



Autonomy

Forecasting Timelines for Self-Driving Vehicles

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ACMA Automotive Summit
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Outline

- About LMC Automotive
- Opportunities and threats from self-driving vehicles (AVs)
- Barriers to adoption
- Forecasting timelines

About LMC Automotive

- **Independent** industry-leading source of market intelligence for over 25 years
- **Focused** on global automotive forecasts: sales, production, powertrain & electrification
- **Responsive & flexible** support for OEMs, suppliers, financial firms & government institutions
- The **smart** choice for automotive intelligence & insight into market dynamics, economic, regulatory & technological change





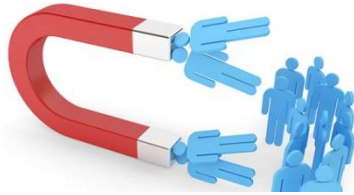
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Opportunities and threats from AVs ...



In-vehicle services are likely to be a highly significant, while some business models remain speculative or hidden.



Vehicle autonomy opens up mobility services to many companies, expanding into peoples' lives.



Transformation of support services (for AVs) is also a new area for component, and other, companies.



Some may find the transition difficult.

Automotive industry business model implications



Today, a key feature is that OEMs fundamentally control the value chain.

In a shared AV world, the customer relationship will be different → Mobility Provider.

Larger OEMs will retain an advantage over smaller ones in seeking to claim the customer relationship and, therefore, primary control over the system.

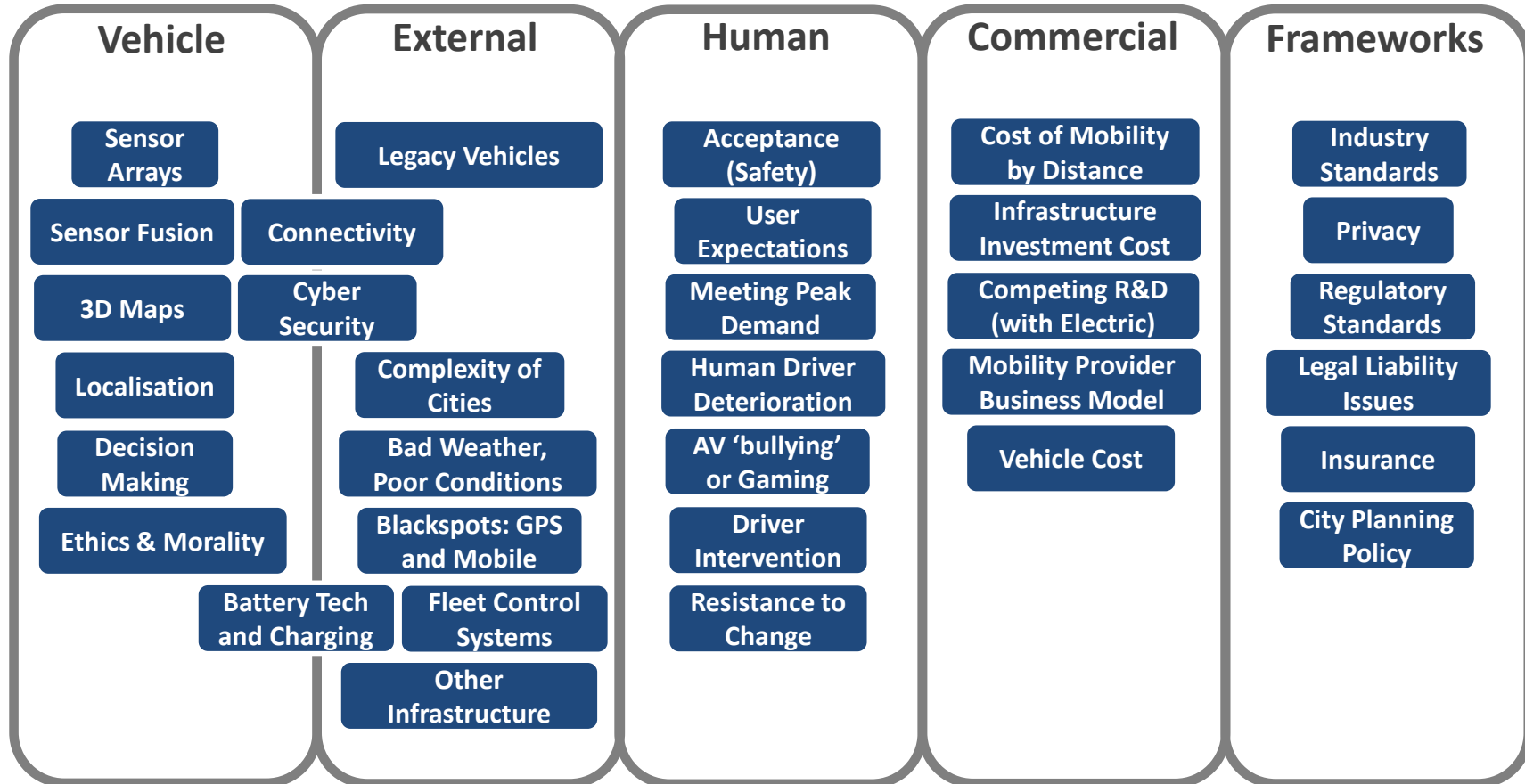
OEM competitors could be: the ‘disruptors’, megasuppliers, and other new entrants.



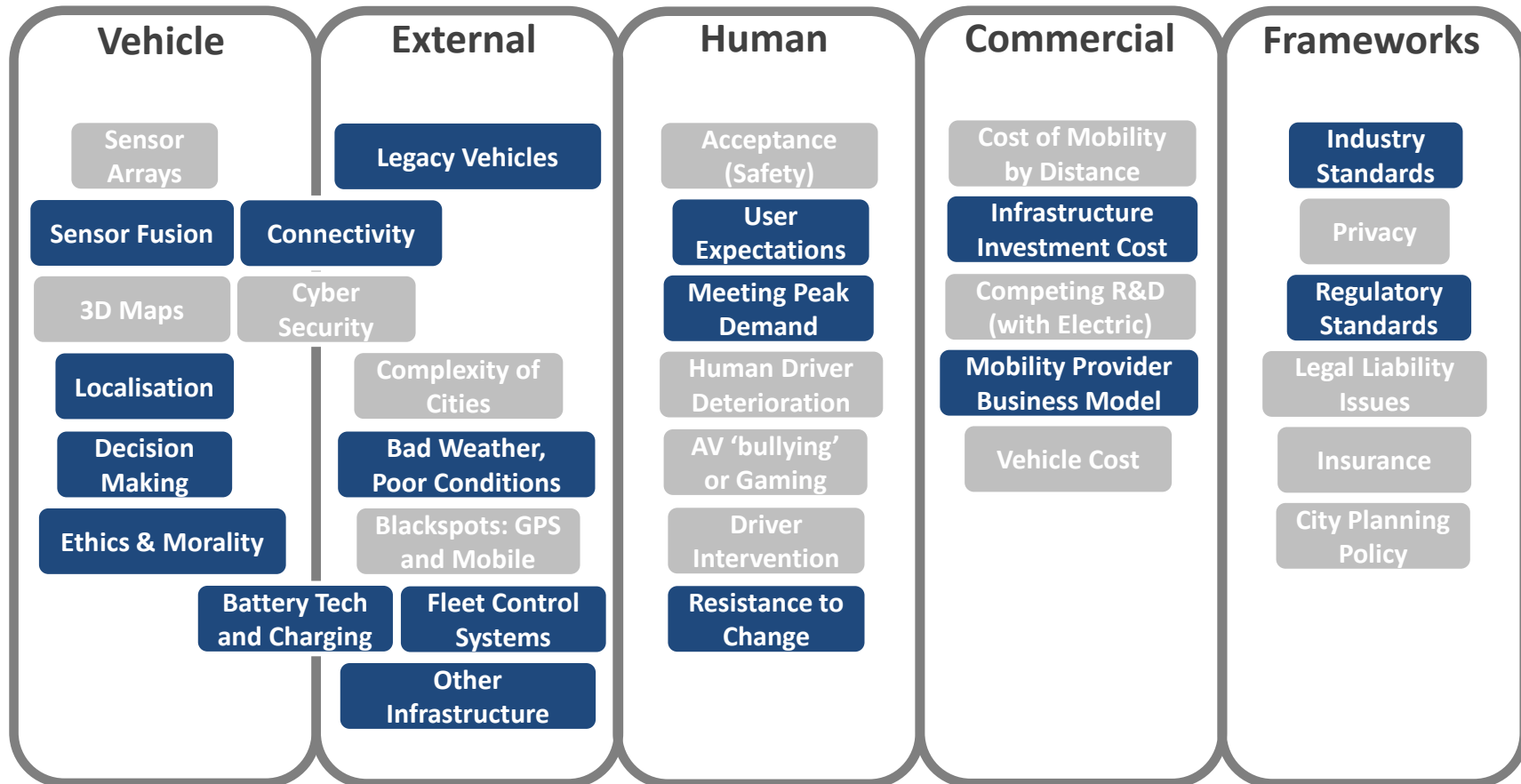
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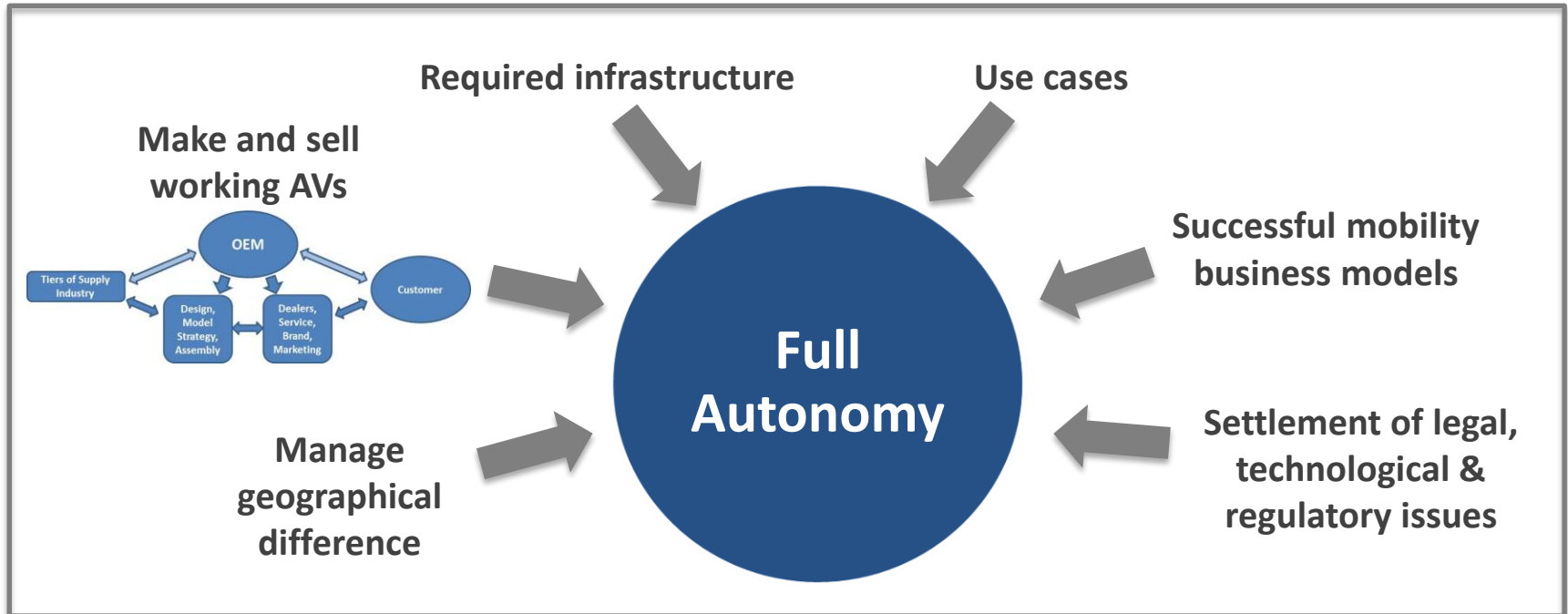
Many things to be solved before shared AVs can work



Many things to be solved before shared AVs can work



The holistic solution could be hardest of all ...



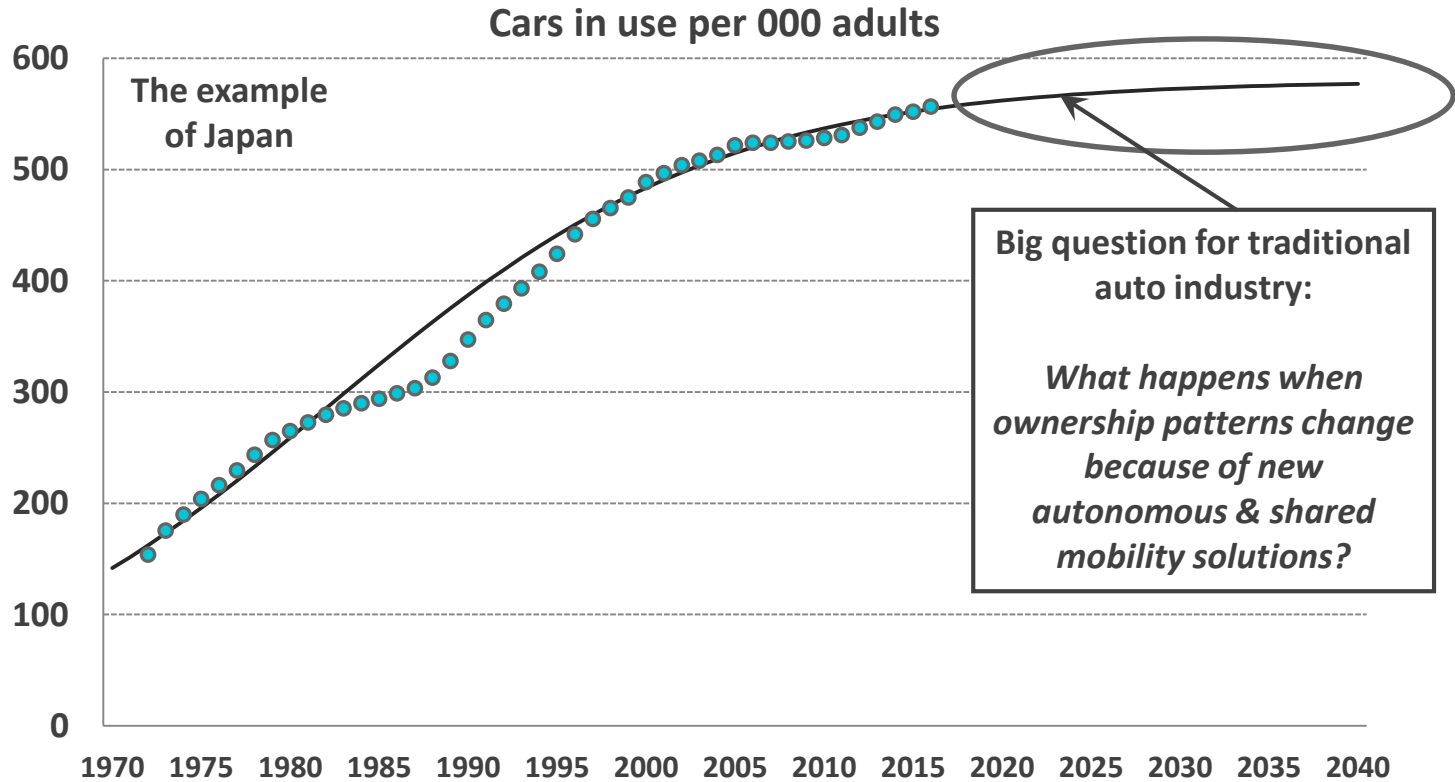
**Who is the 'owner' of this historically complex project? How can they make it work?
Step by step progress is the likely way – it will add time.**



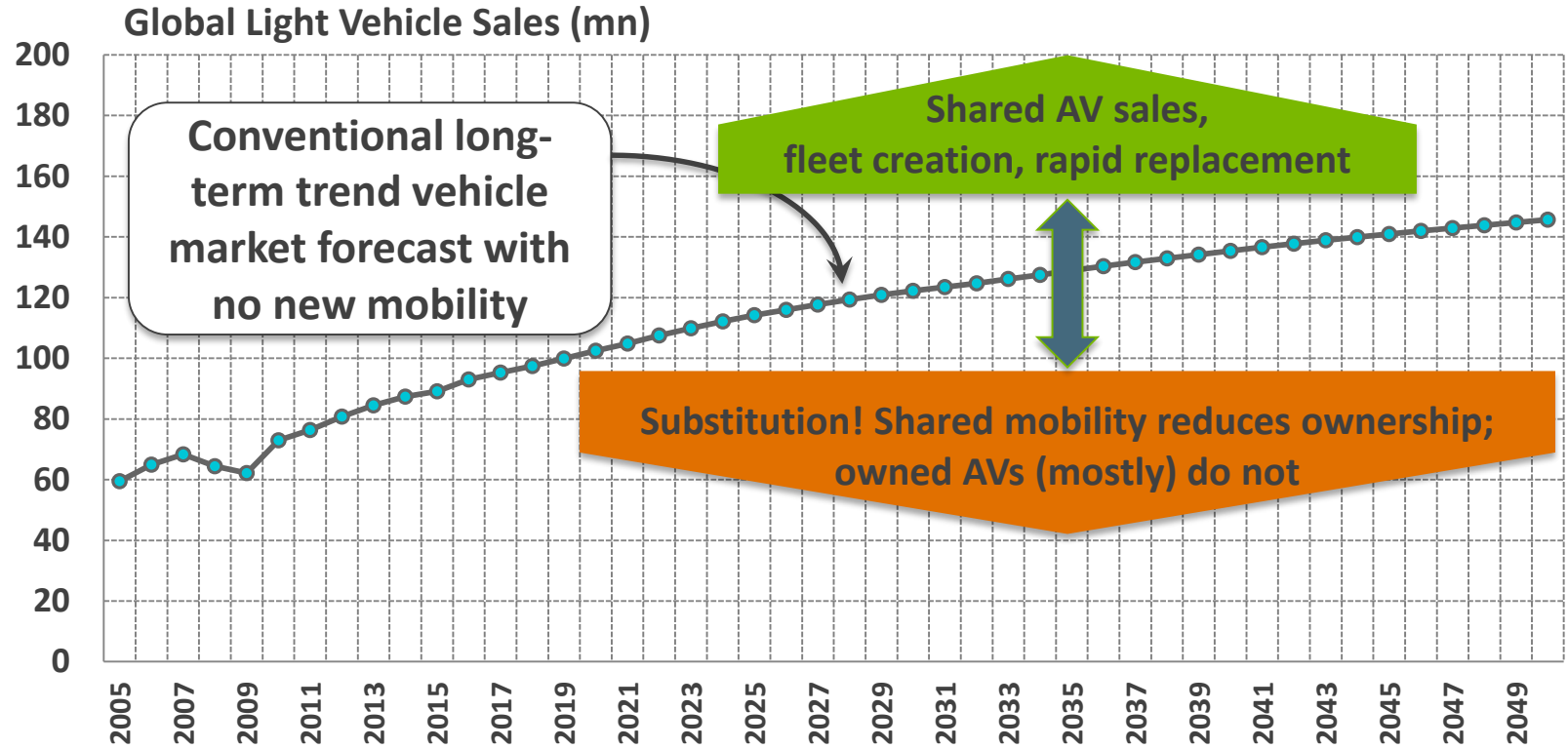
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Ownership growing on the traditional model ...



Impact on light vehicle sales ...



Shared AVs: an optimistic timeline for adoption



2019-25

2025-30

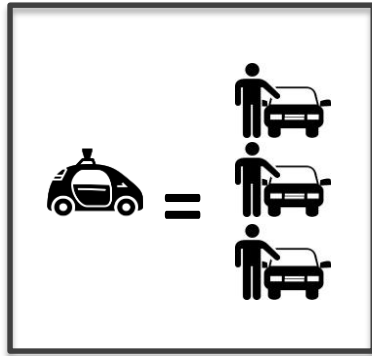
2030-35

- Mass trials Level 4 vehicles.
- AVs have not 'arrived' at this point. This is still a part of establishing how they work in the real world.
- Numbers cannot be large because of potentially huge expense.
- **Volume impact: zero conventional + some new AVs**

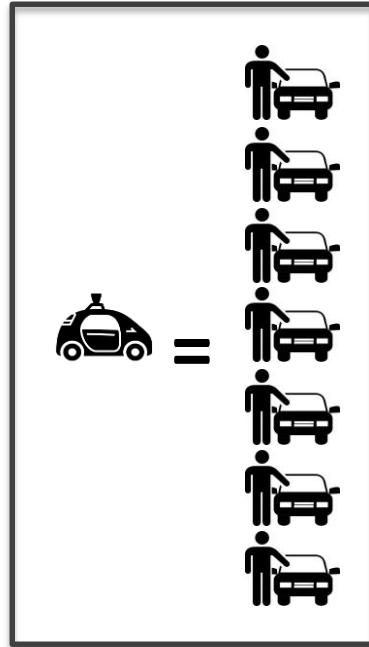
- Next stage in development of AVs including learnings from phase 1.
- True commercial deployments develop, in a variety of different geographies.
- But geographical extension still relatively limited.
- Level 5 vehicles testing
- **Volume impact: minus few mn conventional + few mn AV sales**

- World AV sales start decade in 10 mn range, and rising quickly.
- Substitution starts to hit individual (conventional) ownership model.
- Level 5 vehicles begin to arrive, replacing some Level 4.
- **Volume impact: lose 10s mn convention + add new AV sales.**

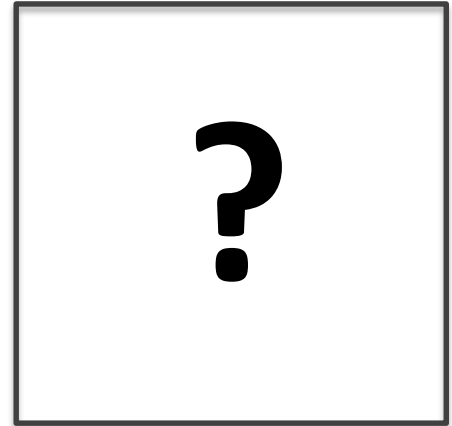
Uncertainty over extent of substitution



OR



OR



Shared AVs: scenarios needed to capture possibilities

Slow burn

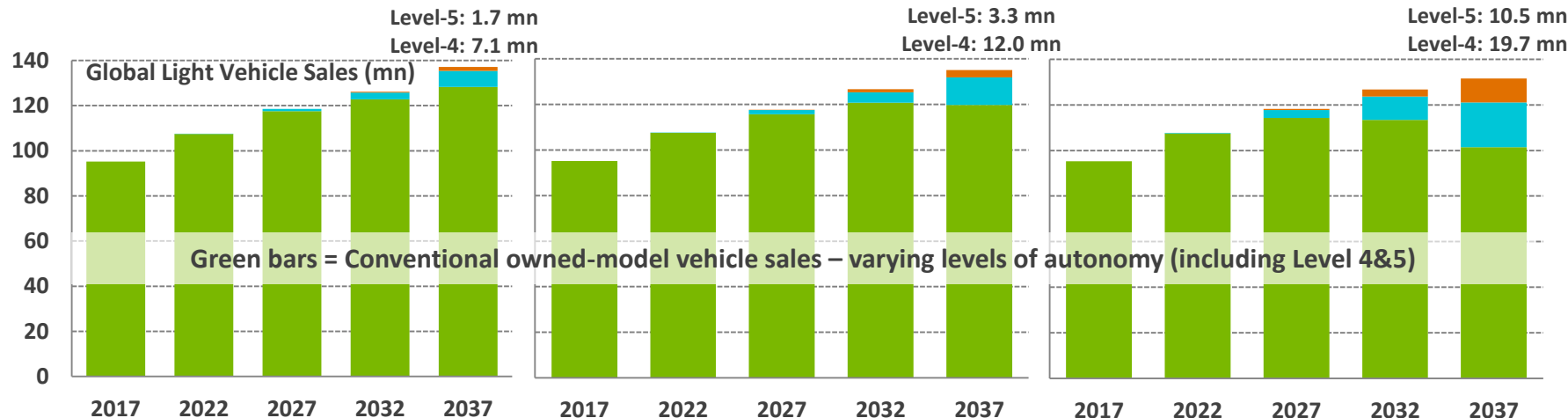
- Technical difficulties & high costs
- Infrastructure delays
- Consumer reluctance
- Ethical issues
- Legal, regulatory mismatch
- 2040?

Moderate Progress

- Success in limited areas
- Incremental expansion
- Breakthrough emerges in 2030s
- Ownership model flattens, ready for subsequent fall

Optimistic

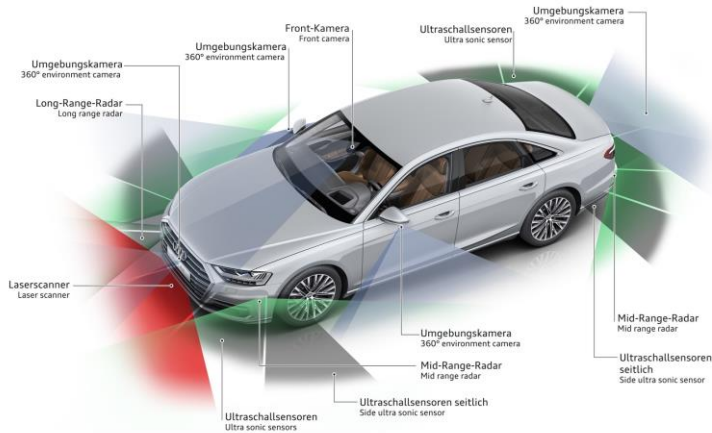
- Technological, commercial, logistical issues solved fairly quickly
- Breakout from first zones to much broader usage
- Transportation boom
- Ownership model down



Not all self-driving cars will be shared ...



Latest Audi A8 is the first Level-3-capable car for wider consumption (launched in 2017)



Premium brands look to be at forefront of incremental adoption of higher levels of automation.

Reasonable to assume next A8 will be Level 4, e.g. by 2025?

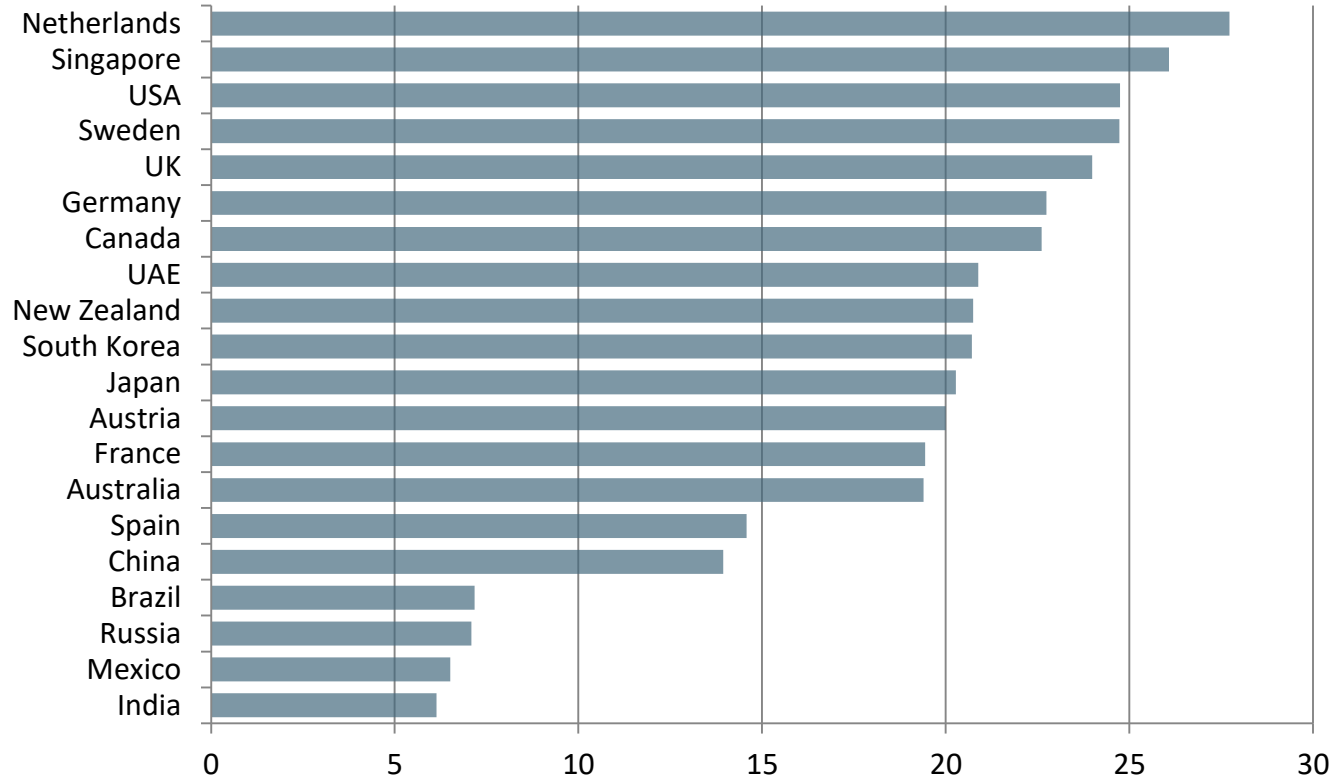
Others coming but a conservative approach is likely for all.

Estimate up to 4 mn Level-4-capable by 2030; with Premiums leading.

Which countries are well-placed?



KPMG's Autonomous Vehicles Readiness Index




Concluding remarks



- The media obsession with disruptive self-driving trend is not representative of developments in the real world (yet).
- Large-scale adoption of the shared autonomous model – potentially the most disruptive – faces major technical and organisational barriers. Some scepticism is reasonable and adoption seen as more evolution than revolution.
- Forecasting requires scenarios now. But, in future, key factor monitoring will be critical: technological and other binary barriers, sales of AVs, mobility models, costs, ownership substitution, geographical variation.
- Overcoming technical hurdles and costs is a global challenge.





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Thank you