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McKinsey perspective on Robo Taxi and Private AVs

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Introduction



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McKinsey Center for
Future Mobility (MCFM)

The McKinsey Center for Future Mobility®

– What we do

Leading think tank and advisor in the mobility industry



Think tank with a
clear voice in the
industry



Global convener of
exceptional thought
leaders



Client service
innovator



Global network of
experts

Agenda

1

Introduction: Mobility
Market Model (M³)

2

Key insights from the
Mobility Market Model

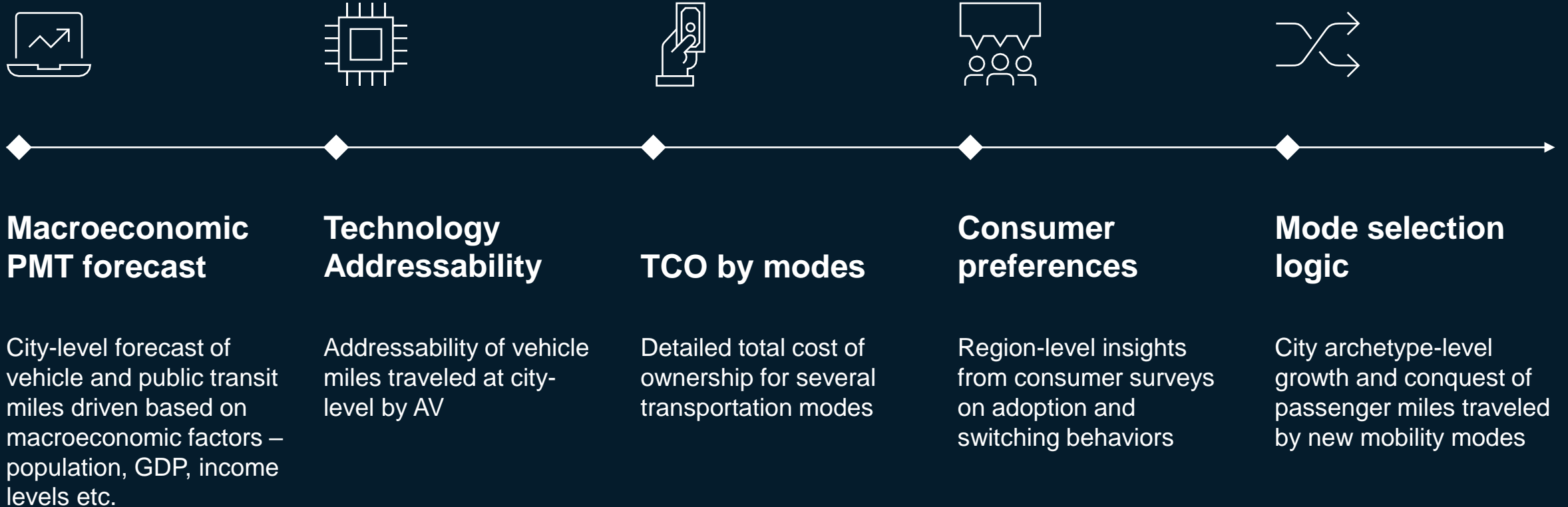
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Implications from
Covid-19

4

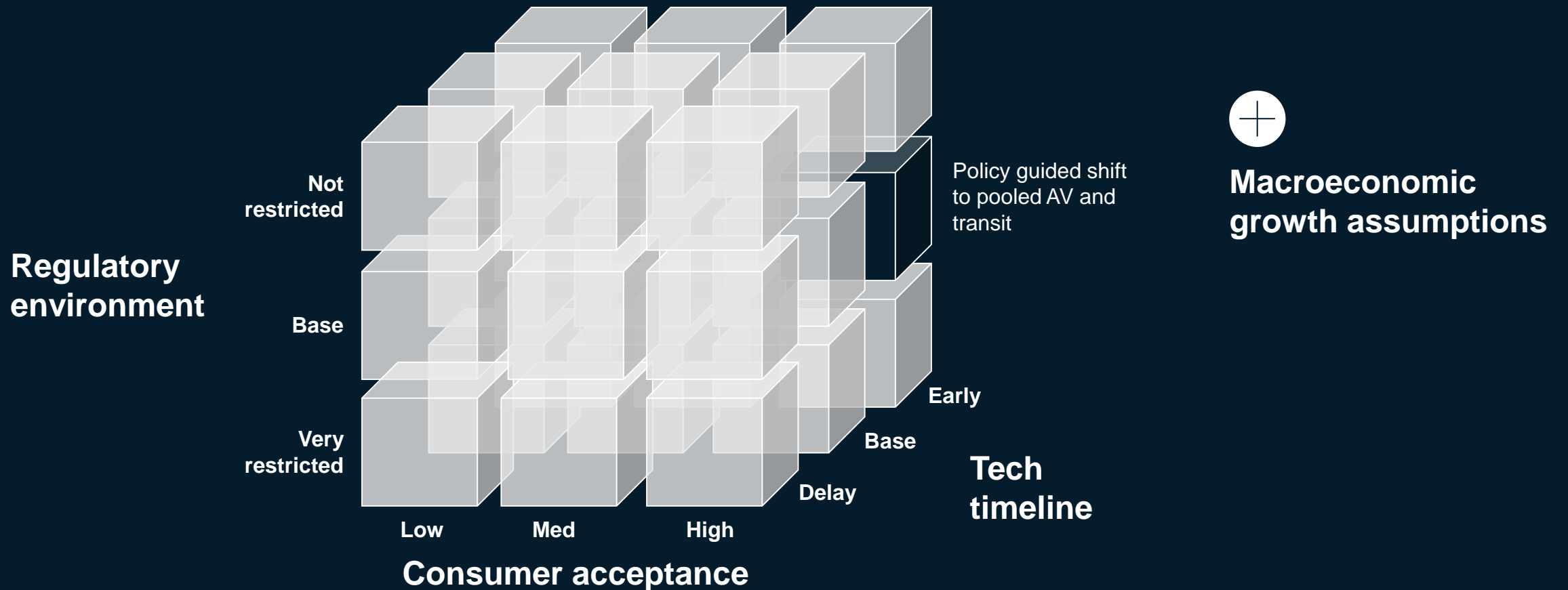
10 timeless tests for
AV strategy

Mobility Market Model projections are built using several modules that shape future scenarios

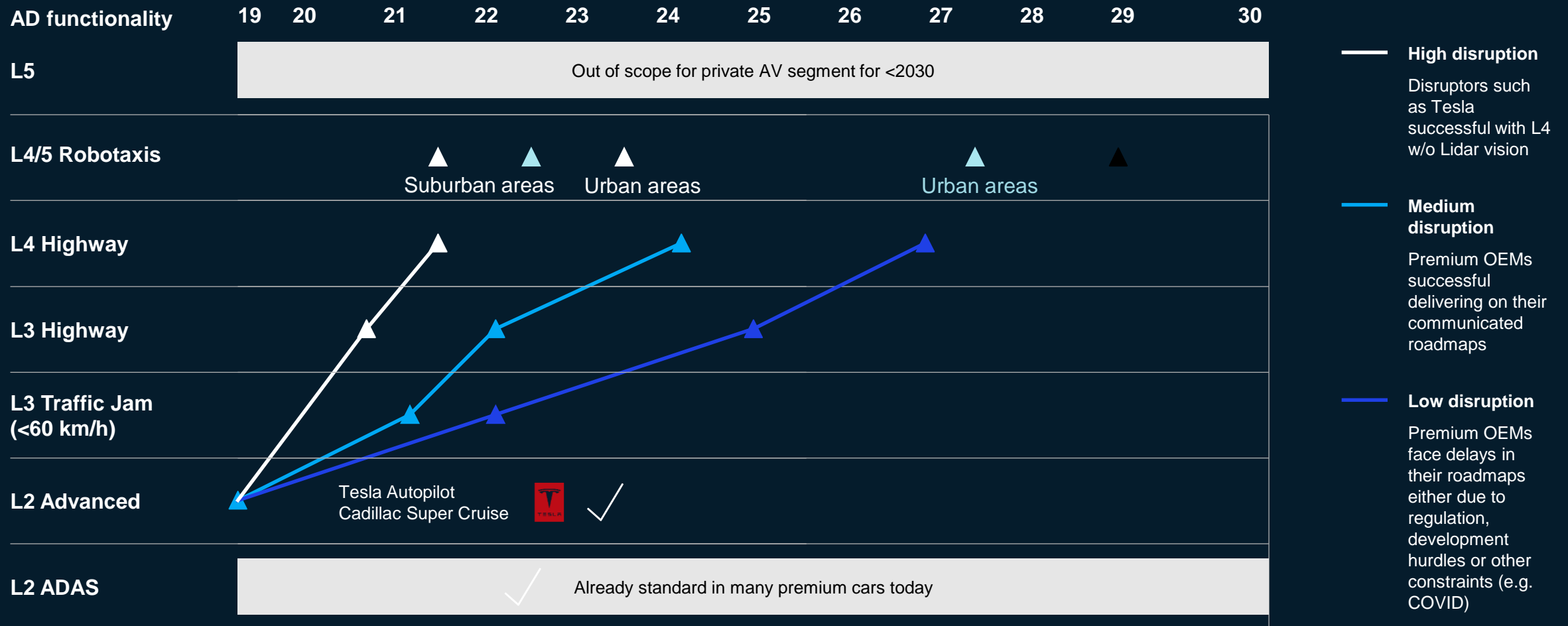


We see 4 main driver for the future of mobility: Regulation, Consumer acceptance, Tech readiness and macroeconomic growth

Mobility Market Model – Scenarios



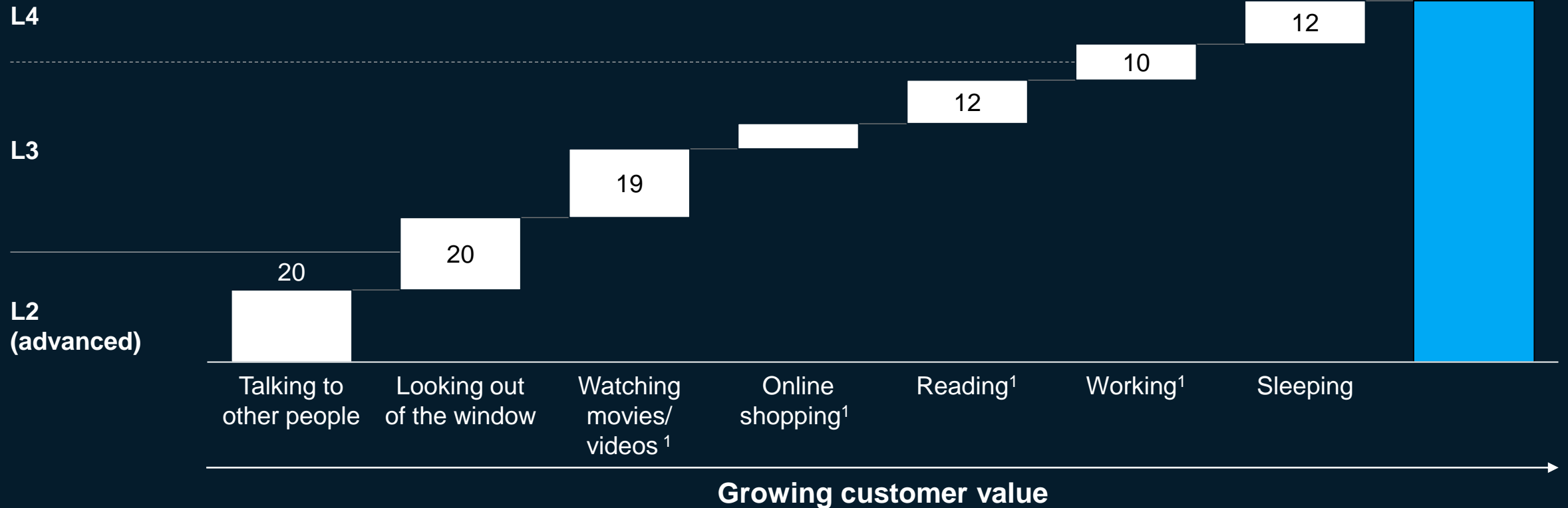
High uncertainty in the tech time line driven due to regulation, development hurdles, and willingness to invest



The customer willingness to pay will depend on possible activities while driving, which are dependent on the regulatory situation

Conceived distribution of time spent while autonomous driving mode is active

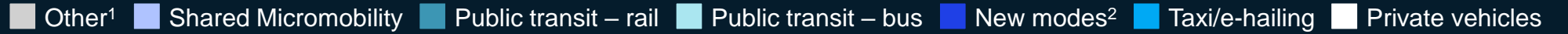
Percent of total time



1. Could be feasible with L3 if done through MMI; potentially requiring L4 if own device to be used

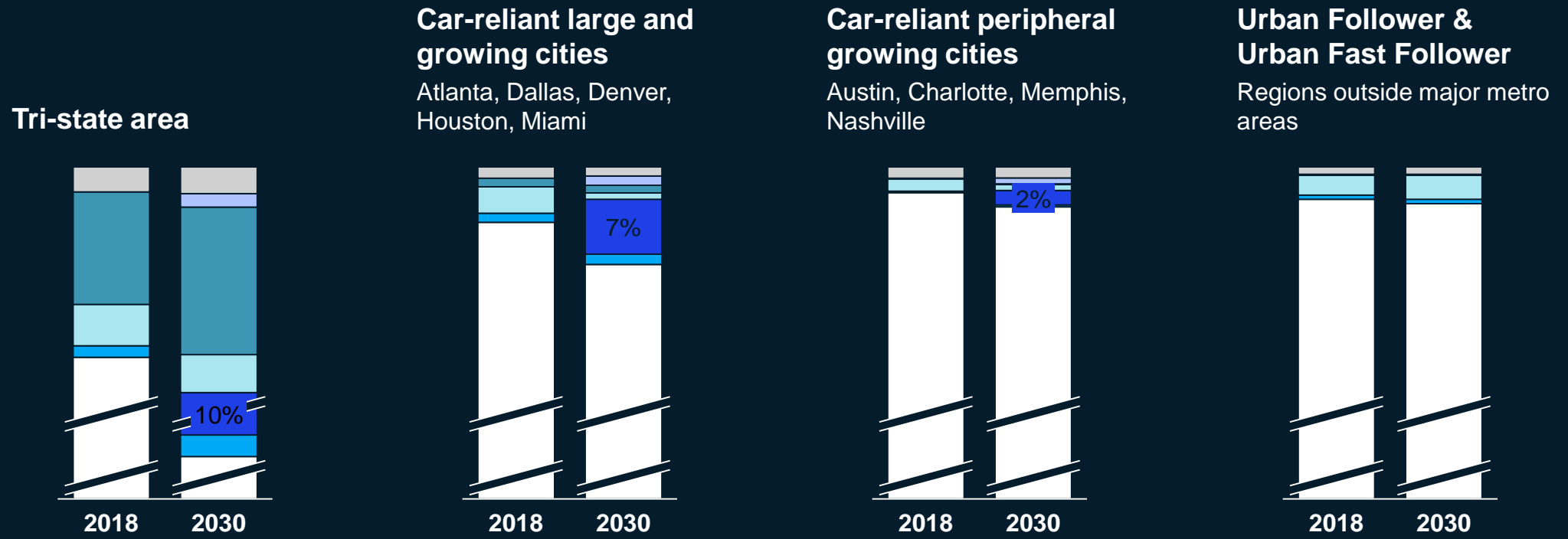
North American cities could see more muted disruption to mode share and private vehicle usage from new mobility modes

Total Passenger Miles Traveled, Trillions of miles, %



North American modal share by selected city archetypes

% of PMT, "Policy-guided shift to pooled AV and transit" scenario



Sample drivers

New modes take share from private vehicles and bus

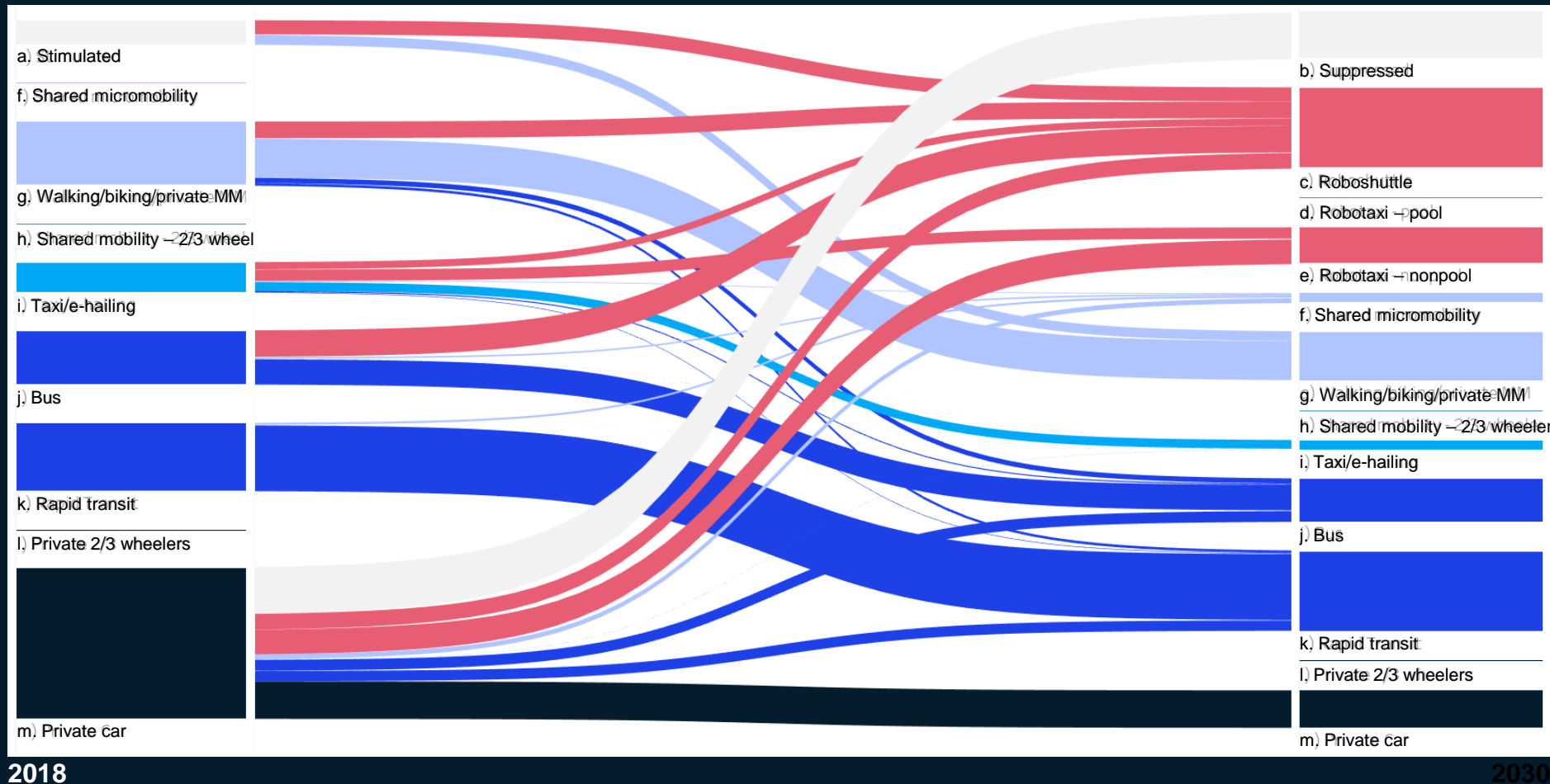
Some disruption to bus and private vehicle usage

No real disruption to mode share

1 "Other" includes walking, biking, private micromobility, 2/3 wheelers
 2. New modes includes Roboshuttle, Robotaxi (pooled), Robotaxi (non-pooled)

Example: In London emerging AVs will cannibalize miles travelled by other private and shared modes due to regulations

Mode share conversion in PMT, London, from 2018 to 2030, Policy-guided shift to pooled AV + transit



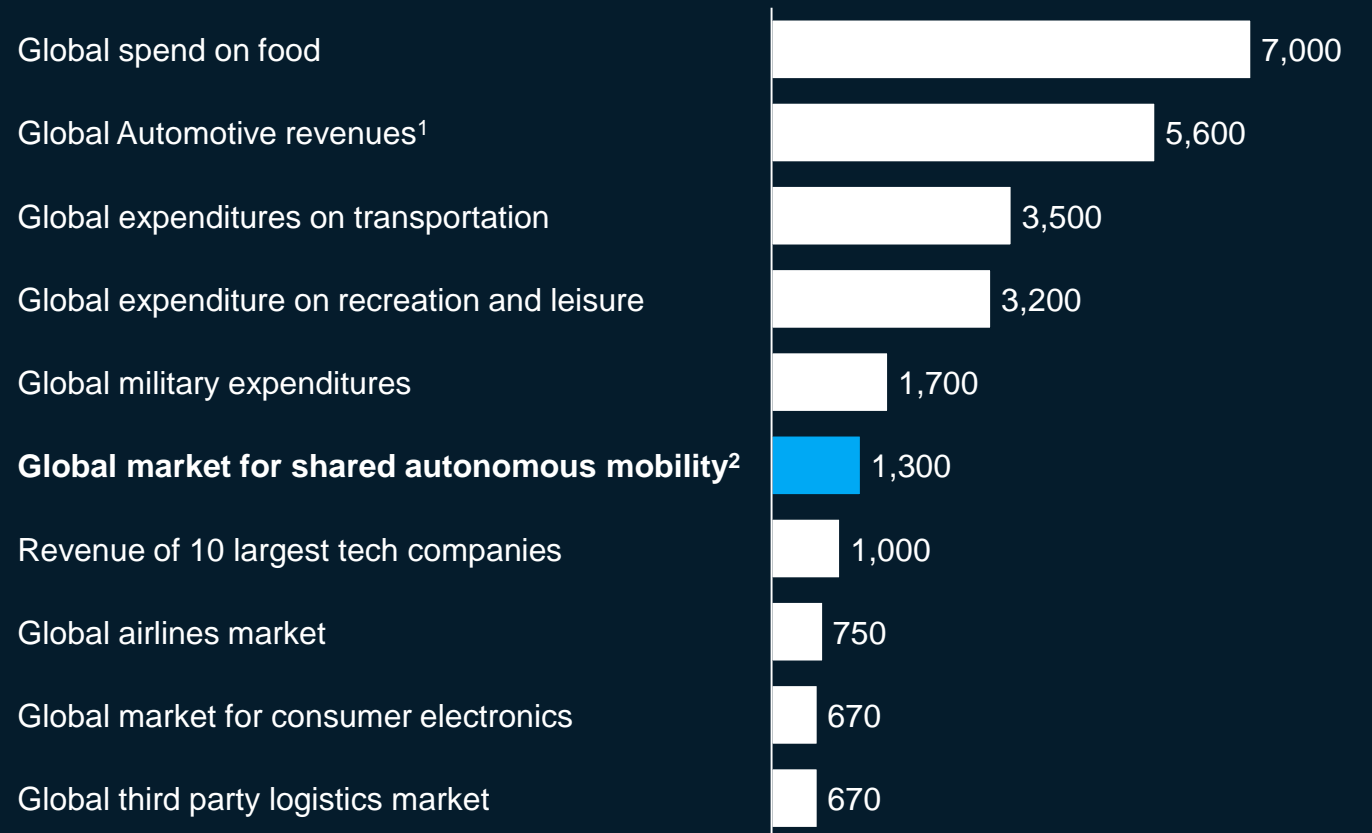
2018

2030

By 2030, shared autonomous mobility market will be among the largest revenue pools in the world



Potential revenue for shared autonomous mobility in 2030, USD billions

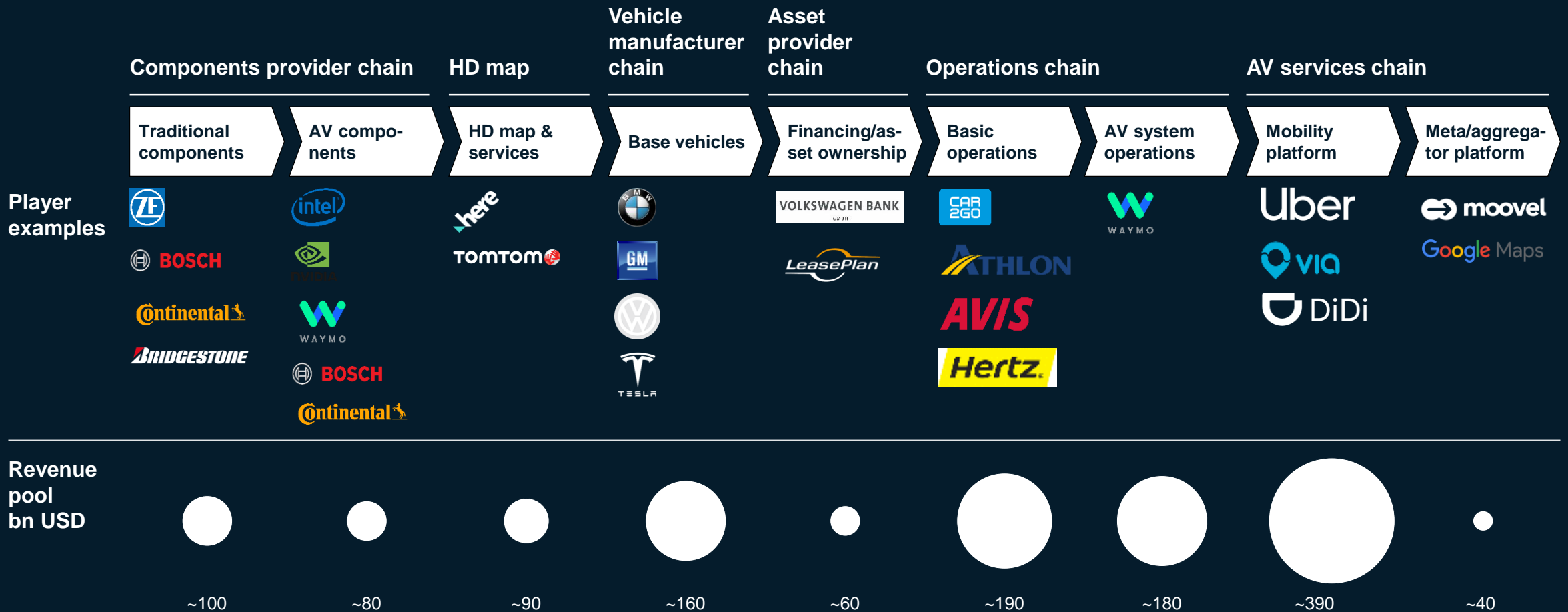


1. Includes one-time vehicle sales, aftermarket, shared mobility

2. Roboshuttle, Robotaxi non-pooled, robotaxi – pooled. Excludes base vehicle and incremental AV hardware, revenue

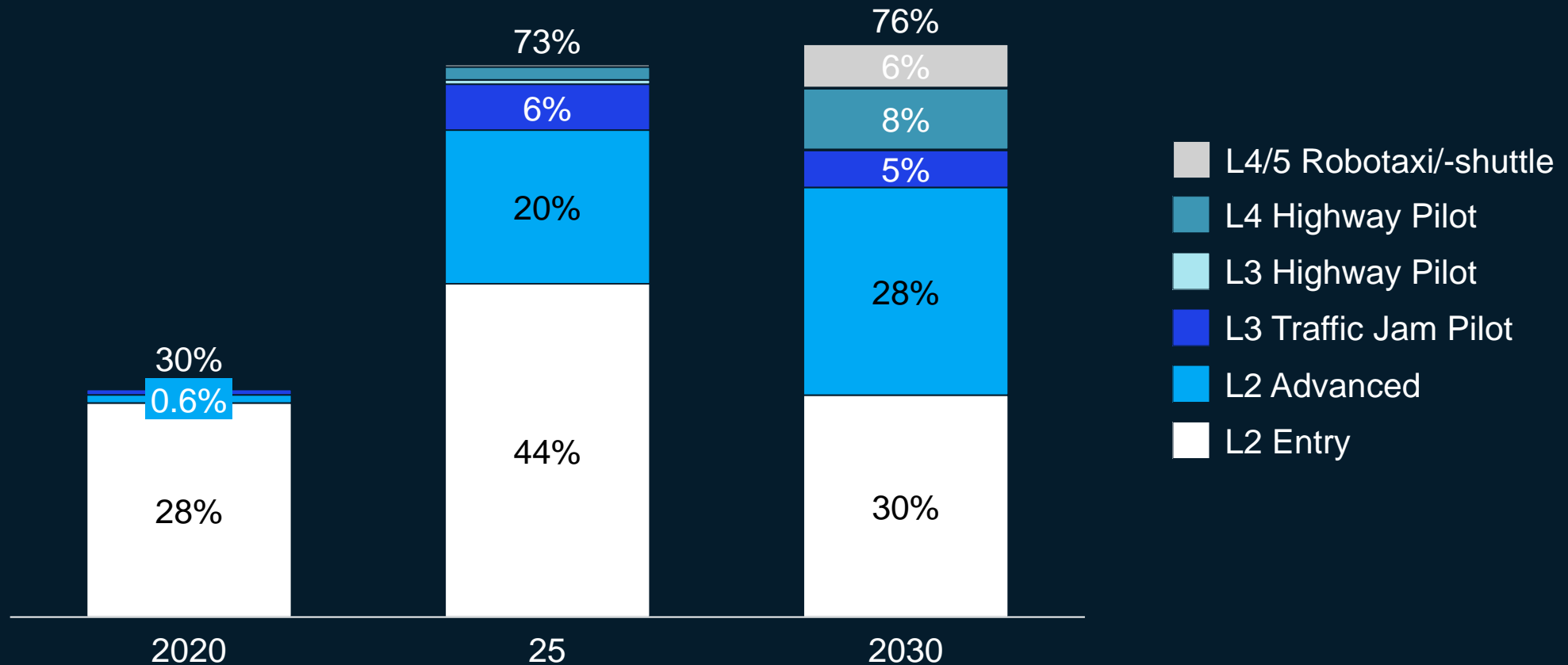
AV components, basic operations and mobility platform as largest revenue pools in 2030

Potential revenue pools by 2030



Strong growth of L2 entry features until 2025 driven by regulation—then continuous replacement by higher levels of AD

Annual vehicles sales by AD feature



1. L2 and above, excluding Robotaxis

We expect impact of COVID-19 on the ACES to differ by trends in the short-term – no major changes in the mid-term outlook ...

⬆️ Trend intensified
⬇️ Trend slowed down
➡️ Trend comparable to pre-COVID

Short-term

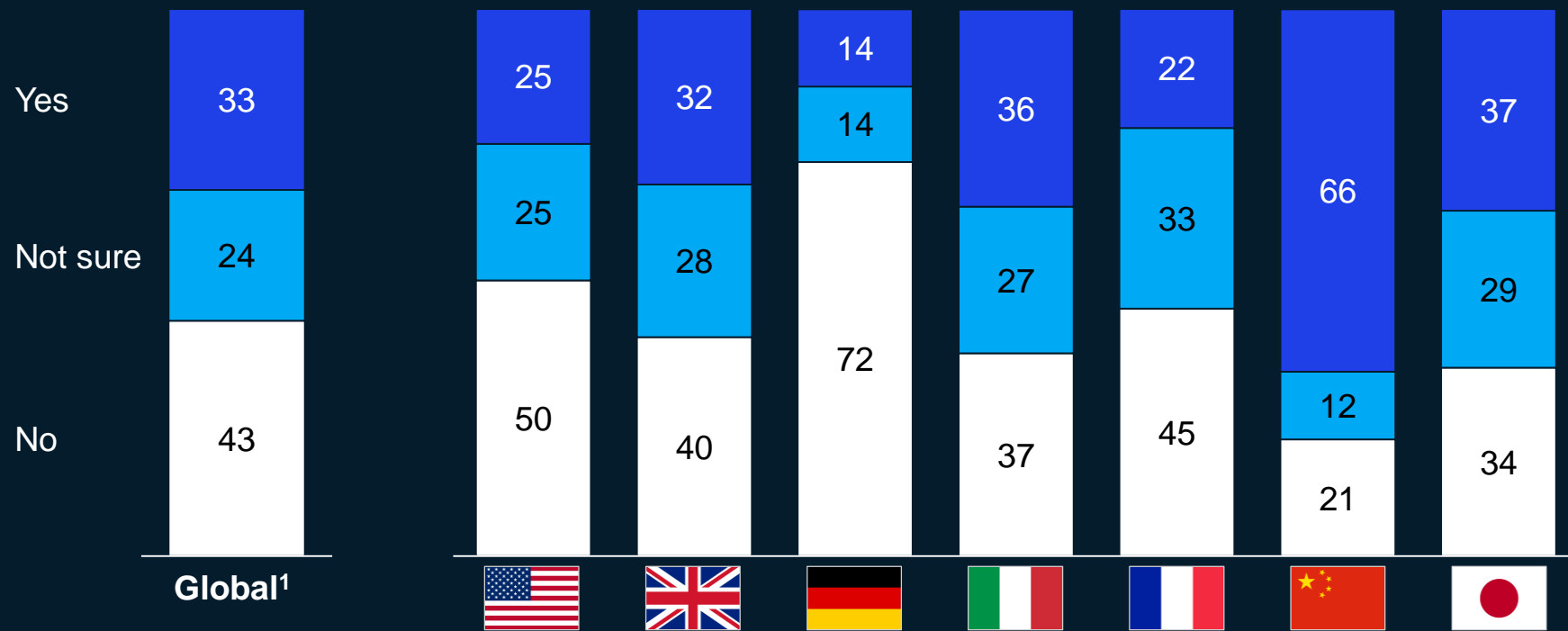
Mid-term

<h3>A</h3> <p>utonomous</p>	<p>⬇️ Testing temporarily suspended; OEM investments expected to slow down</p>	<p>➡️ Delay in development (“months”) partial consolidation to be expected, eventually increase in cooperation, however importance still high (e.g., contactless delivery)</p>
<h3>C</h3> <p>onnectivity</p>	<p>➡️ Limited impact expected as many programs have already been decided and will not be halted</p>	<p>➡️ Consolidation in the startup and software tech space provide chances to acquire talent or players (esp. for OEMs); “buy” more likely than build” for OEMs</p>
<h3>E</h3> <p>lectrification</p>	<p>➡️ EV market share slightly higher than Pre-COVID fueled by new incentives (CN, EU) and OEMs fulfilling CO₂ targets (EU), with regional slow-down (esp. in parts of the US)</p>	<p>➡️ EV sales back to pre-Covid projections by 2022 in EU and CN; Uncertainty in the US, depending on future regulatory landscape & oil price development</p>
<h3>S</h3> <p>haring</p>	<p>⬇️ General slow down expected (Demand drop expected to recover not before mid 2021, financial pressure on start-ups, regulations focused on social distancing), small modifications to reduce risk of infection (e.g., face masks, riders required to sit in back seat)</p>	<p>➡️ Consolidation expected by M&A activities (esp. in micromobility), while cities might not take back all restrictions for private vehicles</p>

Our consumer survey shows increasing importance of autonomous driving in times of Covid-19

Preliminary results of first wave as of May 9-18

Do you value autonomous vehicles more than before the COVID-19 outbreak?^{1,2}
 Number of respondents, in percent



Despite regional differences, 33% of consumers value autonomous vehicles more due to the pandemic

1. Q: Based on your experience with COVID-19, do you value autonomous vehicles more than before the pandemic?

2. Aggregated results for US, UK, Germany, Italy, France, China and Japan

10 timeless tests for AV strategy

Market	1 Market development	Do you have a clear perspective on future AV market size and profit pools?
	2 One-time sales are outdated	Do you have a clear vision how your business model and monetization model is changing due to autonomous driving?
	3 Speed is king	Do you have the right internal organization (e.g., agile development teams, own AV spin-off) to move fast in the industry?
	4 Completely new customer and product segmentation	Do you have a clear positioning/USP defined how to achieve the targeted market share with AV products or AV mobility services?
	5 Cities are key	Do you or your strategic partners have a team and strategy how to approach cities?
Control points	6 Still huge challenges in AV technology	Are you a leading player in terms of AV technology or have you secured access?
	7 Integration capabilities	Do you have capabilities or a partner for mass-market integration of AV technology into cars?
	8 End customer game	Do you or your strategic partner customer access that could be converted to an AV customer base?
Capabilities	9 Totally different capabilities	Have you created an attractive organization for external talent?
	10 Network player will win	Have you already found the best partner(s) to fill your white spots along the whole AV value chain?