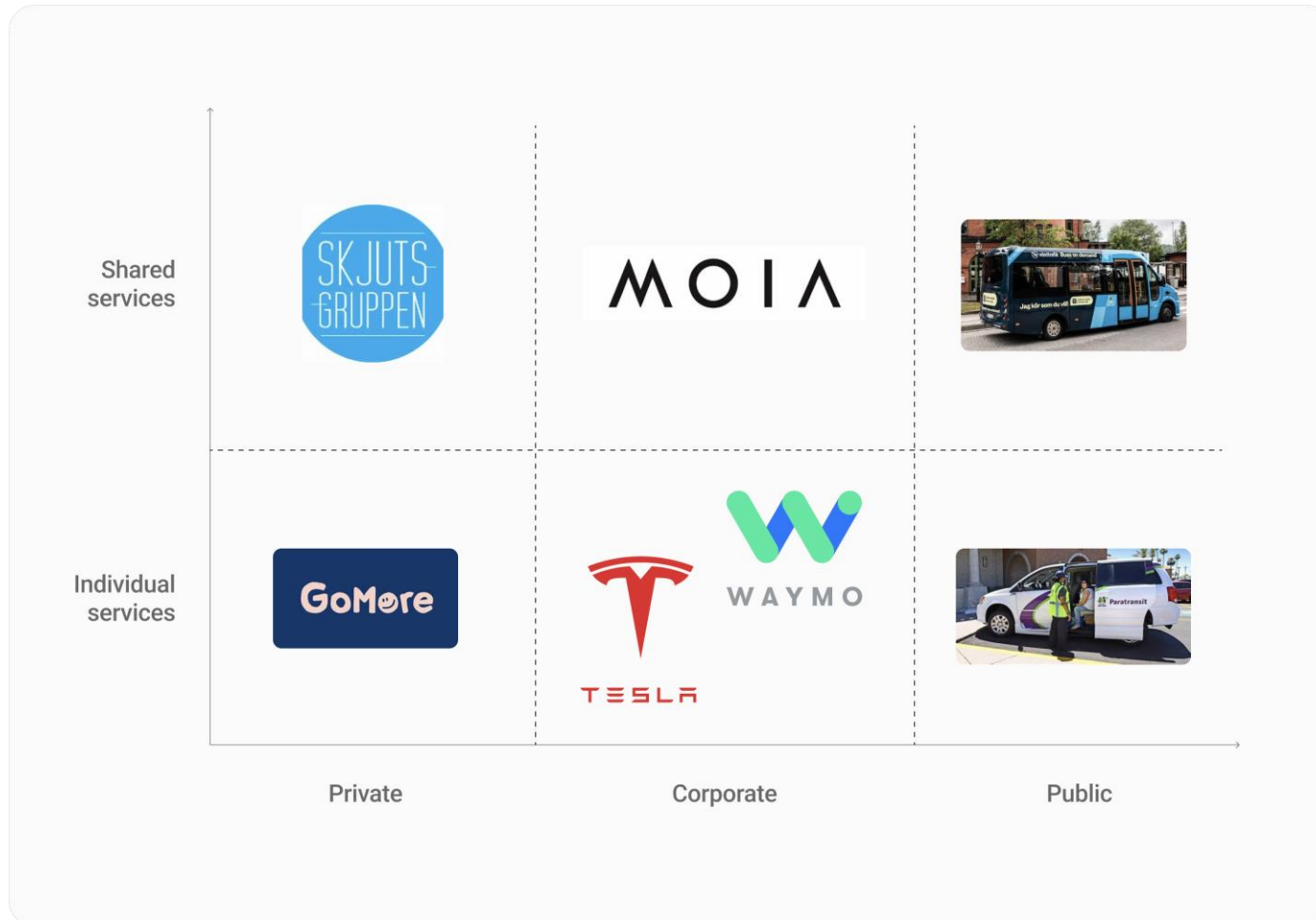
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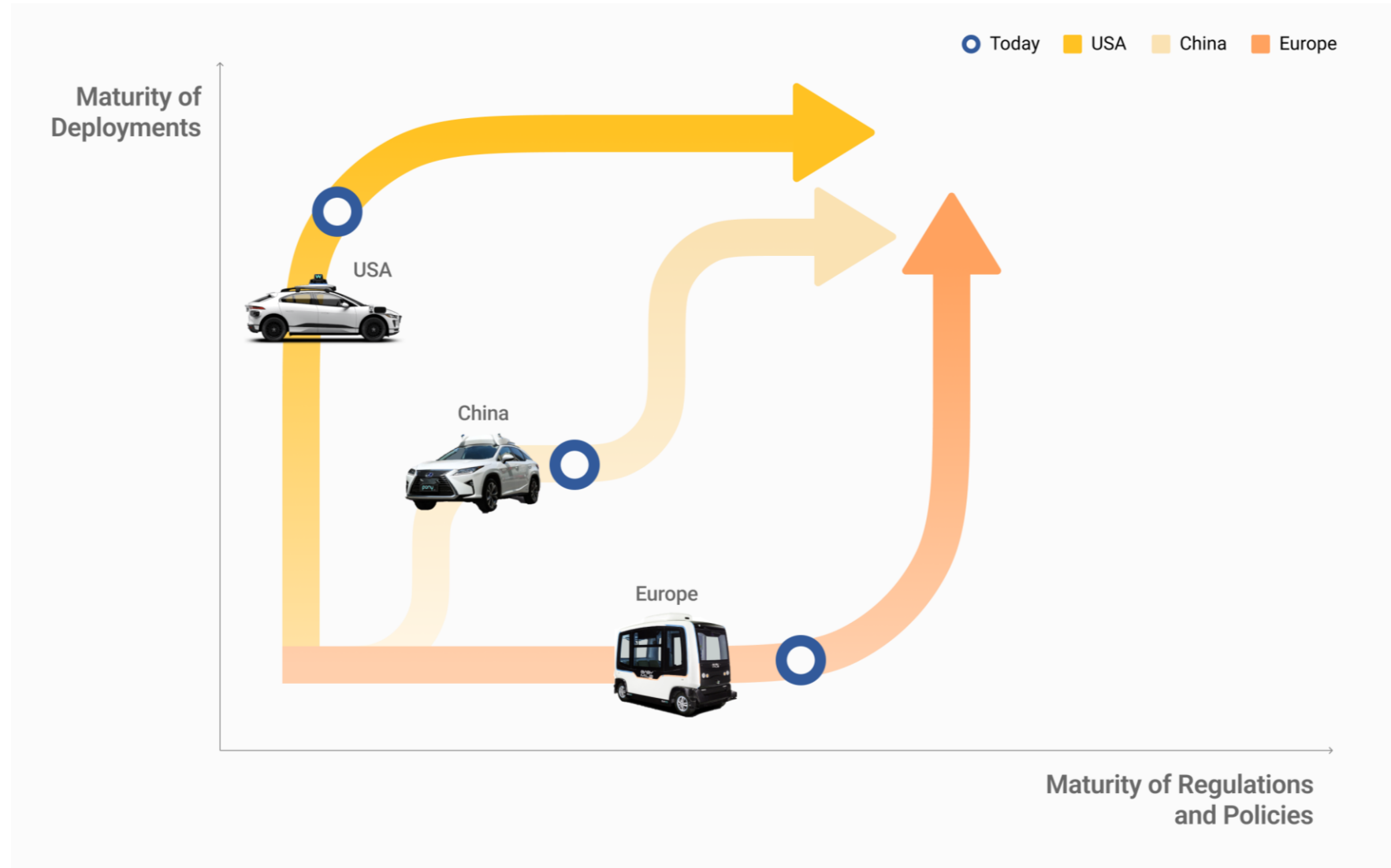
# PRODUCT MARKET FIT



# ROLES & SERVICE CONCEPT



# GEOGRAPHIC DIFFERENCES



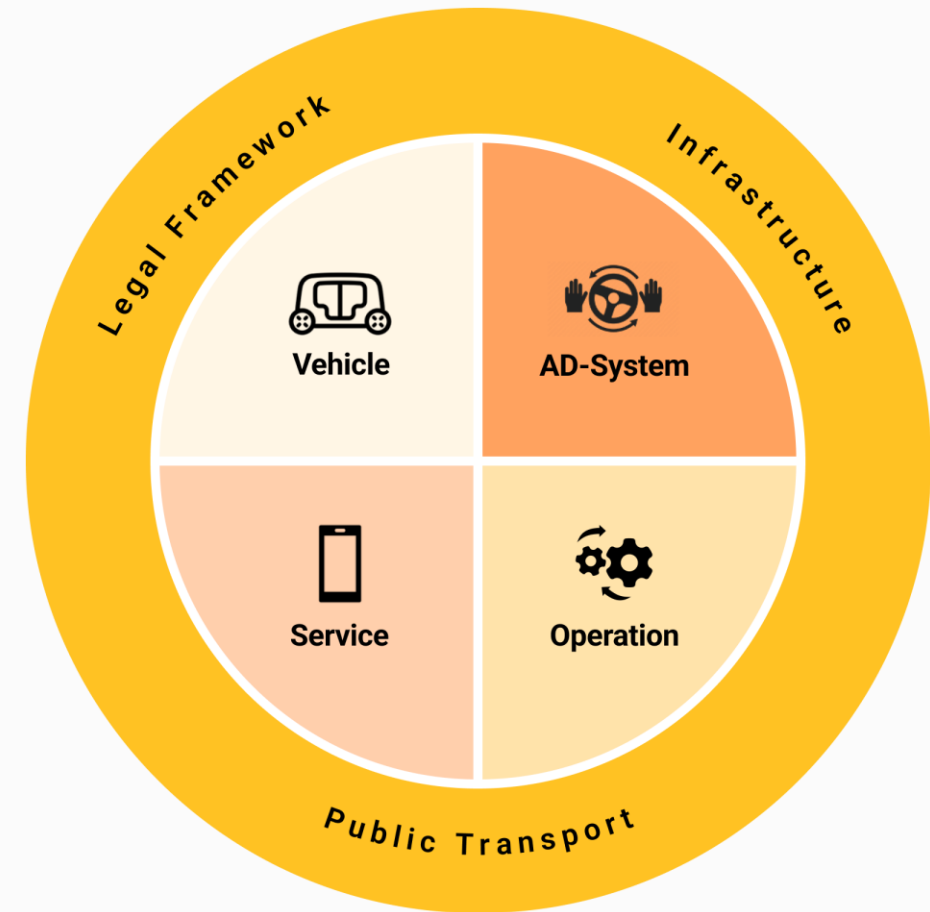
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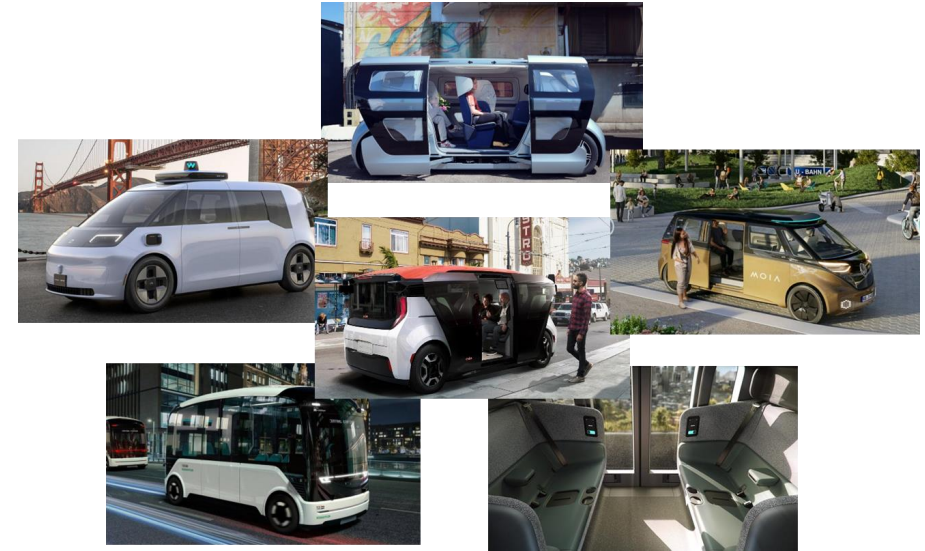
# ECOSYSTEM

- Vehicle
- ADS
- Service & Operations
- Public Transport
- Infrastructure
- Legal Frameworks
- Relevant Actors & Initiatives on the Market



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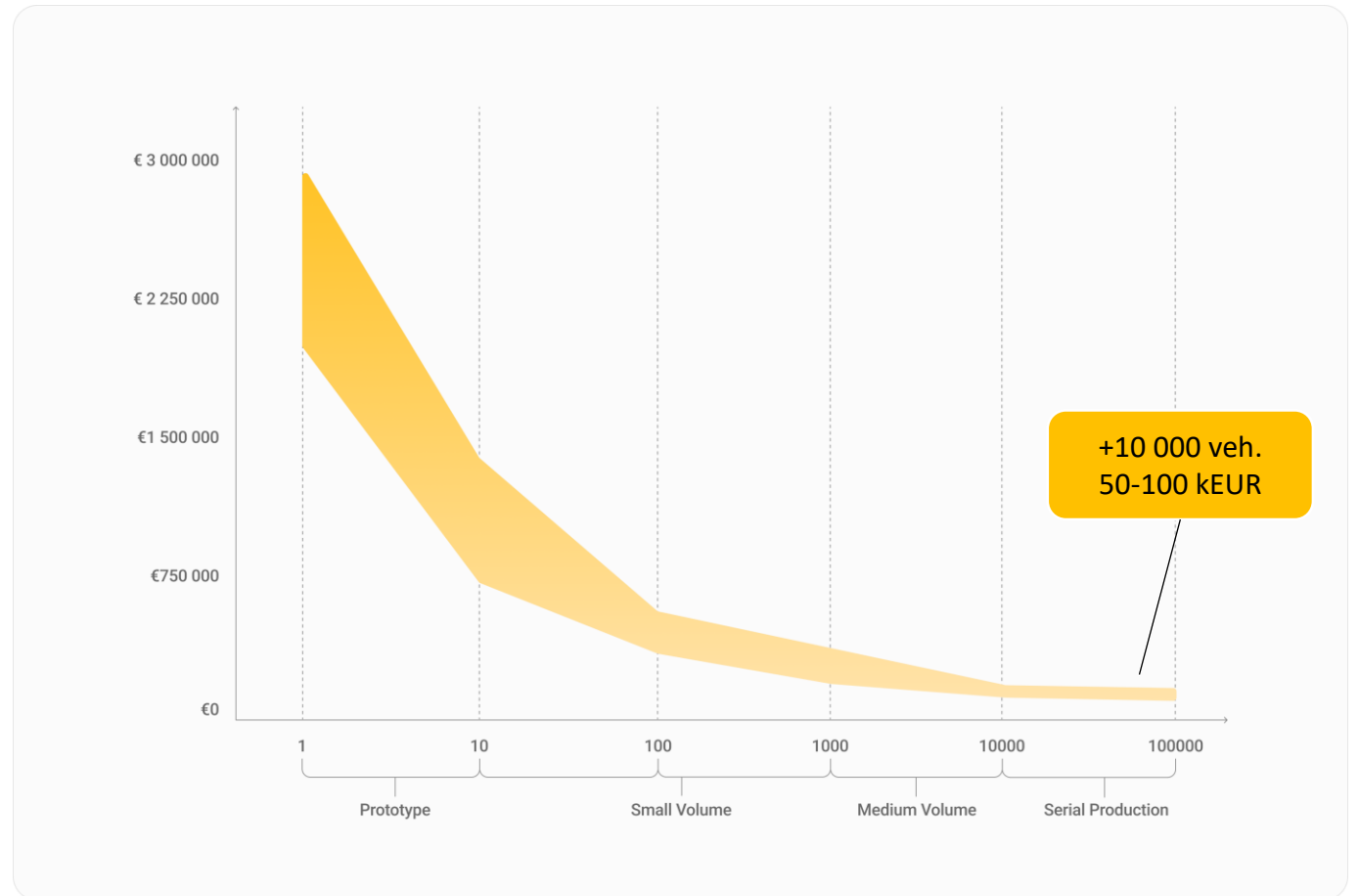
# VEHICLE HARDWARE

- Requirements for a purpose-built vehicle
- Realistic user studies
- Seat arrangement, Safety and privacy
- Accessibility
- Luggage
- Child seats



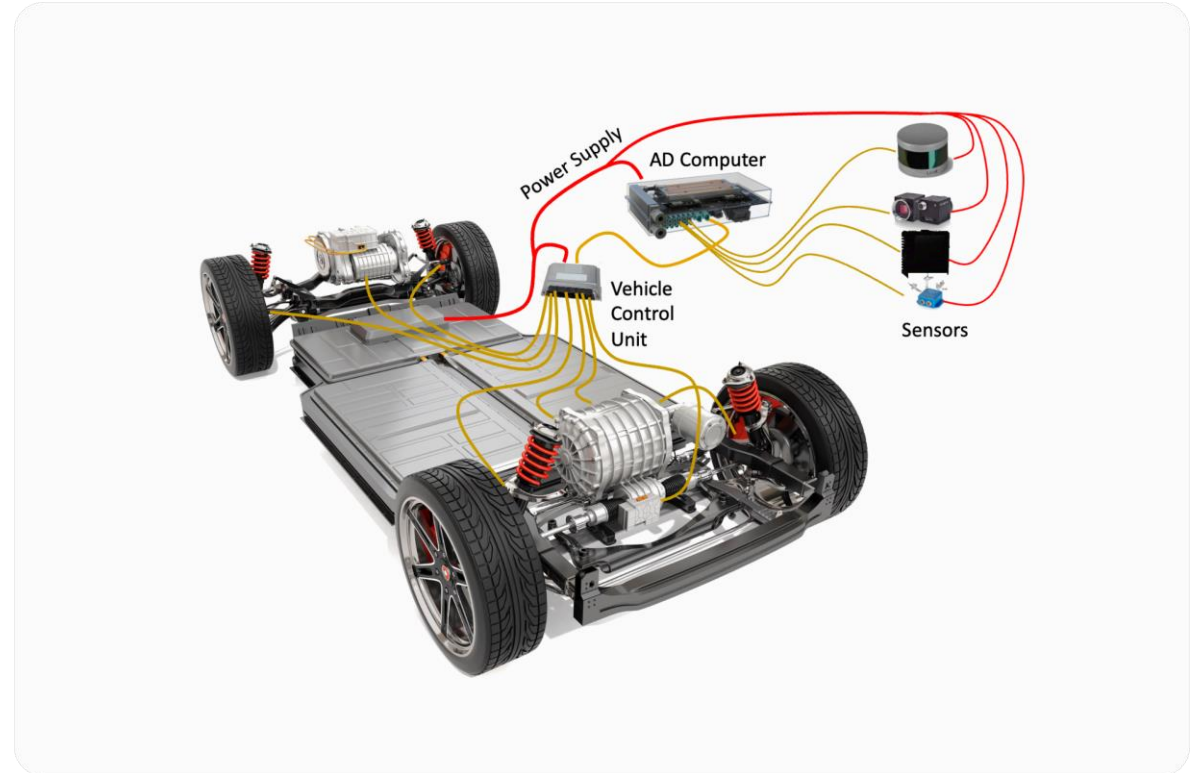
# VEHICLE PRODUCTION

- Production Volumes
- High investment



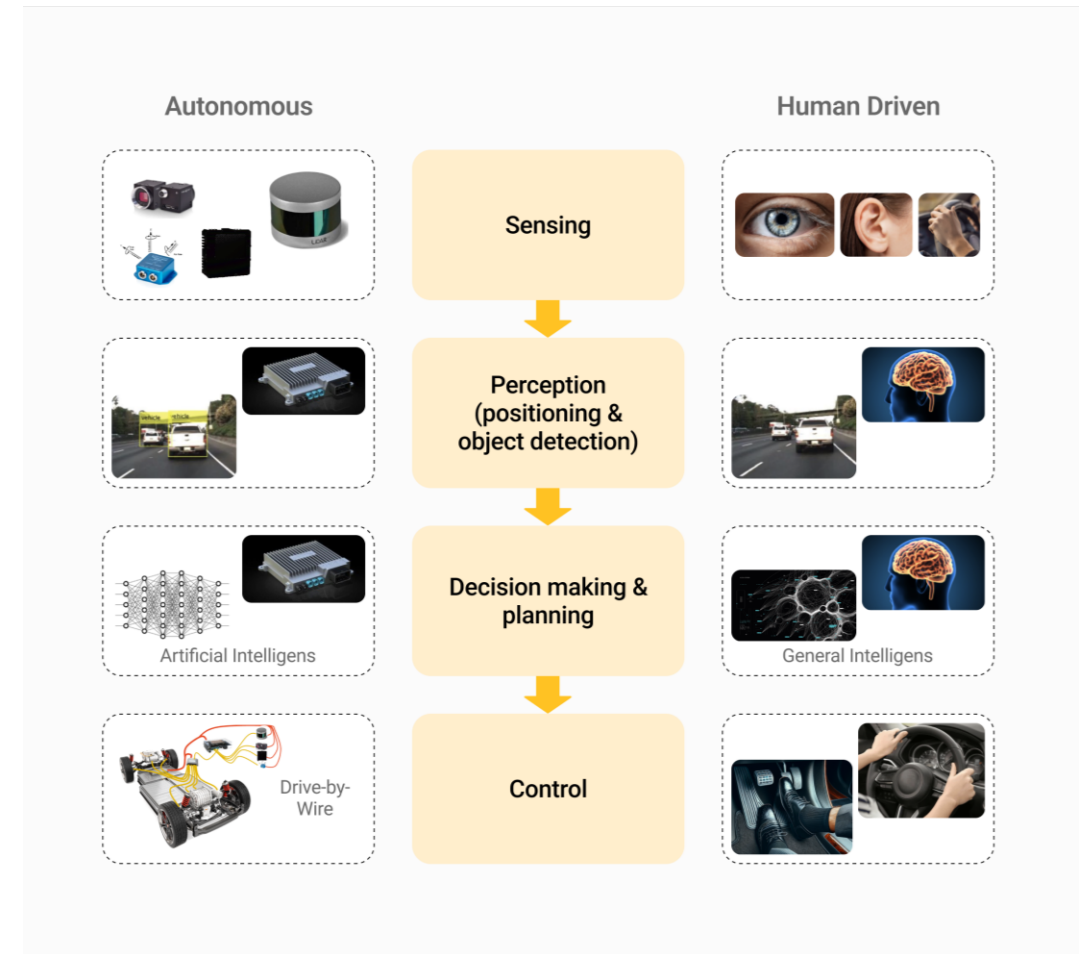
# VEHICLE SOFTWARE & ELECTRONICS

- DevOps vs. traditional waterfall
- Functional req. due to new use cases
- **Drive-by-wire**



# AD SYSTEM

- Non-deterministic behaviour of neural networks
- Data management
- Edge cases and extreme weather



# SYSTEM OF SYSTEM COMPLEXITY

- Interoperability
- Real time coordination and control
- Data management
- Lifecycle management



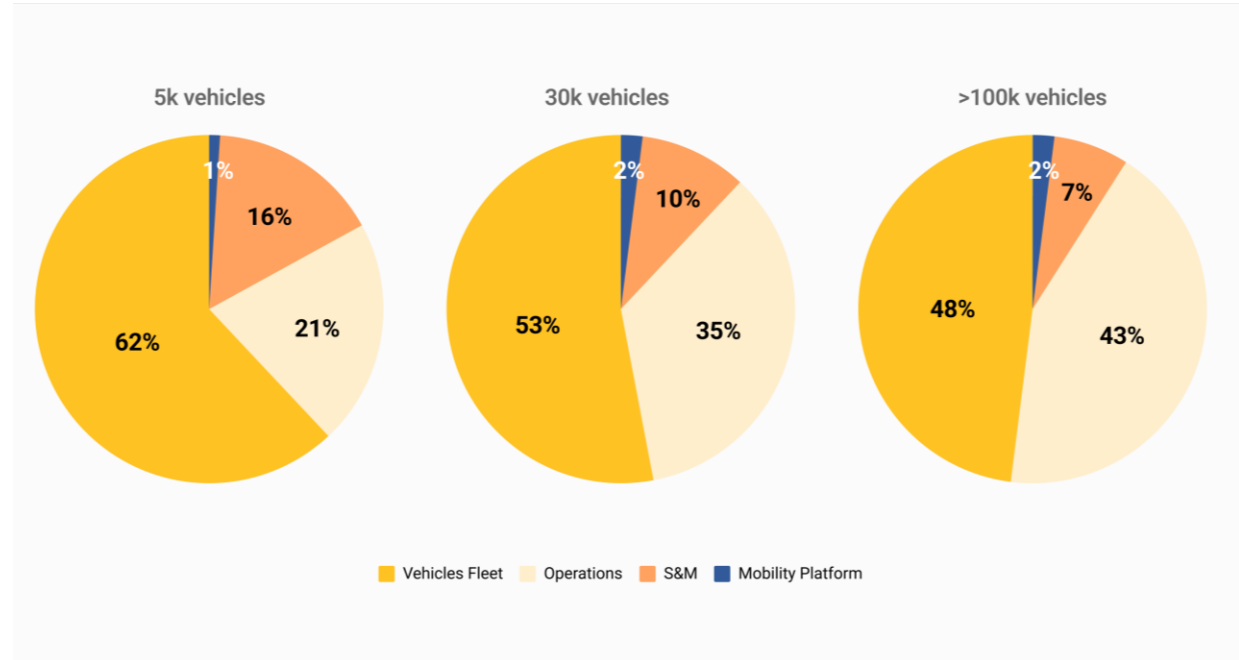
# SERVICE AND USER INTERACTION

- Privacy vs. everything else
- Interaction with no human present
- Security
- Design for heavy usage



# BUSINESS MODEL & BUSINESS CASE

- No market, no vehicle or no vehicle no market
- Customer behaviour
- Peak demand
- Distribution of revenue in the value chain



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# RECOMMENDATIONS

- Authorities
- Public transport & cities
- OEM
- AD system providers
- Fleet operators & service providers
- University and research institutes





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TACK!