Whitepaper

Accelerating automotive transformation through partnerships

How software and strategic alliances will reshape the global mobility market

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Preface

The key elements for driving the automotive transformation are a consistent centralization of the vehicle electric and electronic (E/E) architecture, a strategic shift from project-driven execution to a product-centric mindset, as well as decoupled, modular, and scalable solutions for both hardware and software. We need to focus on understanding and meeting the needs of our customers by steering our offerings systemically.

Nevertheless, the real game-changer for a successful transformation lies in the creation of ecosystems and forging of strategic alliances that go beyond traditional networks. Mastering today's complexity is no longer something anyone can accomplish alone.

Over the past decades, our industry tried many different approaches to realizing the "software-defined vehicle". However, the complexity is higher than we all expected, and the tipping point remains an elusive idea. To truly leverage the benefits of software-defined mobility, we must adopt a joint approach with cross-industry partners to accelerate the automotive transformation – an approach that keeps pace with our software-driven environment. This has become more important than ever in the face of advancements such as generative AI, which further accelerate the pace of technology, particularly when it comes to automated driving.

At Bosch, we value the power of partnerships. That is why we are actively building alliances that transcend different industries – to not only master this transformation, but to expedite it. This whitepaper is based on our extensive discussions with partners, ecosystem leaders, and key stakeholders from across the automotive landscape. Together, these conversations illuminate a path forward – one defined by partnership, innovation, and a shared purpose.

We invite you to explore our perspective as we collectively shape the future of mobility.

Christoph Hartung
President of Cross-Domain Computing Solutions
Robert Bosch GmbH

Executive summary

The automotive industry stands at a crossroads. Despite the billions invested in electrification, software innovation, and automated driving, the profitable and sustainable transformation remains incomplete. Foundational shifts must be prioritized over temporary hypes.

Our understanding is based on extensive discussions conducted with vehicle manufacturers, system-on-chip (SoC) suppliers, hyperscalers, and other eco-system players in an effort to capture the real pain points they currently face. These highlight four key challenges that are reshaping the industry:

- **Hybrid globalization**: geopolitical tensions are forcing the adoption of strategies and definition of localized solutions, which is increasing ecosystem fragmentation.
- **Cost and speed benchmarks**: Chinese vehicle manufacturers and suppliers are dominating the market with their superior cost structures and rapid execution, thereby challenging traditional players.
- **Intensifying competition:** start-ups, tech giants, and cross-industry entrants are challenging incumbents for their leadership.
- **Transformation impacts profitability:** years of investment in electrification and software-defined vehicles (SDV) with centralized architectures have yet to yield returns, thus placing a strain on resources.

Overcoming these multidimensional challenges of a traditional industry calls for a strategic realignment of our energy and resources. We recommend focusing on the following key priorities in order to guide us through the transformation:

01 | Think local, win global: we must move from one-size-fits-all strategies to market-specific solutions, developed on the basis of our customers' needs.

02 | The essential shift for SDV – it's about more than just software: we must embrace fundamental operational and cultural shifts to meet the demands of SDV development.

03 | No AI, no future: AI will be the defining factor when it comes to cost-efficiency, speed, and the crucial competitive edge.

04 | Partnerships are key: transformation is a journey, and collaboration within a growing ecosystem is the key to reaching new horizons.

In summary, sustainable transformation demands a new way of thinking. This whitepaper takes stock of significant efforts within the automotive industry to drive change and highlights key assets and lessons learned along the way. Our way forward emphasizes collaboration, modular local design, and user-centric strategies as enablers for sustainable transformation. With its global expertise and strong local presence, Bosch offers a unique position as a partner for navigating these challenges, providing tailored solutions that deliver both regional relevance and global scalability.

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Introduction

The automotive industry is at a pivotal moment, dealing with disruptive changes that demand thoughtful and strategic responses. Geopolitical tensions, shifting consumer demands, and rapid technological advancements have disrupted the status quo, forcing companies to reevaluate their strategies. Based on our in-depth discussions with all relevant ecosystem players in the automotive industry, this whitepaper reflects the core challenges identified by industry leaders. It emphasizes the importance of practical, scalable solutions and strategic partnerships that address these challenges while enabling long-term sustainability.

Geopolitical tensions and shifting user expectations are challenging companies to adopt more **localized approaches.** For example, both the US and the EU are introducing tariffs, export controls, or other trade measures for Chinese-made vehicles and components. At the same time, the EU's stringent environmental regulations are pushing the automotive industry to develop tailored, region-specific solutions. Rather than viewing this fragmentation as a barrier, it presents an opportunity to innovate and adapt. Vehicle manufacturers can respond by diversifying supply chains, aligning strategies with regional requirements, and balancing localization with scalability, which can turn fragmentation into a competitive advantage.

Simultaneously, new **cost and speed benchmarks** are being set by Chinese vehicle manufacturers, who are thus challenging traditional players. With rapid innovation cycles and cost-efficient manufacturing, they have become global leaders in both technology and business model innovation. Vehicle manufacturers and suppliers recognize the need to rethink their development processes by leveraging partnerships and adopting more agile, cost-effective strategies to regain competitive ground.

The situation is further compounded by **intensifying competition**. Start-ups, tech giants and new entrants from adjacent industries are entering the fray, challenging traditional players in the automotive industry for market share. Tesla's software-first approach has redefined consumer expectations, while tech companies from other domains are leveraging their expertise to carve out significant roles in the automotive value chain. Vehicle manufacturers and suppliers are keenly aware of the need to innovate quickly and decisively to remain relevant in this field.

Finally, years of investment in transformative initiatives have yet to yield the expected returns. The impact of the **transformation on profitability** has left many companies reeling. Electric vehicles (EVs), once seen as the silver bullet for sustainability, remain expensive to produce and have not yet achieved the economies of scale needed for widespread profitability. Similarly, software-defined vehicles (SDV) promise a future of seamless connectivity but have proven to be resource-intensive yet with limited immediate payoff. This financial strain is evident in layoffs, factory closures, and stalled projects across the industry, highlighting the urgent need for a shift in focus.

The result is an industry that finds itself at a crossroads, torn between the need for transformation and the imperative of financial sustainability. To survive and

thrive, focus is needed, avoiding the pitfalls of hype and distraction while realigning resources towards what truly matters.

This whitepaper describes shared perspectives and outlines a collaborative path forward, identifying four critical priorities to reshape the industry for sustainable success:

01 | Think local, win global: we must move from one-size-fits-all strategies to market-specific solutions, developed on the basis of our customers' needs.

02 | The essential shift for SDV – it's about more than just software: we must embrace fundamental operational and cultural shifts to meet the demands of SDV development.

03 | No AI, no future: AI will be the defining factor when it comes to cost-efficiency, speed, and the crucial competitive edge.

04 | Partnerships are key: transformation is a journey, and collaboration within a growing ecosystem is the key to reaching new horizons.

This is a call to action: by prioritizing practical, forward-thinking solutions, the automotive industry can turn disruption into opportunity and emerge more resilient than ever.

01 | Think local, win global: we must move from one-size-fits-all strategies to market-specific solutions.

"Common technology such as basic hardware and software, middleware software, communication tech. and power networking tends to become standard, modular and reusable. Meanwhile, user experience for specific regions is differentiated with diversified solutions."

Qinghua Wang, XE President, UAES

One major challenge for the global automotive industry is the fragmentation of markets. For decades, globalization allowed vehicle manufacturers and their partners to scale standardized solutions across regions. Today, geopolitical tensions, diverse user expectations, and varying technological priorities have made this approach impossible. Stakeholders in the automotive industry need to rethink their strategies and focus on localized solutions while identifying opportunities for global scalability. Striking this balance is a key challenge in these times of rapid technological advancement and intense competition.

Understanding local needs: the key to success

Central to this transformation is a deep understanding of end users. Consumer preferences differ drastically by region. This becomes particularly evident in the area of software and services. Vehicle manufacturers in every region have been experimenting with paid offerings, with varying degrees of success.

Bosch regularly conducts user studies to understand these local user needs in various markets, including China, US, Europe, Japan, and Brazil.

The following end user findings highlight general trends and specific regional preferences, providing us with a roadmap for navigating the associated complexities.

China: cutting-edge features as a status symbol

Consumers in China favor advanced driving features, intelligent voice assistants, and highly automated driving systems. These technologies serve practical purposes and enhance social appeal, with consumers viewing cutting-edge features as a status symbol.

US: battling subscription fatigue

In the US, consumer frustration with subscription-based models is growing. Many users prefer annual payment plans due to their simplicity and cost predictability. Users are demanding

Key messages:

- Focus on localized solutions while identifying opportunities for global scalability.
- Consumer preferences differ drastically by region.
- Investments in a thorough understanding of local needs is the key to success.

real-time updates for their navigation systems with improved accuracy. Additionally, there is significant interest in parking solutions such as trailer parking or in-vehicle payment options, which reflects the region's emphasis on convenience and integrated digital experiences.

Europe: balancing sustainability, regulation, and premium expectations
Demand among European consumers for affordable, eco-friendly options is rising. Great importance is attached to safety features, such as advanced driver assistance systems. This is further reinforced by an increasing demand for vehicles compliant with Euro NCAP standards. Additionally, there is a growing interest in seamless connectivity and personalized experiences.

Japan: prioritizing safety and convenience
Japanese consumers prioritize features that enhance safety, navigation performance, and convenience. Automated parking systems are highly valued, particularly in urban areas with limited space. There is also growing interest in connected navigation systems and personalized in-cabin experiences. Japanese users prefer one-time purchases to subscriptions and view free trials as essential for assessing the value of new technologies.

Brazil: security as a top priority
In Brazil, security and safety dominate consumer preferences, with high demand for vehicle tracking systems, cameras, and advanced driver assistance features, including retrofit and over-the-air options. Consumers also expect connected services to be included in the vehicle price, reflecting a different approach to paid features when compared to other regions.

Particularly when requirements of different markets vary so significantly, it is crucial to invest in a thorough understanding of these needs. Building on this foundation, common elements can be identified before being scaled globally. In addition, key focus areas for individual markets can be defined to develop local solutions.

Figure 1: End customer needs differ significantly in the individual regions.

Warschauer Str.
Pariser Platz

02 | The essential shift for SDV – it's about more than just software: we must embrace fundamental operational and cultural shifts to meet the demands of SDV development.

"To build software-defined vehicles for global markets we need to radically transform our traditional way of developing software and features which is what we are doing with the Superset tech stack. This converges all our engineering efforts into one direction so that we can build safer cars, more efficiently. This is why we are so proud of the EX90, our first truly software-defined vehicle built on the Superset tech stack. Crucially, this transition from hardware to software requires a complete shift in mindset and culture so that we think, and build for, software first. That's an immense strength and a prerequisite to unlock tomorrow's mobility."

Alwin Bakkenes, Head of Global Software Engineering, Volvo Cars

The traditional automotive industry has been held in suspense since the beginning of the decade, when the first new-style vehicle manufacturers entered the market. They showcased radically new approaches to brand differentiation and customer retention by putting the digital consumer experience first. This very much appeals to a new younger generation of tech-savvy car owners, with brand choice and vehicle performance outpacing price when it comes to consumer choice [1].

The software-defined vehicle is about much more than just software

Executives of established manufacturers have coined the term "software-defined vehicles" in the belief that the success of new vehicle manufacturers lies in their mainly software-driven implementations [2]. Their reasoning is that building up the same momentum requires a technology revolution. Subsequently, many definitions surfaced that describe the SDV in what are primarily technical terms: updateable, connected, configurable, centralized. These definitions often fall short in highlighting the differences in how such cars come into being.

Key messages:

- Organizational transformation is the real challenge for SDV; Chinese manufacturers are at least one generation ahead.
- New technical approaches with segment-specific and regional vehicle architectures are needed to meet target costs.
- Manufacturers and tiers need to collaborate on reusability and industry-wide scaling, for example, by fostering open-source software solutions.

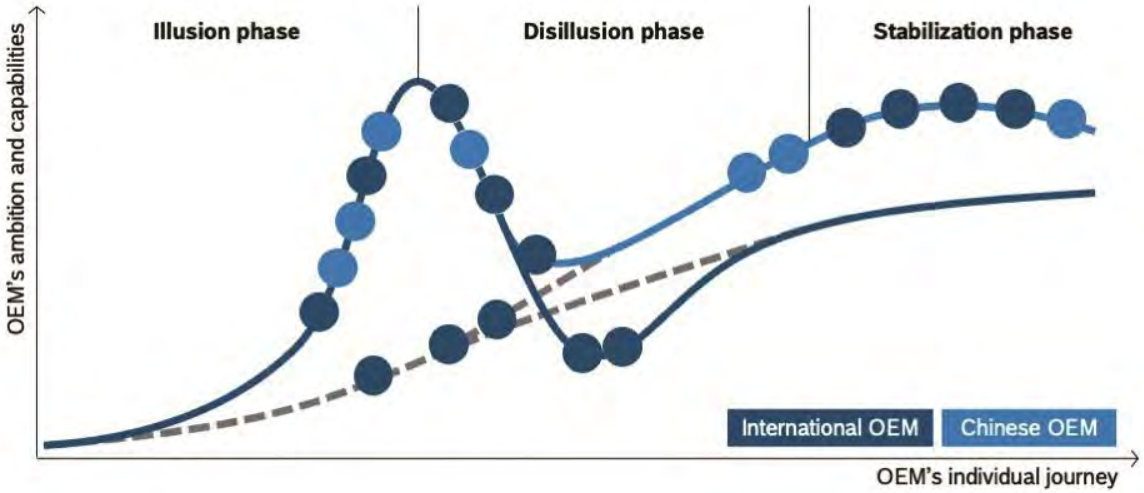


Figure 2: Vehicle manufacturers are going through the hype cycle of SDV, with some taking shortcuts.

Capturing the SDV purely in technological terms is not effective. Rather it is the internal organizational transformation and the new splits of responsibility within the ecosystems that are decisive.

We can see this conundrum in Figure 2. A large group of primarily Chinese vehicle manufacturers has established organizations that are capable of rapid evolution. In their upcoming next-generation centralized vehicle architectures, they are heavily targeting verticalization to avoid any friction with corporate boundaries. In addition, they are already in a phase of optimization in order to meet target costs, because this speed is often achieved at the expense of profitability. This requires efficiency improvements throughout the continuous development cycle, for example, with regard to integration, delivery, and testing. Some projections suggest that manufacturers investing here will achieve a 26% cost benefit in terms of software R&D spending in an area where overall budget spending is likely to double [3, Figure J]. The approach adopted by these manufacturers is to build tightly grouped networks of suppliers, establish agile development setups across departments and domains, and embrace a fail-fast, fail-early mindset. However, there will be more than one kind of SDV.

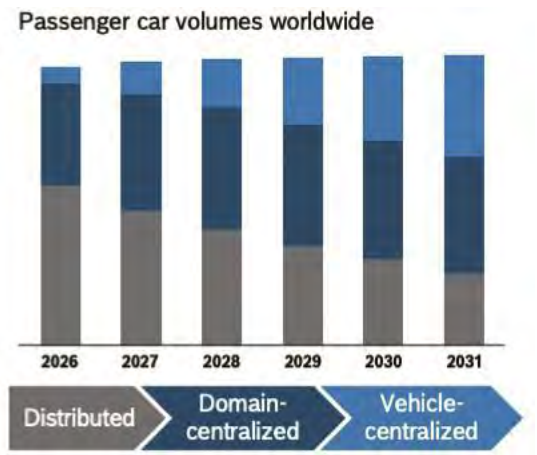


Figure 3: Projections of vehicle volumes with respective architectural patterns. [4]

In comparison to the SDV frontrunners, traditional manufacturers are struggling. Many started by imitating the newcomers and planning for a technical "reset" of their vehicle architectures, while also creating dedicated software organizations. However, this approach is currently being re-evaluated. Over the past few years, the forecasts for new-architecture vehicles have continuously been lowered.

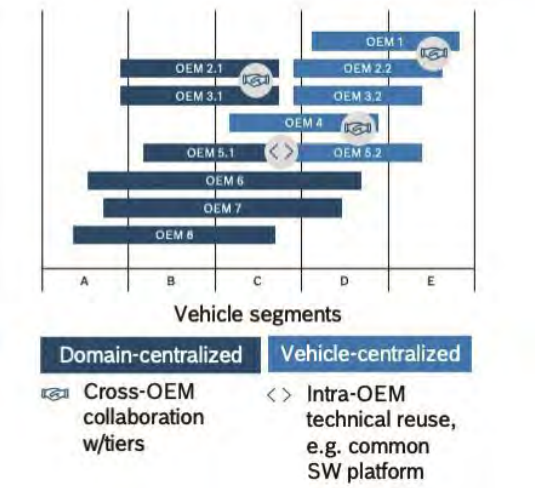


Figure 4 (schematic): Collaboratively developed, segment-specific, and regional architectures with reusable technology elements meet feature demands.

Manufacturers are increasingly adopting a multi-architectural approach, which is split across markets and segments (see Figure 4). With an approximately 40% market share, domain-centralized architectures with traditional value streams continue to play a significant role. Therefore, they need to provide the same customer-perceived features of an SDV to remain competitive. The reuse of software solutions across architectures that we deem commercially necessary requires a renovation of existing domain-centralized setups. Emerging from the trough of disillusionment leads to a new stabilization phase, albeit with diverging technological solution spaces. Since maintaining multiple architectures can be prohibitive, collaborations for technical parts that can be reused between architectures are crucial. The same applies to scaling with components developed jointly between multiple manufacturers and provided by scaling tiers.

Cost-efficiency will be paramount for a sustainable software-defined vehicle

We already hinted that, for a growing consumer group in the emerging Chinese middle class, the overall vehicle price is of lower relevance than the experience and prestige one stands to gain from owning a particular car. However, there is also a large customer base in markets such as the US, Japan, and Germany for which price remains the most important factor when buying a car, followed closely by product quality [1, 5]. Appealing to these consumers with an attractive SDV offering will be vital, and this can be implemented in a gradual technical evolution.

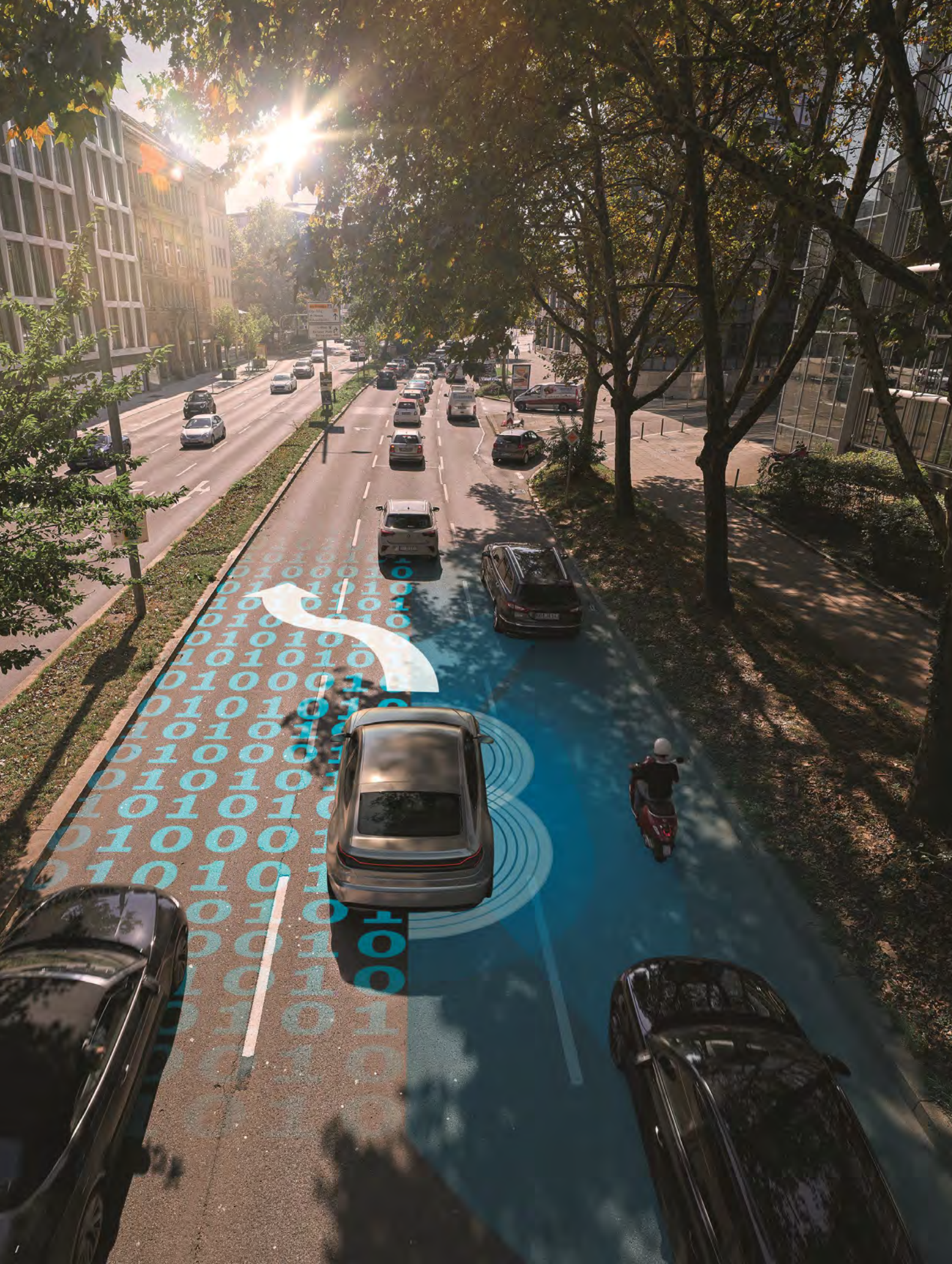
A recent attempt to classify software-defined vehicles clusters technical solutions using a system of five levels with increasing implementation maturity of the SDV north star [6]. As we have witnessed from similar classifications, such unidimensional approaches often fall short in capturing the real complexity of a topic.

Nevertheless, this system depicts a fairly common understanding of the relevant technical needs. It shows that SDV features relating to dynamic functionality, pay-per-use, and connectivity may be readily implemented through evolutionary adjustments within existing domain boundaries. New, dynamic designs for the target hardware are only deemed necessary in the highest SDV levels.

A clear distinction is required between areas of the vehicle architecture driven by cost optimization and those where standardization and differentiation dominate. Using the design of zone ECUs as an example, we see that a further consolidation is beneficial, for example, with the integration of most power and communications components. A best-fit design of the embedded computing capabilities, for example, for the motion or energy management, will be decided here. The design will need to allow for the variation in the physical vehicle layout while also taking scaling into account. Ultimately, the SDV will only be successful in combination with parts that are reusable

across segments and regions. Industry standards and consolidation into well-defined core elements are key. This will allow choices to be made from solution catalogues from different sources. Open-source solutions can be used for applications other than infotainment once processes and community developments have evolved to a point of continuous safety certifiability. Due to the very different premises of the automotive software market with few customers and established traditional delivery paths, automotive open source will be organized differently than business setups in other less regulated industries.

When we consider the high expectations placed on the SDV, it is apparent that most of the new features will be implemented in the connected high-compute system. In terms of hardware, standardization will continue to facilitate further commoditization across carlines, and, ultimately, between manufacturers. With regard to domain design, we expect driver assistance and infotainment to remain largely separate from a functional perspective. Nevertheless, cost optimization potential exists in the form of mechanical solutions, fusion of system-on-chips (SoCs), or future chiplet integrations. To port more easily between the individual elements, improved hardware abstraction, interface standardization, and better industry-standard frameworks will be essential. True cost-efficiency is achieved when ecosystem contributors focus on end-customer value and collaborate for industry-wide standards.



03 | No AI, no future: AI will be the defining factor when it comes to cost-efficiency, speed, and the crucial competitive edge.

"Data partnerships are key to build the best experiences for our customers."

Shyam Krishnamurthy, Vice President Auto and IE-IOT Compute, Qualcomm

Amidst the software transformation, artificial intelligence (AI) is the key to delivering the best possible user experience. As consumers increasingly seek smarter, safer, and more seamless driving experiences, AI provides the means for vehicle manufacturers to meet and exceed these expectations. By leveraging AI, advanced driver assistance systems (ADAS) can be transformed from reactive safety systems into proactive, intelligent copilots. AI-powered ADAS systems can deliver unmatched safety and performance by learning from real-world data, enabling vehicles to respond more intuitively to real-world complexities. At the same time, AI-driven development boosts speed and efficiency. In this way, customers can benefit from rapid feature updates and an improved user experience.

It is our firm belief that embracing AI as a strategic cornerstone is not merely an option. Instead, it is a make-or-break decision for vehicle manufacturers that holds more significance today than ever before if they are to stay competitive in the ever-evolving global ADAS market and meet increasing customer demands. But what is needed to be successful in the AI transformation?

Focus on highest end customer value with full end-to-end AI ADAS stacks

The use of AI is on the rise in the ADAS market, primarily driven by ever-increasing end user expectations and a growing demand for improved safety and performance with human-like driving behavior and contextual understanding. Traditional non-AI solutions are struggling to keep up with the increasing complexity of ADAS use cases and are already losing competitiveness. The solution lies in full

Key messages:

- Embracing AI is essential for meeting evolving customer expectations and staying competitive in the global ADAS market.
- Modular end-to-end AI ADAS stacks pave the way for superior performance and enable flexibility for customized ADAS features.
- Integrating real-world knowledge from foundation models into ADAS stacks will further boost performance and efficiency.

end-to-end AI ADAS stacks, which eliminate the need for traditional, manually engineered modules and instead rely on algorithms that can learn from raw sensor data from vehicles to enable high-performance ADAS features. Full end-to-end AI stacks are already a reality in ADAS products today. While these approaches are currently used predominantly for premium features, their rapid adoption in other market segments is already underway, for example, in China. Therefore, it is evident that vehicle manufacturers and their partners need to act now to embrace the AI transformation and stay ahead in the global ADAS market.

Ensure scalability by choosing modular approaches

For players in the automotive industry to consciously steer their transition towards AI-based systems, they must adopt modular end-to-end AI approaches. These approaches enable the seamless derivation of sub-modules, allowing for scalable technology solutions tailored to the needs of end customers from the entry segment to the premium market. This paves the way for a gradual and cost-effective introduction of AI. While monolithic end-to-end AI solutions have received widespread support for their performance, they come with serious drawbacks for automotive applications. Due to their black box nature, they lack transparency and interpretability and struggle to provide the necessary scalability to address different market segments in a cost-effective manner. In contrast, modular end-to-end AI approaches achieve a balance between safety and performance: with end-to-end training guided through architecture, they ensure interpretability and controllability while leveraging the performance of a fully AI-driven system.

Boost ADAS stacks with real-world knowledge from foundation models

Preparing their ADAS stacks for the integration of distilled foundation models will be essential for vehicle manufacturers to remain at the forefront of technological advancements in the industry. Foundation models can boost ADAS stacks in several ways. They can extend the vehicle's modular functionality with advanced cognitive features, improving existing ADAS capabilities and introducing new ones such as context-aware situation classification and semantic reasoning. At the same time, foundation models can serve as a development catalyst and significantly increase efficiency, for example, by leveraging the potential of unlabeled automotive data via self-supervised training methods.

Forge strategic partnerships to master the complexity of integrating AI into ADAS

The integration of AI into automotive systems presents a unique set of challenges. These include, for example, downscaling AI onto affordable embedded control units for the mass market segment as well as the requirement for large-scale access to high-quality, real-world automotive sensor data. Ensuring the safety and regulatory compliance of AI-based ADAS systems is another critical consideration. To successfully address these challenges, collaboration between vehicle manufacturers and suppliers will be crucial. Strategic partnerships are essential for bundling the right competencies and gaining speed in the AI transformation. By jointly establishing robust data sharing frameworks to unlock high-quality data sets while ensuring privacy and compliance, a competitive advantage can be gained in the race for data. Furthermore, vehicle manufacturers and suppliers must take the lead in creating industry-wide standards for AI.

This will ensure seamless interoperability, safety, and regulatory alignment to effectively navigate the complexity of the AI transformation. Only through collaborative efforts with trust and a shared purpose can we unlock the full potential of AI and shape the future of ADAS.

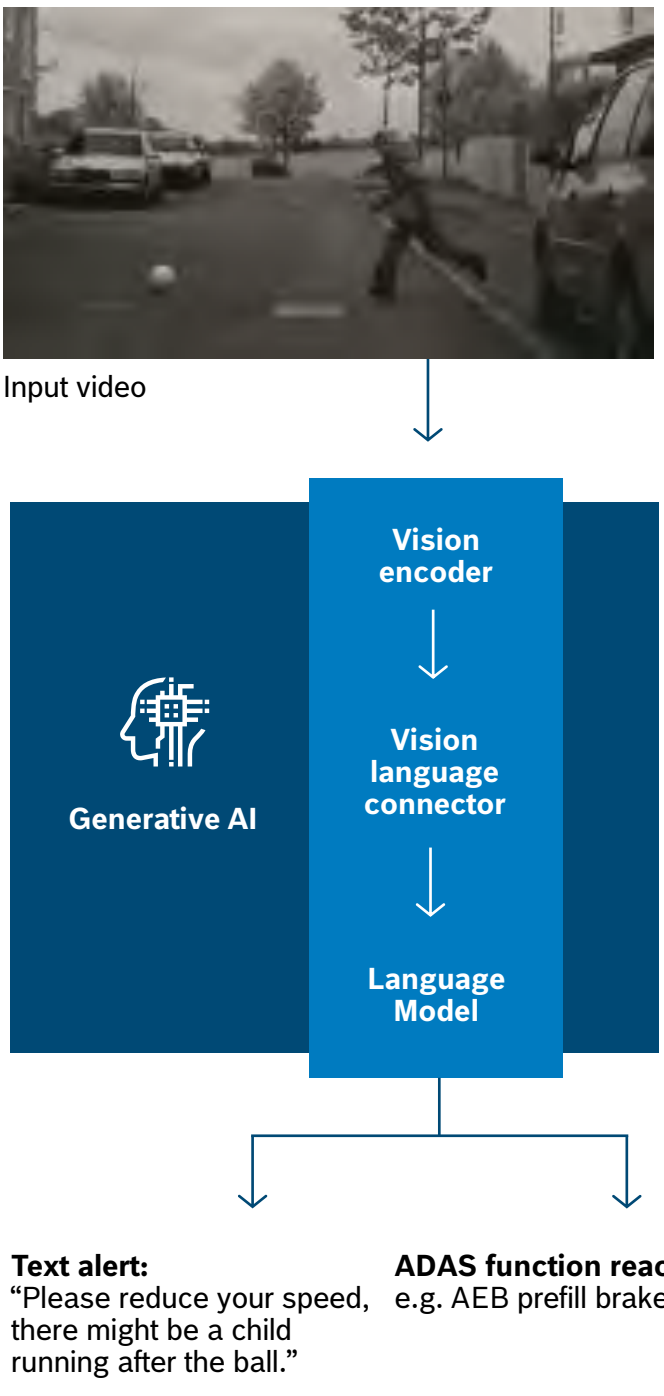


Figure 5: Example of ADAS capability enhancement with advanced cognitive features using foundation models.

04 | Partnerships are key: transformation is a journey, and collaboration within a growing ecosystem is the key to reaching new horizons.

"Open source collaboration will be the key to the future success of our industry. The organisations that will thrive are not just those that participate, but those that embrace change and cultivate a culture that welcomes fresh ideas and new approaches."

Michael Plagge, Vice President Ecosystem Development, Eclipse Foundation Europe

Over the past decade, relationships between vehicle manufacturers and their suppliers have shifted from exclusive and transactional to open, collaborative ecosystems. This change is driven by increasing vehicle intelligence and centralized architectures, with new players such as SoC vendors and tech firms redefining power dynamics. Everyone in the automotive industry must adapt to stay competitive in this evolving landscape.

From in-house software to strategic alliances and backup plans

Vehicle manufacturers have heavily invested in in-house software since 2012, inspired by Tesla's end-to-end in-house development model. Several vehicle manufacturers aimed to build key differentiating software features, reduce supplier dependency, and avoid lock-ins into proprietary systems. However, by 2021, the scalability of fully in-house software efforts was limited, leading vehicle manufacturers to scale back and instead focus on 10–25% of vehicle software [8]. In response, strategic alliances with key tech players emerged as a pragmatic solution to meet the demands of compute-heavy functions such as ADAS. For example, BMW partnered with Qualcomm and Arriver, while Mercedes aligned with NVIDIA to accelerate development and mitigate risks.

Despite this shift toward alliances, vehicle manufacturers continue to rely on tier-1 suppliers either as a second source or to foster internal competition, which reflects the ongoing skepticism regarding in-house software. While betting on two suppliers – internal and external – may increase the likelihood of market success, it also adds costs and limits both scalability and speed. For vehicle manufacturers to maintain the all-important competitive edge, a focused co-development approach for scalable products is essential. The goal should be to share risks, reduce costs, and address market volatility while maintaining flexibility.

Key message:

- Partnerships are the key to driving a sustainable transformation, striking a balance between ecosystem openness and access, while also taking regional specifics and timeframes into account.

"Especially for non-differentiating software like ECU operating systems and middleware, collaborating with ecosystem partners enables the industry to speed up innovations and lower costs through standardized infrastructure layers."

Mariella Minutolo, Executive Vice President Sales, ETAS

The integration dilemma: in-house or supplier expertise?
As vehicle manufacturers engage with diverse software suppliers, some are opting to bring their integration efforts in-house. However, this approach demands significant capabilities to efficiently manage integrations while ensuring suppliers align with the broader ecosystem. Without this alignment, vehicle manufacturers risk delays in time-to-market and in delivering critical updates. While integration may appear to grant strategic independence and flexibility, it is not inherently differentiating. It can be more effective for vehicle manufacturers to involve suppliers who are deeply integrated into the ecosystem, allowing them to consistently leverage the suppliers' expertise to achieve agility.

Balancing ecosystem openness as well as market and technology access
Vehicle manufacturers are increasingly adopting new business models, such as mobility-as-a-service and subscription-based in-car services, which require collaboration with cloud providers and other ecosystem players. However, reliance on these providers can lead to vendor lock-in, which restricts long-term flexibility. To mitigate this risk, vehicle manufacturers should negotiate clear exit clauses and regularly review their cloud partnerships. Moving beyond service scaling, vehicle manufacturers should focus on co-developing data-driven solutions that benefit both parties.

Similarly, SoC vendors play a critical role in key vehicle functions such as ADAS but can create vendor lock-ins and high switching costs. To maintain agility, many vehicle manufacturers adopt multi-cloud and multi-SoC strategies until their architecture is finalized. However, this flexibility may come at the cost of competitive pricing as SoC suppliers often offer better pricing through volume scaling. Vehicle manufacturers must balance flexibility with cost efficiency and strategic alignment to optimize their approaches.

Managing partnership timelines
Short-term and long-term partnerships each play a distinct role in transformation. Short-term alliances drive rapid innovation and legacy-building, while long-term partnerships help sustain investment and share risks for product commercialization. The latter offer stability, trust, and alignment of goals, which are essential factors for navigating complex changes. While deep-pocketed companies may pursue solitary transformations, sustainable change thrives on time, consistency, and shared commitment.

These partnerships are critical for successful, region-specific technology rollouts. In China, rapid market shifts of every six months demand a fast time-to-market, supported by strategic partnerships or investments. This approach follows the pricing of "survival of the fittest" and thus promotes regional independence and local innovation. Meanwhile, in the rest of the world, vehicle manufacturers are still transitioning through traditional structures, with early steps such as software updates underway. Balancing these stages requires tailored partnerships to accelerate commercialization.

Together, we can shape a sustainable, competitive future for the automotive industry

The automotive industry stands on the brink of an enormous transformation. Fragmentation of markets, intensifying competition, and mounting cost pressures demand a bold strategic shift. Success will require us to move beyond traditional value creation, embrace localization, and implement cutting-edge technologies such as AI efficiently, while fostering collaborative ecosystems.

At the heart of this transformation lies the end customer. The ability to meet evolving consumer expectations is not optional. Instead, it is the driving force behind innovation and growth, and it will determine the industry's leaders. Consumers demand more than just reliable vehicles. They seek seamless connectivity, personalized experiences, and sustainable solutions that match their lifestyles and align with their values.

To accelerate and master this transformation, cost reduction is more critical than ever before. To achieve this, we require great innovations for cost-efficient solutions and must drive standardization for non-differentiating technologies to enable global scalability. This can only be accomplished through true collaboration and partnership on an equal footing. We must continuously reinvent the way we work together by rethinking partnerships and collaboration models to drive valuable progress. The automotive industry's future depends on bold decisions, great innovations, and a relentless focus on what truly matters.

The time for change is now. Together, we can shape a sustainable, competitive future for the automotive industry. Are you ready to take the next step?

Partnering with Bosch: accelerating the automotive transformation

With our deep automotive expertise, openness for collaboration (see Figure 6), and innovative capabilities, Bosch is committed to accelerating the transformation together with our existing and future partners.

Tailored and scalable solutions
Bosch's robust global presence and local market expertise enable vehicle manufacturers (together with our partners) to develop tailored, region-specific solutions that address distinct user needs, while ensuring seamless integration into scalable vehicle architectures. We empower our customers to adapt quickly to changing market demands by leveraging our insights and best practices gathered across global markets.

Leadership in ADAS and AI integration
Our ADAS solutions enhance safety and comfort in real-world driving scenarios, delivering value on every journey. Bosch's ADAS strategy is rooted in a modular end-to-end AI approach, which enhances the user experience by delivering best-in-class, high-performance features embedded on cost-effective, state-of-the art SoCs. Our modular designs not only provide scalable solutions but also include innovations, such as the integration of foundation models into ADAS systems. With extensive experience as a global automotive supplier and a strong foundation in AI and software, we assist vehicle manufacturers in building end-to-end AI capabilities on their technology roadmap.

Compute solutions for software-driven transformation
Bosch's compute business focuses on delivering the foundation for the software-driven architectural transformation, offering solutions for all types of E/E architectures. Furthermore, Bosch provides industry-leading, high-performance vehicle computers and complementary ECUs, including cost-optimized enhancements such as advanced zone ECUs and cross-domain fusion, which combines multiple functional domains into one box or even onto one SoC. We accelerate the transformation towards SDV. Our engineers design solutions tailored to customer-specific needs in the areas of safety and security as well as sustainability and reliability. As part of consortiums like AVCC Autonomous Vehicle Computing Consortium [9], we bring the industry together to improve automotive computing for the software-defined vehicle by benchmarking and specifying vehicle system architectures, defining cybersecurity, and guiding software-hardware abstraction, portability and interoperability.

Comprehensive life cycle support and standardization leadership
As a reliable partner, we help to establish industry-wide standards enabling the cost-efficient adoption of new technological components. We support our partners throughout the development life cycle – from pre-sales consultation to architecture planning, technology evaluations, and lifetime feature improvement – thereby ensuring alignment with their strategic goals and operational needs.

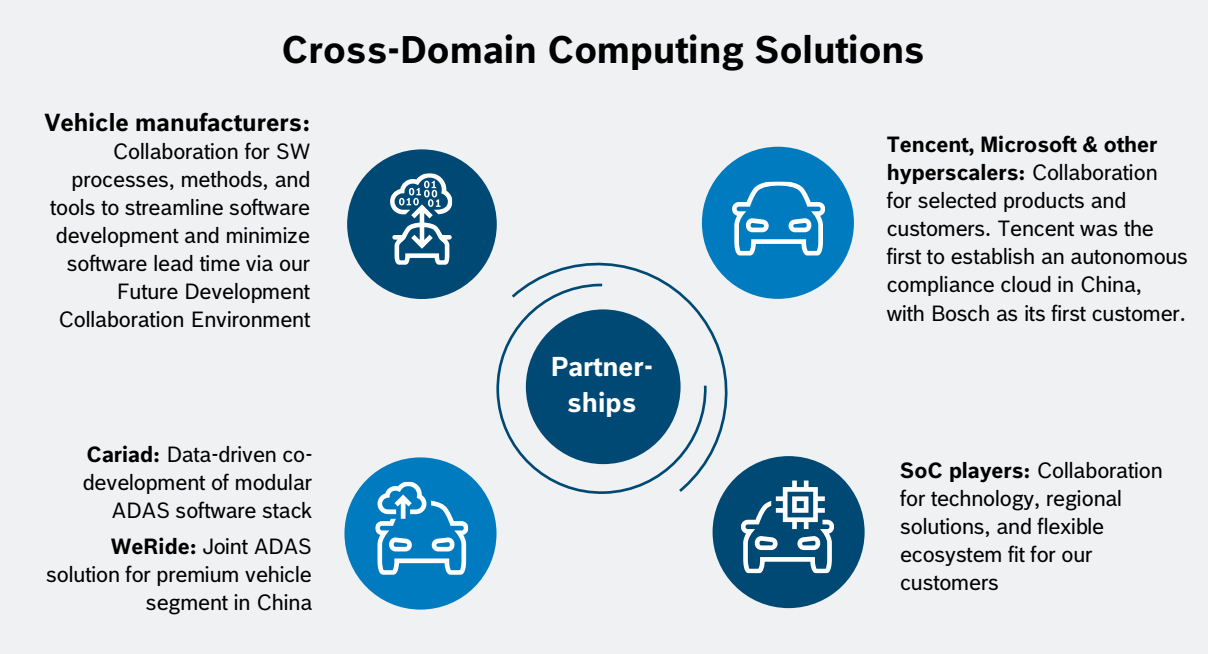


Figure 6: Our partnership landscape to create an ecosystem fit for our customers

You can read more on this topic via the following links:

Scan for more information.

The next step in E/E-architectures

Scan for more information.

Gear up vehicle powernets for future mobility

Closing remarks

The decision to make, buy, or partner is pivotal in the transformative journey of the industry – a marathon filled with exciting opportunities and dynamic adjustments.

Strategic partnerships are at the heart of this transformation, and selecting the right relationships is crucial for success. The fear of missing out often leads to a relentless pursuit of the latest trends. However, the unwavering focus on building a sustainable, long-term ecosystem that ensures resilience and growth in our increasingly vibrant market has been the marked difference between those that endure and the many that do not.

After speaking to thousands of stakeholders and dozens of ecosystem partners, we can highlight several success factors:

Enhance software core competencies through shared innovation
Moving beyond rigid, end-to-end control fosters faster time-to-market and impactful, cost-effective solutions. Embracing open-source contributions strengthens our collective ability to innovate and adapt.

Accelerate time-to-market through data-driven collaboration
Shorter development cycles, achieved by leveraging anonymized end-user data, enable iterative performance improvements, seamless feature enhancements, and stronger alignment between product development and marketing strategies.

Scale efficiently by streamlining processes and tools
Ecosystem collaboration optimizes interfaces and reduces lead times. Goals such as 24-hour bug fixes and bi-weekly software updates ensure operational continuity and enhance the user experience.

Foster balanced partnerships rooted in strategic rationale
The transactional models of the past no longer suffice. Sustainable growth demands fair and honest collaboration on an equal footing, and this must be built on trust and a shared vision for long-term value creation.

As we conclude this discussion, it is clear that partnerships are not just a tactical necessity but instead are the cornerstone of transformation. By prioritizing collaboration, agility, and data-driven innovation, we can unlock the full potential of a future-proof, sustainable mobility ecosystem.

Join us as we shape this dynamic future.

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Contact us now

Get in touch with our expert team. We are looking forward to support you with our expertise to find out more about the future of mobility.

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