

SBD Explores: The emerging new ecosystem for software defined vehicles

Making the decision to build, partner or buy?

10-minute Insight

Software defined vehicles (SDVs) are a more advanced version of current vehicle architectures. Successfully implementing SDVs allows the development and use of hardware and software to be independent. This 'decoupled' state allows vehicle manufacturers (OEMs) to more readily meet the fast-changing demands of customers.

There are multiple strategies available for transitioning to this decoupled state. On one hand, an OEM can build their own software in-house. Alternatively, software and hardware can be built and bought using a mix of in house and outsourced components.

Before making the decision to build, partner or buy, OEMs must develop a clear roadmap that leads to the safe and sustainable deployment of SDVs. In this edition of SBD Explores, the varying strategies available to OEMs are highlighted and the benefits of each discussed.

Target audience

Engineering Strategy

Marketing Product Planning

Focus market(s)

Global



What is happening?



[Woven by Toyota is made a wholly owned subsidiary of Toyota](#)

Woven by Toyota will be a **software development outsourcing company** for Toyota. This shows that Woven is a strategic priority for Toyota.



[KPIT to accelerate Honda's transformation towards Software-Defined Mobility](#)

Honda have partnered with **system integrator, KPIT** to develop and integrate software for future SDVs.



[BMW and Valeo engage in a strategic cooperation](#)

BMW have partnered with **Tier 1 supplier, Valeo** to jointly develop automated parking technologies up to SAE L4.



[Volkswagen's CARIAD teams up with ThunderSoft](#)

Volkswagen's software subsidiary, **CARIAD** have partnered with **system integrator, ThunderSoft** to develop connectivity and infotainment systems for China.



[Polestar partners with Meizu to make in-car operating system](#)

Polestar have partnered with **software vendor, Meizu** to integrate a China-specific operating system. In China, there is increasing integration between vehicles and consumer electronics.



[BYD partners With NVIDIA for Mainstream SDV Built on NVIDIA DRIVE](#)

NVIDIA and **BYD** are expanding their partnership to jointly develop safe and intelligent vehicles. Functionalities could be delivered and enhanced through **software updates** over the life of the car.

Key takeaway

OEMs are transitioning to strategies that better enable the development of software defined vehicles. This includes seeking out strategic partners.

- OEMs are trying to improve their in-house software development capabilities. Examples of this include Volkswagen's software subsidiary, CARIAD and Woven by Toyota. Both are affiliated with an OEM and could enable the OEM to control vehicle software.
- The maintenance of in-house software development capability comes with significant costs. These costs come from talent acquisition, establishing new organizations and managing software development.
- Making partnerships with software companies is one way for OEMs to balance the upfront costs of software development while gradually increasing control over development.

Why does it matter?



Integration Approach

Leverage 'off-the-shelf' software vendors



Long-Term Approach

Careful investment to spread risk



Partnership Approach

Form partnerships where necessary

	Integration Approach	Long-Term Approach	Partnership Approach
Pros	<ul style="list-style-type: none"> Fast time to market Low upfront investment 	<ul style="list-style-type: none"> Complete control over software Ability to meet custom needs 	<ul style="list-style-type: none"> Good balance of speed and cost. Internal teams get the opportunity to gain expertise
Cons	<ul style="list-style-type: none"> Internal team may not gain expertise Difficult to meet custom needs 	<ul style="list-style-type: none"> Slow time to market High cost 	<ul style="list-style-type: none"> Complexity challenges

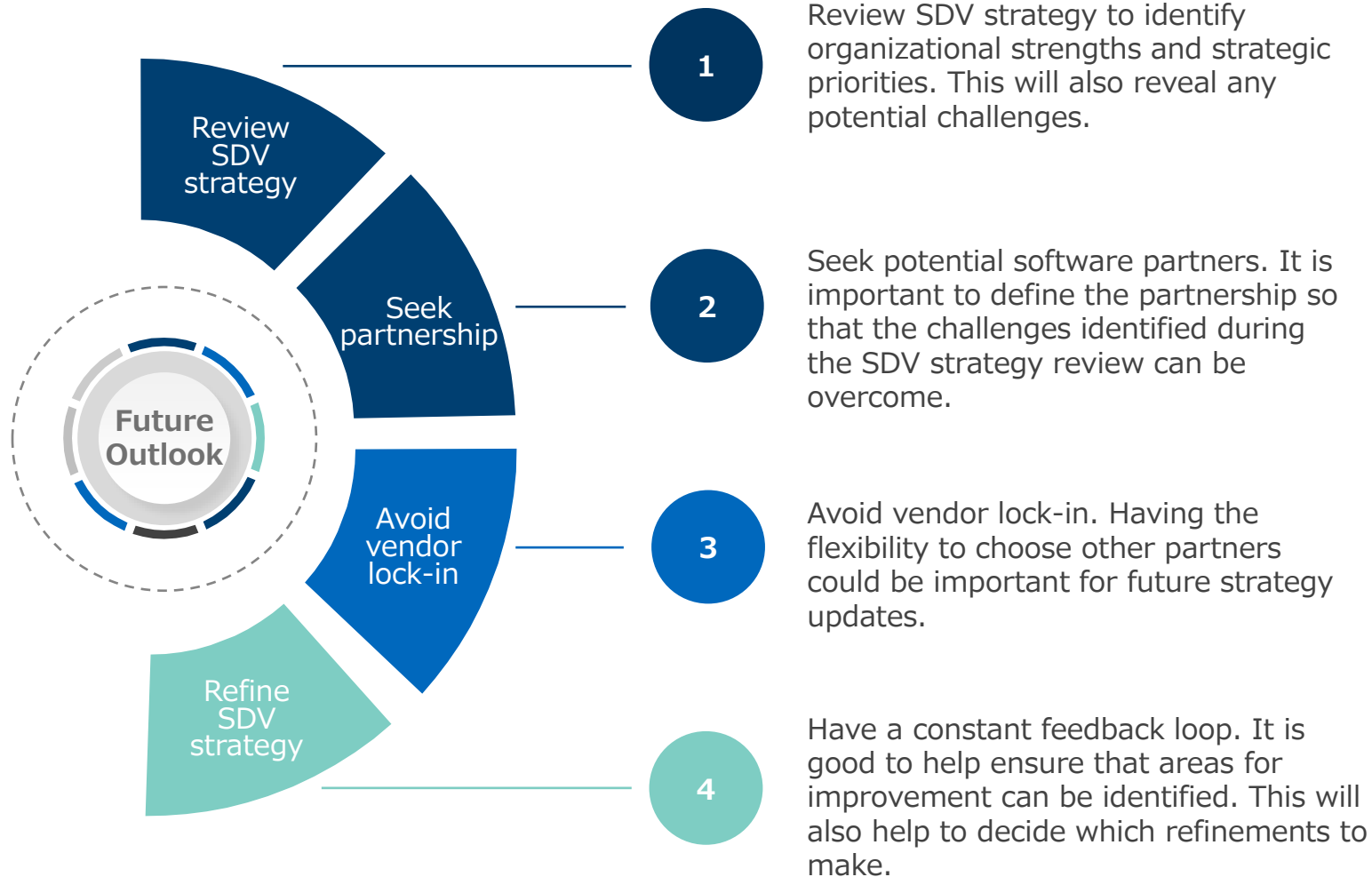
Main takeaway

- This approach can be a good option for organizations that need to quickly launch a new product or service, or that have limited resources.
- However, off-the-shelf software may not meet all an OEMs' needs, and OEMs may be limited in their ability to add new features or functionality in the future.
- This approach gives OEMs the most control over their software. They can add new features or functionality as needed through in-house development.
- However, this approach is also the most expensive and time-consuming. It requires a team of experienced software developers and the necessary infrastructure and tools.
- This approach is a middle ground. It allows OEMs to build expertise and resources without having to build everything in house.
- However, it can be complex and challenging to manage a partnership with a third-party vendor.

Key takeaway

The collaboration between OEMs and suppliers can speed up product development but the risk is that OEMs will then lack their own software development capabilities.

- SDVs allow OEMs to continually update vehicle fleets with new features and improvements. Having control over software allows OEMs to realize these benefits.
- OEMs have the flexibility to choose the development approach that best suits their needs and resources. There is no one-size-fits-all solution.
- The core competencies, and the importance of the SDV stack to an OEMs' business should be considered when deciding how to develop components. They could be developed in-house, outsourced, or in partnership.
- Internal development does not mean developing from scratch. OEMs can also quickly build their SDV stacks by integrating different components.



Short Term	Mid Term	Long Term
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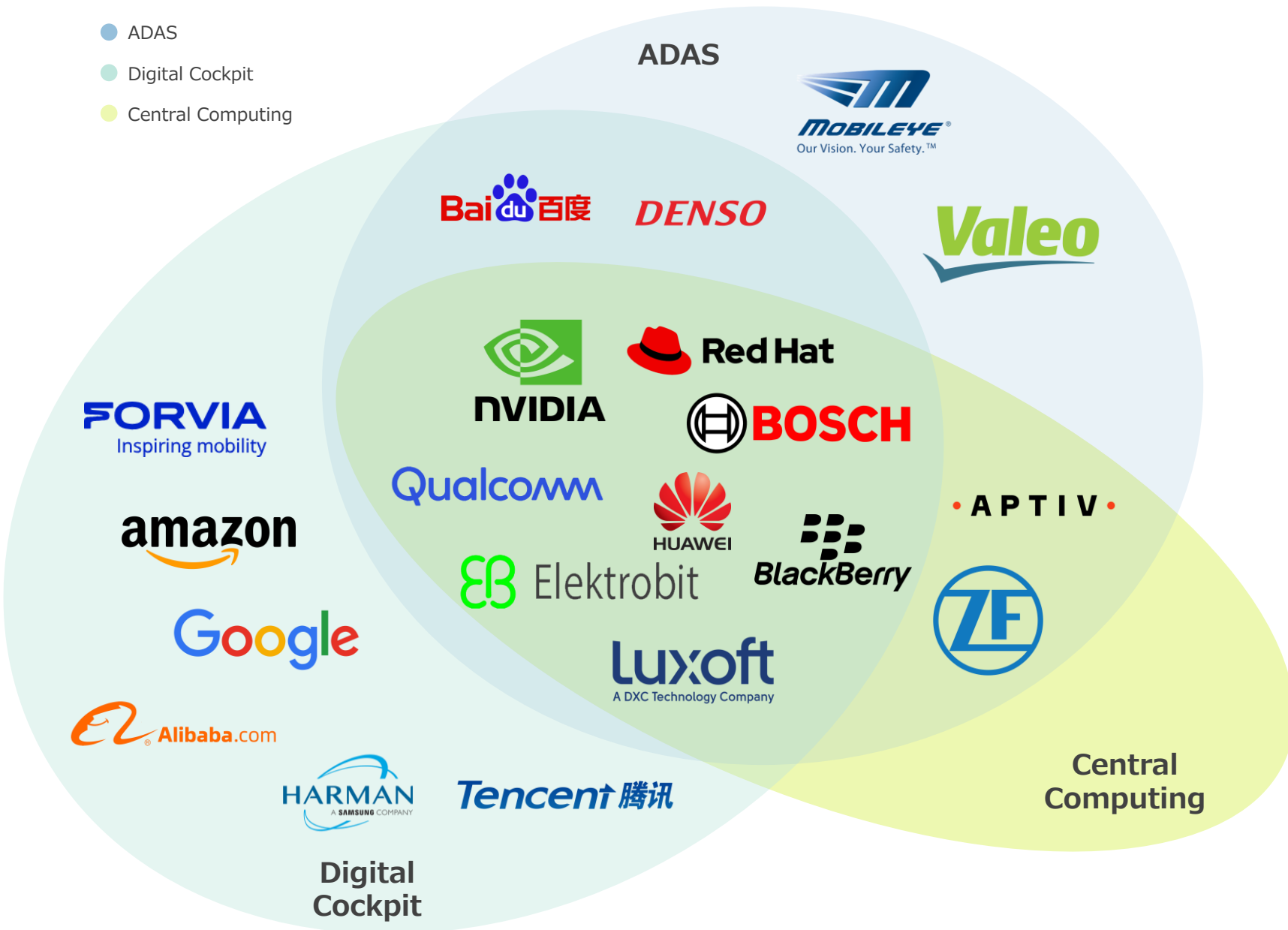
Key takeaway

OEMs might want to start to see the next phase of the rollout of SDV – refining their SDV strategy.

- To avoid delays and wasting resources, OEMs should be focused on which aspects of the SDV stack are of strategic value to them, and to prioritize in house development or IP ownership accordingly.
- OEMs should review their SDV strategies regularly, to pinpoint their strengths. Regular reviews also help to identify any challenges that the organization is facing.
- Partnerships are an “express train” to overcome challenges, but careful thought needed to avoid diluting expertise. There are multiple options along the partnership spectrum.
- OEMs need to establish a feedback loop for their SDV strategies to identify areas for improvement and make necessary adjustments.

What to watch out for?

- ADAS
- Digital Cockpit
- Central Computing



Key takeaway

New players such as software vendors and chip suppliers are becoming direct partners with OEMs.

- Ex-Tier 2 suppliers, such as software vendors and chip vendors are making direct partnerships with OEMs thanks to their highly sophisticated domain expertise.
- Cross-domain enablers are companies which offer domain-agnostic services and products. These companies are seeing significant demand from OEMs looking for non-differentiating components for the SDV.
- Technology giants and traditional Tier 1 suppliers are complementing the SDV. Technology giants can provide advanced software and technology, while traditional Tier 1 suppliers can provide experience in automotive manufacturing and supply chain management. Through collaboration, the two sides can jointly promote the development of SDVs.

How should you react?



1

Vision

Reaching the SDV does not lead to success in the automotive industry. What matters is the experience and services that the SDV delivers. An OEM must have a clear vision for what they want to use the SDV for.

2

Strategy

Some OEMs want to have control over their software. Others may want to select software. In both cases, the strategy should be based on business volume and R&D capacity.

3

Partner

Supply models may need to change to reach the SDV. For this reason, some tier-2 suppliers are seeing a rise in interest from OEMs.

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SDV:
Organization
and Strategy

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- SDV strategic support
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