



BUSINESS AS UNUSUAL

Reshaping ADAS Organizations for an End to End AI World: Aligning Regulation, Partnerships, and Technology

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What you will hear about today...

1 Introduction to E2E systems & Organizational Implications

2 AD/ADAS Core Trends & OEM Product Portfolios

3 Technology Impacts

4 Regulatory Challenges

5 Partnership Strategies & Organizational Models

6 Conclusion & Call to actions

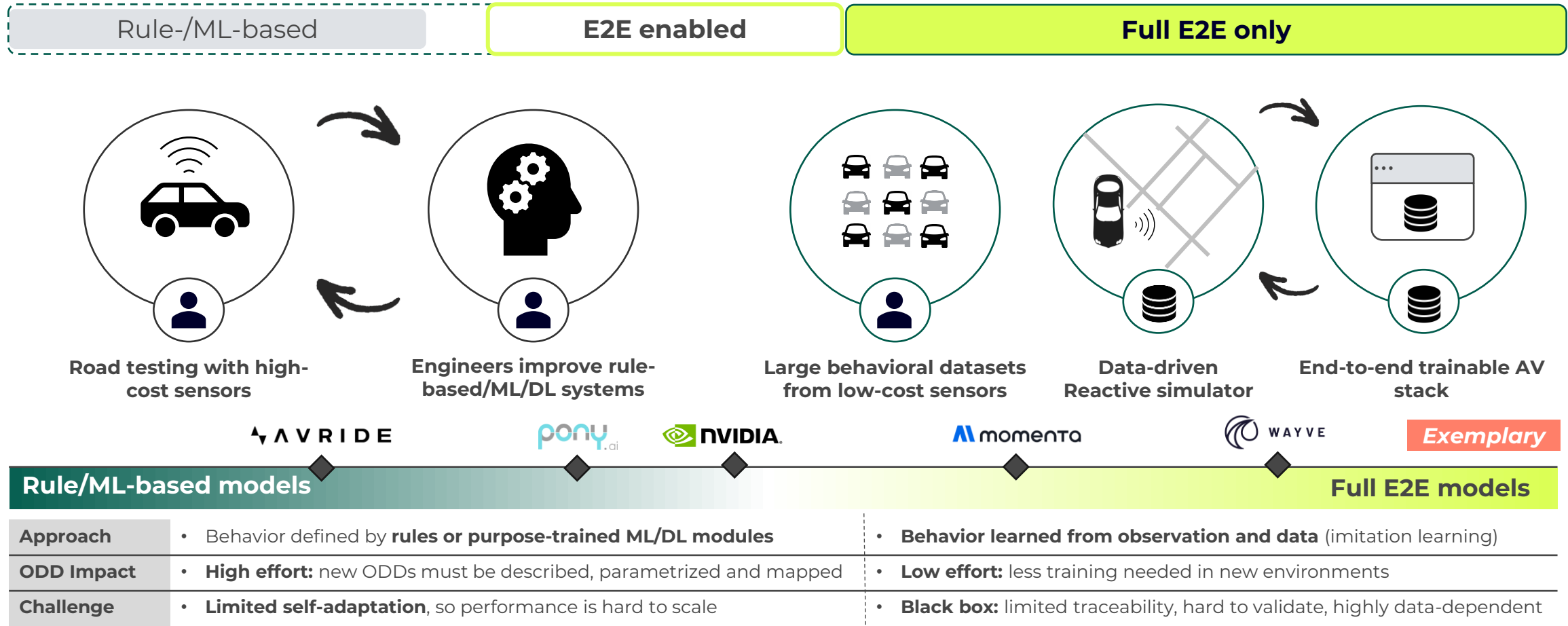


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#1: Introduction to End2End systems & Organizational Implications

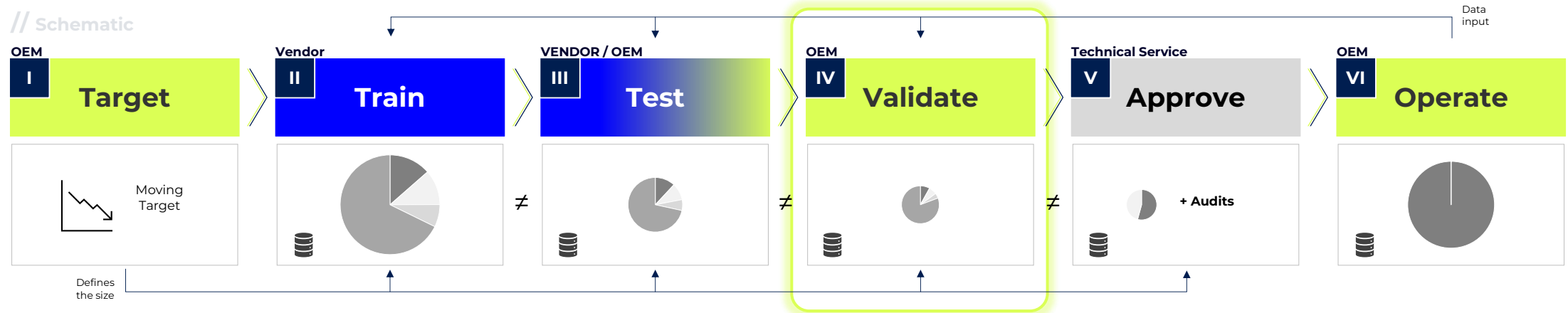


Industry transition: Adaption of End2End AI architectures could serve as catalyst for the industry to accelerate progress to “driver-out”



» ADAS (L1–L2++) is shifting from **modular to one- or two-stage E2E architectures**. For L4, the race is still open: so far, **E2E models are being embedded into modular architectures** rather than replacing them.

E2E model challenges have overcome the problem of training and testing, but not yet achieved full validation cycles as well as approval



How are the **targets defined**?

How to validate **cost-efficient** yet **functionally effective** (when, how much, and of what)?

How do you deal with the **AI black box**?

How is **data diversity** along the whole process ensured?

How are **updates / incremental** changes validated?

Organizational implications of end-to-end AI



Product strategy

- Standalone features give way to more complete solutions
- Driving and parking can become integrated offerings



Research & development

- R&D shifts toward more data-intensive one- or two-stage models
- Model development relies heavily on compute and platform capacity



Validation & regulation

- Black-box behavior makes end-to-end systems harder to validate
- Simulation and statistical evidence grow more important



Organization & partnerships

- OEMs increasingly use focused partnerships for data and AI development
- Tier-1s need a clear ecosystem role, domain expertise and close OEM integration

#2: AD/ADAS Core Trends & OEM Product Portfolios



Our Core Beliefs and Control Points in the upcoming trends for ADAS systems

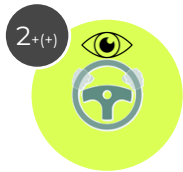
Two Macrotrends shaping E2E-based AD/ADAS



Depth first: urban autonomy in narrow ODDs



China-led push for full automation in narrowed-down urban ODDs (parking + driving)



Premium L2 ADAS

Hands temp. off, eyes on



L4 readiness in urban ODDs

Hands off, mind off



Breadth first: broad ODD coverage



Iterative & evolutionary development of SAE L2 and L3/L4 functions to address diverse market needs



Advanced L2 ADAS

Hands temp. off, eyes on



L3/L4 ADAS

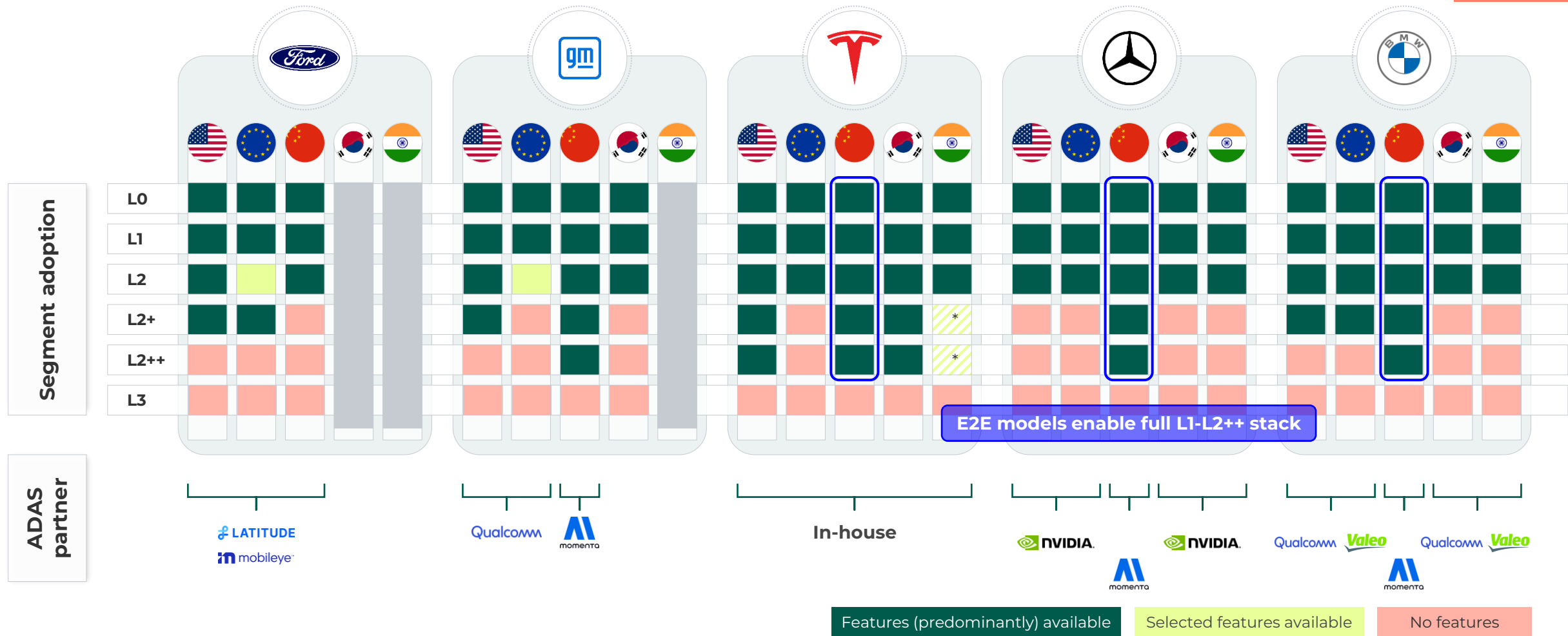
Hands off, eyes off

- **Core belief:** One E2E model base serves both L2++ and L4. Fed by dense urban fleet data, data density beats ODD breadth on the way to L4.
- **Control point:** The fleet data and training loop (data, compute, model ownership).

- **Core belief:** E2E lowers the effort per new ODD, but validation and approval per market remain the bottleneck.
- **Control point:** Safety case and type-approval capability per market.

Overview of selected OEM ADAS solutions per market

Exemplary

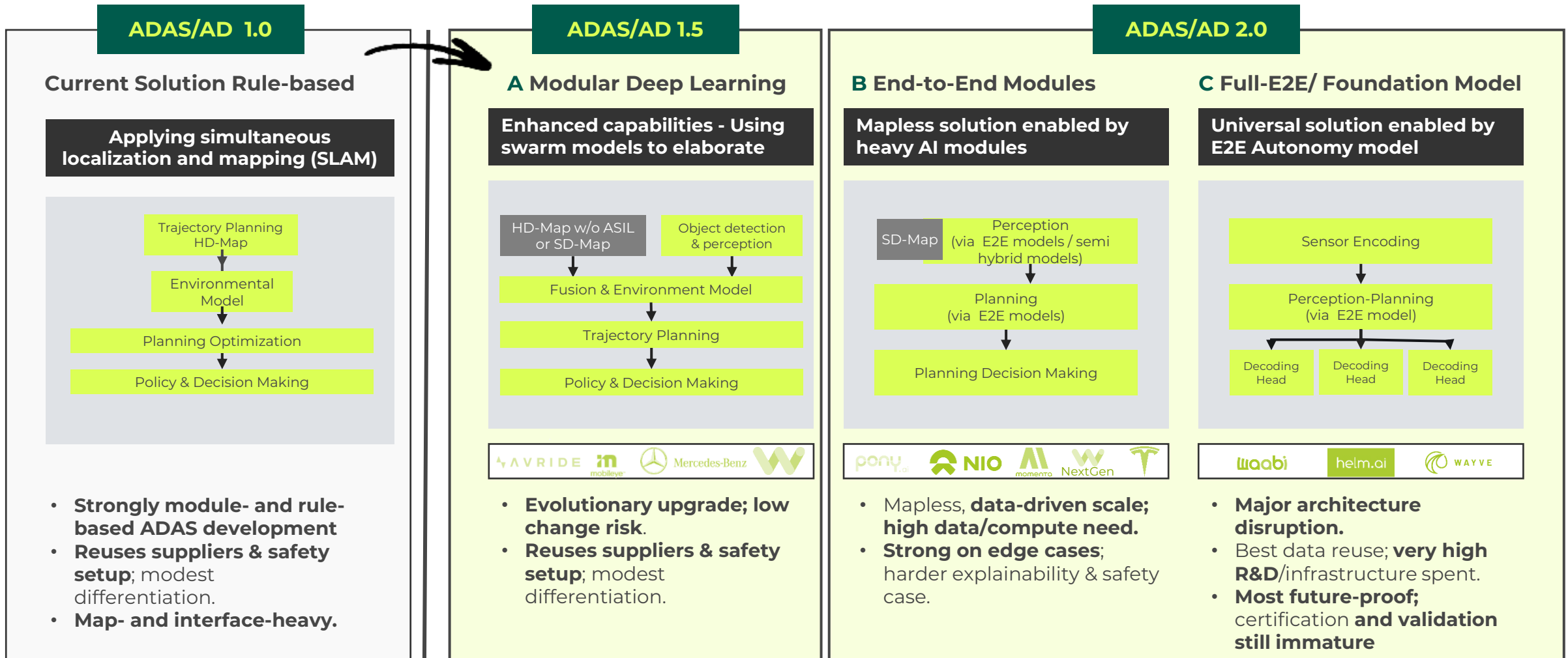


» OEMs that partner with **E2E solution providers** can **cover the full ADAS range from L1 to L2++**. However, these partnerships are **not available in every market**, so an OEM's **ADAS offering differs significantly** from region to region.

#3: Technology Impacts



As E2E takes over more driving functions, ADAS architectures must be redesigned around learned behavior



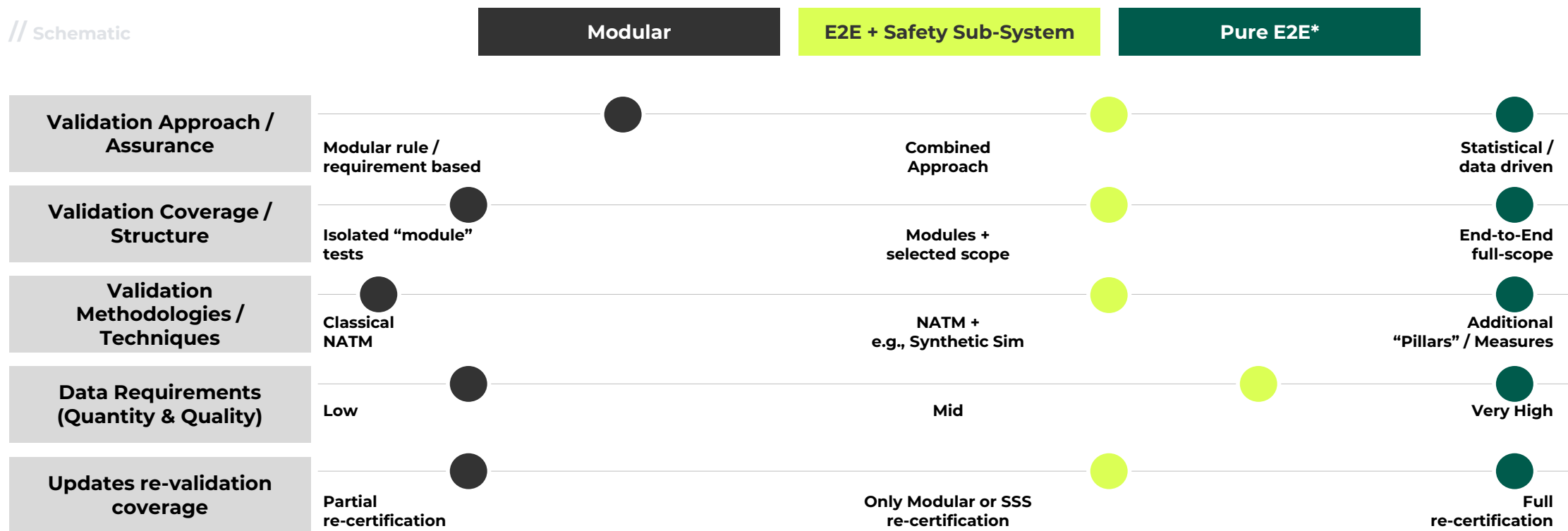
This shift makes data, model training and in-vehicle compute the new foundation of ADAS development

Three interdependent layers of an E2E AD system

	Role / Why central for E2E?	Key Aspects / What Changes?	Market Implications
Execution Layer	AI Runtime on System-on-a-Chip (SoC) E2E only counts if it runs in real time on target hardware	SoC-first co-design: model compression becomes a product decision	In-vehicle compute becomes a bottleneck and bargaining chip
Training Layer	AI-Model(s) Adoption hinges on trust and transparency, not accuracy alone	Evaluation moves to scenario KPIs and regressions	Differentiation shifts from handcrafted logic to training recipes and evaluation discipline
Foundation Layer	Data & Infrastructure Data quality and scenario coverage set the ceiling for E2E performance	"Data factory" replaces ad-hoc pipelines and simulation closes long-tail gaps	Data and infrastructure become the moat with more regionalized stacks where data access is constrained due to regulations

As more driving behavior is learned, validation must move from module checks to system-level evidence

// Schematic

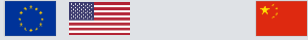


» The safety framework remains but learned driving behavior demands broader scenario evidence and re-validation after model updates.

#4: Regulatory Challenges



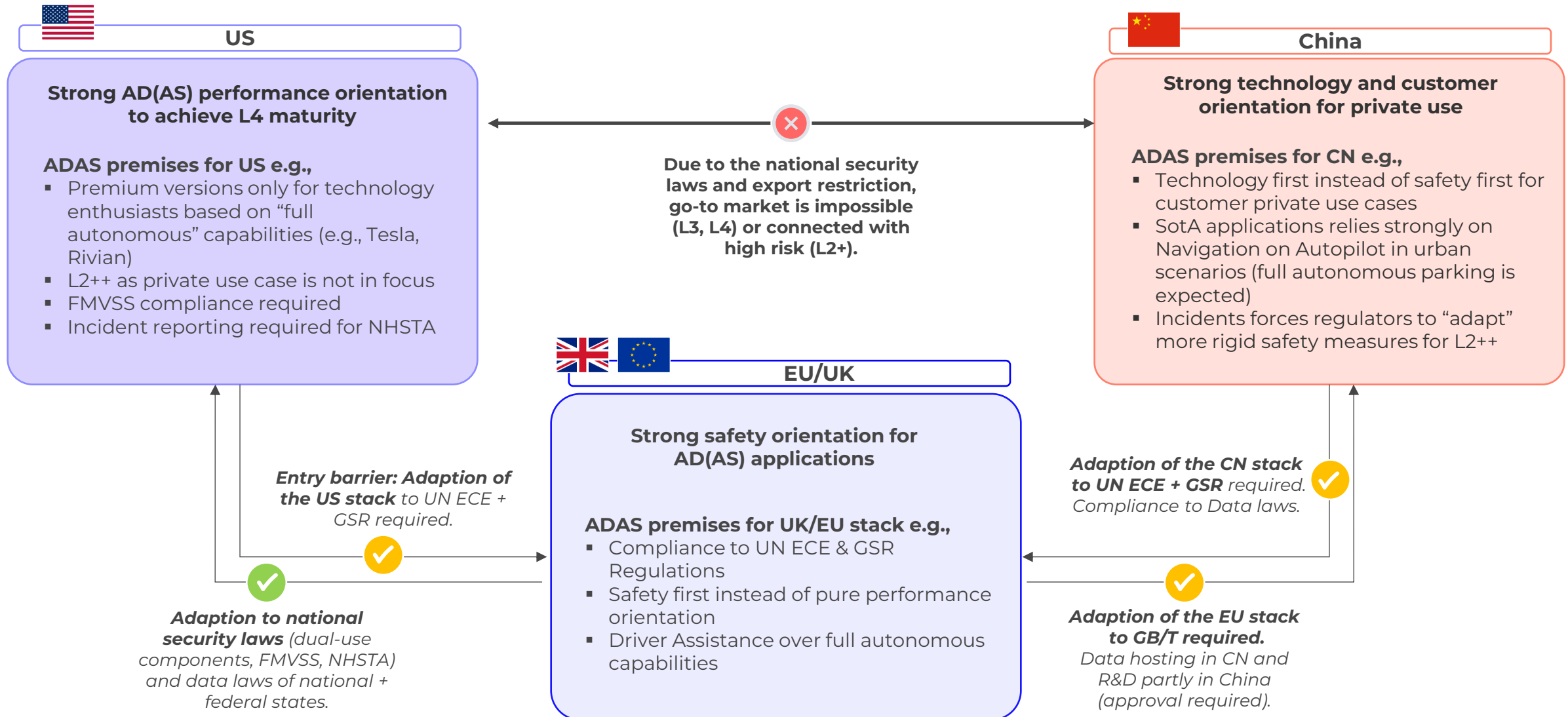
Right ADAS stack depends on regional regulation, performance needs and development effort.

	Building one world SDS stack (Qualcomm & Mobileye approach)	Dual Stack approach Combining different stacks		Individual Regional approach Sourcing of single stacks per core market
System Approach Description	Fully vertical integrated HW/SW architecture	2 vertical integrated HW/SW architecture based on clear interfaces within the architecture 	1 common safety path worldwide and 2 different performance stacks	3 vertical integrated HW/SW architecture based on a common interface  1 common safety path worldwide and 3 different performance stacks
Advantages	- Achieving a fully integrated HW/SW stack tailored for a worldwide deployment “One time” development efforts	- Avoiding regulation no-goes due to differentiated stack - Leveraging of synergies and taking over of ADAS and potential US supplier ADAS stack environments		Strong localization of SDS stack development within the target markets would lead to strong performance within the respective countries
Disadvantages	World Stack seems not plausible due to legal and performance constraints Legal constraints: - Chinese stack (above L2+) is currently not applicable in the US due to the smart car initiative Performance constraints: - Danger of not having a globally performant stack	- Optimization and localization of partial efforts lead to higher development efforts and integration scope - Synergies depend on the integration approach - Adaptability depends on architecture		- Strong increase in complexity and integration effort due to adoption of downstream driving dynamics - Adaption efforts of SDS stack, architectures, high development, and validation efforts



Based on geopolitical and regulatory challenges, two-stack solution (CN + RoW and US + RoW) as way-to-go for ADAS/AD to enable regulatory fit in all relevant global markets.

Market and regulatory fragmentation significantly limit the feasibility of a global ADAS/AD stack and their transition (tariffs excluded)



#5: Partnership Strategies & Organizational Models



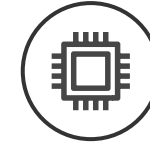
AV 2.0 shifts competitive advantage from system integration to ownership of data, AI platforms and learning ecosystems



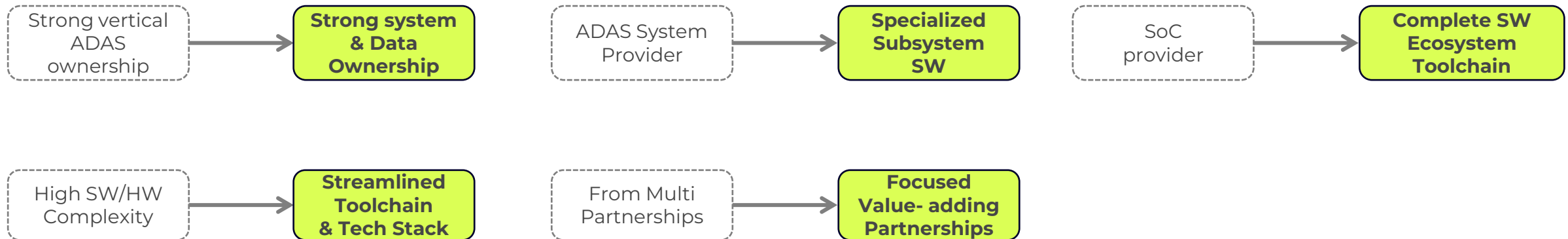
OEM



Tier 1/Tier 2



Tech/ SoC Player

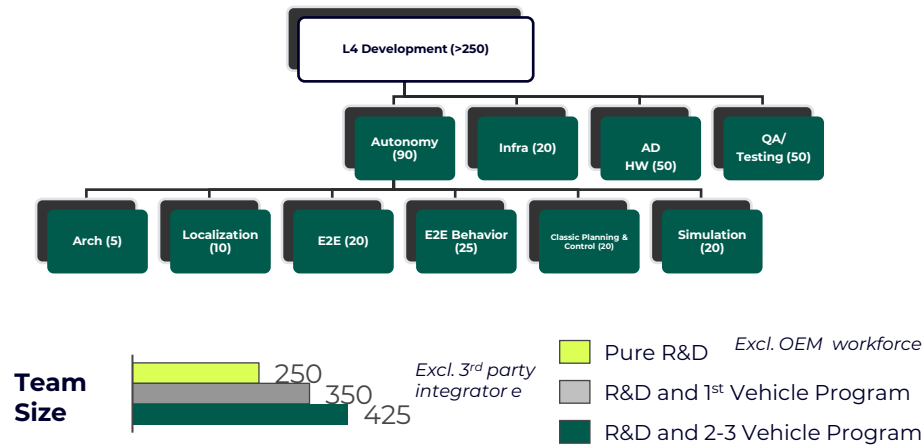


- Control of data and learning loops becomes more valuable than ownership of individual ADAS functions
- Tier-1s move from full-stack suppliers toward specialized safety, validation and integration roles
- Technology players expand from silicon providers to complete AI platform ecosystems

- OEMs win through data ownership
- Tier-1s win through domain expertise
- Tech players win through ecosystem scale

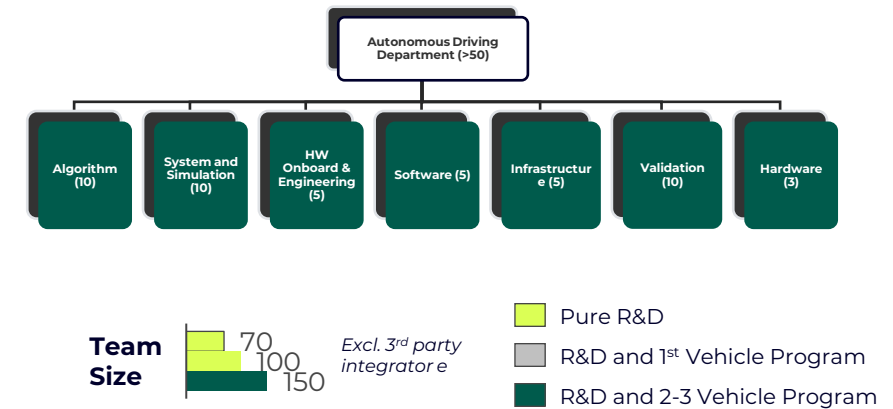
AV 2.0 shifts the scaling model from headcount growth to data-driven automation

AV 1.5 Stack



- **Function & Feature-centric** organizational setup
- OEM and ODD scaling requires **additional engineering teams**
- **ODD expansion** driven by local adaptation and integration
- **High coordination effort across specialized domains and validation teams**
- **Engineering capacity is the primary scaling lever**

AV 2.0 Stack



- **Small, highly leveraged core organization**
- **Scaling enabled through automation and data flywheels**
- ODD expansion driven **by model generalization**
- **Higher reuse across** OEM vehicle platforms and regions and requirements
- Data and compute become **the primary scaling levers**

#6: Conclusion & Call to actions



Key takeaways as guidelines to succeed in an E2E-driven ADAS/AD landscape

Market Impacts



Competitive advantage is shifting from individual functions and features to control of the data and learning loop for the E2E world

Data quality, learning velocity and deployment scale increasingly determine system performance and competitiveness.

Tech. & Reg. Impacts



The primary challenge is no longer developing E2E models, but **validating and scaling them safely across markets.**

Regional AI, data, cybersecurity and approval requirements demand portable architectures and market-specific evidence

Managing Partnerships



Successful ADAS organizations combines **strong system ownership, focused partnerships and clearly defined ecosystem roles.**

OEMs retain system and data control, Tier-1s differentiate through domain expertise, and technology players scale AI platforms and ecosystems.