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Partnerships are essential to leading in the autonomous vehicle market

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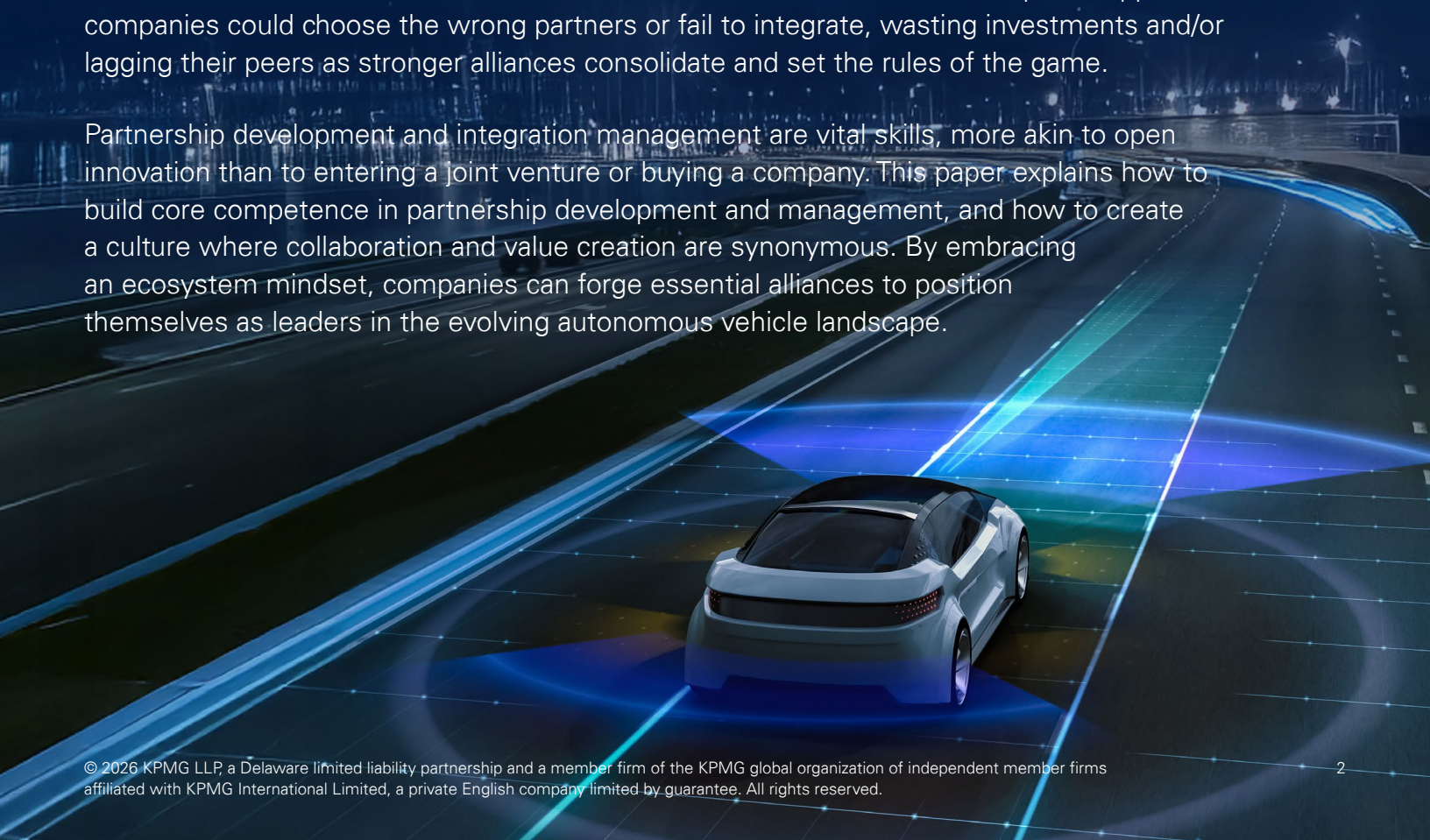
Introduction

The race in autonomous vehicle (AV) development is no longer about the best technology—it's about building durable, profitable partner ecosystems aligned to public and private industry goals. Delivering market-ready solutions in this fragmented, high-risk sector takes strong partnerships to overcome capital constraints, functional gaps, and regulatory hurdles.

This challenge is the direct result of a market evolution KPMG foresaw in its 2017 thought leadership, Islands of Autonomy. As we predicted, the market did not develop monolithically but has emerged as a series of distinct, geographically-bound "islands," each with unique regulatory, operational, and consumer demands. Yet navigating the complexities of partner selection can be daunting. While assembling a full capability stack is essential, the best partnerships are those that open new revenue channels, mitigate risk, reassure regulators, and drive industry standardization. Without cooperation, even the most capable innovators risk falling behind as platforms consolidate and one vertically integrated stand-alone wields its market influence.

While companies recognize the need to prioritize building these collaborative ecosystems, they often lack the know-how to cultivate these relationships or the criteria to evaluate their merits. Collaboration is essential, but it is difficult to do well. Without a disciplined approach, companies could choose the wrong partners or fail to integrate, wasting investments and/or lagging their peers as stronger alliances consolidate and set the rules of the game.

Partnership development and integration management are vital skills, more akin to open innovation than to entering a joint venture or buying a company. This paper explains how to build core competence in partnership development and management, and how to create a culture where collaboration and value creation are synonymous. By embracing an ecosystem mindset, companies can forge essential alliances to position themselves as leaders in the evolving autonomous vehicle landscape.



The ecosystem

In the broader landscape of software-defined vehicles, no automaker is more vertically integrated than Tesla. By designing vehicles, manufacturing them at scale, embedding its own silicon, and developing its advanced driver-assistance system (ADAS) with the stated goal of a future robotaxi network, Tesla controls nearly every aspect of its value chain. However, when focusing strictly on the currently operating Level 4 autonomous vehicle market—where the driver has already been removed—the strategic landscape shifts.

Most companies acknowledge the obstacles they face without them. Building fleets, infrastructure, and safety systems requires billions of dollars of capital investment. Gaining regulatory approval and urban integration depends on broad public-private cooperation, to secure permitting and maintain regulatory confidence. Standardizing to accelerate innovation and adoption requires market collaboration. In short, partnerships are not optional—they are the foundation for overcoming financial, regulatory, and operational barriers in autonomous vehicle development.

Autonomy at scale demands an ecosystem approach, as even highly vertically integrated players rely on partners across compute, hardware, manufacturing, regulation, and operations. Several companies span multiple layers of the AV stack, but in different ways. For example, NVIDIA provides compute and software platforms, Aurora delivers the autonomy system via partners, and Waymo operates an end-to-end autonomous driving and fleet model. Assembling the pieces of a complete market solution takes expert partnership know-how, agility, and adaptability. It's a complex technology and physical stack fragmented across capability and providers:

Technology and physical stack is fragmented across capability and providers

Compute: The hardware and chips powering the perception, prediction, and planning essential to operate autonomous vehicles. These components process vast amounts of data in real time to make driving decisions.

Software-defined vehicle stacks: These integrate software platforms that manage perception, mapping, and motion planning. They are the backbone of autonomous operations, holding algorithms for vehicle control and environmental understanding.

Data platforms: Data platforms are critical for handling large data sets needed for training and improving autonomous systems. They allow for data storage, labeling, simulation, and re-training based on new inputs.

Middleware and simulation: Middleware serves as a bridge between hardware and software, facilitating seamless integration. Simulation tools enable testing under virtual conditions to ensure systems perform reliably and safely.

Sensors and perception: These components include technologies such as LiDAR, radar, and cameras, which allow autonomous vehicles to perceive their environment by detecting obstacles, lane markings, pedestrians, and other vehicles.

Fleet and operations: This component involves managing the deployment, routing, and maintenance of autonomous vehicle fleets. Efficient fleet management ensures optimal service delivery in ride sharing or logistics.

Considerations and benefits

Companies face big strategic questions as they explore partnership options. Which alliances or consortiums should they join? Which should they avoid? Which partners are likeliest to evolve into competitors? Will the market fragment if there are too many partnerships, undermining goals such as standardization and broad public-private collaboration?

Even with the best due diligence, alliances can be risky. Intellectual property, technology compatibility, cybersecurity, and culture are key considerations. Common risks of tie-ups include intellectual property (IP) disputes, divergent strategic and development roadmaps, culture clashes, and oversharing information.

External factors complicate things further: Meeting regulatory requirements, overcoming supply chain constraints (like expensive sensors or semiconductor shortages), and dealing with regional market barriers (e.g., China versus US AV turf) all require careful partnership strategies.

When partnerships fail, companies typically retrench to internal development, then re-enter partnerships later with tighter governance and audit rights. By then, they may have lost market advantage.

Durable partnerships, though, can be transformational for each company involved. Among the benefits:

- **Resource and capability pooling:** Enables companies to share technical expertise, R&D capabilities, manufacturing capacity, and financial investments.
- **Risk mitigation and cost sharing:** Companies can split expenses and distribute risks, making it easier to manage market and technology uncertainties.
- **Enhanced innovation and scalability:** Collaboration encourages the exchange of ideas and know-how. Parties can leverage one another's strengths to accelerate innovation and scale rapidly.
- **Regulatory credibility and market standardization:** By working together to address regulatory challenges, companies in a partnership can build credibility in the marketplace and encourage industry-wide adoption of common standards.
- **Knowledge sharing:** Partners can learn from each other's mistakes and incorporate best practices into their operating models.

Investors treat partnerships as proof of operational maturity and scalability.

Regulators see them as indicators of shared safety and accountability.

Suppliers see them as more dependable, and potentially preferred, customers.

Proof of partnership potential

In developing industries that are highly dependent on new technologies, innovation, and standardization, partnerships are an important avenue for sharing risk, resources, and best practices. When market-ready solutions involve components that no one company has successfully developed and/or integrated, partnerships are essential to building an ecosystem that reaches across segments, unifying providers to create holistic products and services.

We've seen parallels in other industries. In pharmaceuticals, shared IP pools and codevelopment accelerate innovation. In telecommunications, interoperability standards prevent market lockouts. In aerospace, rigorous supplier certification builds trust in safety-critical systems. And in electric vehicles, state and federal subsidies supported partnership and joint venture developments.

The autonomous vehicles industry needs all of this, though no such subsidies exist today in its ecosystem. A deep partnership with an original equipment manufacturer or Tier-1 adds legitimacy (and perceived access to capital) that a standalone start-up cannot replicate on its own.

As the industry trends towards consolidation, the focus has shifted from the quantity of partnership announcements to the quality of their integration. Investors are now keen to focus beyond the press release, scrutinizing operational metrics and demonstrated commercial scaling. Among recently announced deals, Lyft and Waymo unveiled a robotaxi partnership in September, Stellantis said in November that it would collaborate with Nvidia, Uber, and Foxconn in AV, and Daimler Truck and Torc Robotics teamed with Innoviz Technologies as its LiDAR partner for autonomous trucks.

Recently announced AV collaborations

Robotaxis

- Robotaxi leader Waymo's separate partnerships with Lyft and Uber
- Global Automotive OEM Stellantis' partnership with Nvidia, Uber, and Foxconn

Autonomous trucks

- Innoviz Technologies as the liDAR partner for Daimler Truck and Torc Robotics

Managing partnerships

Evaluating a potential partner's strategic fit, technical expertise, adaptability to regulatory changes, and cultural alignment upfront is key to making informed partnership decisions. Once the choice is made, these actions can help companies manage partnership risk while realizing the expected benefits of the collaboration.

Make contract language specific

Define the operating model early and avoid broad contract language. A partnership agreement (or partnership contract) should lay out terms for sharing IP or assets; not necessarily the ownership of that IP or asset, but the permission to use it. In the case of a software partnership, a joint development agreement should specify the need for nondisclosure agreements (NDAs) and defined IP ownership clauses.

Partnership agreements tend to be less binding than an agreement to form a joint venture (where you're contributing assets to a jointly owned company) or in outright mergers and acquisitions but are no less important for defining the boundaries of the partnership.

Install technology safeguards

When entering partnerships, especially those involving sensitive data or proprietary technology, it is crucial to implement technological safeguards to protect IP, maintain data security, and ensure operational integrity. These safeguards might include data encryption, secure application programming interfaces (APIs), containerization, and access control. We recommend using a secure software development lifecycle that includes code reviews and vulnerability assessments to identify and fix security issues.

Reinforce technical measures with legal agreements, such as NDAs and specific clauses in contracts that outline data security responsibilities and consequences for breaches.

True protection comes from designing the integration itself to minimize code or data sharing. But developing and testing an incident response plan to quickly and effectively respond to security breaches or data leaks can mitigate potential harm.

Navigate the "paradox of openness"

Companies must strike a balance between sharing enough information and collaborating openly with partners and protecting their own IP, sensitive data, and competitive advantage. While partnerships are crucial to innovation, they also expose companies to potential information leakage or misuse.

This requires strict operational discipline at layers below the partnership agreement. Front-line employees and engineers must collaborate with partner counterparts but stay disciplined in what is too sensitive to share.

Monitor, measure and audit

Implement comprehensive logging and auditing systems to monitor data access and usage. Regularly review logs for unauthorized access or unusual activities. Conduct regular security assessments and penetration testing to evaluate the security posture of systems and networks involved in the partnership.

Measuring success in AV involves various metrics that reflect technological progress, market readiness, safety performance, and financial viability. Return on investment can be tracked across three vectors to measure the success of the partnership:

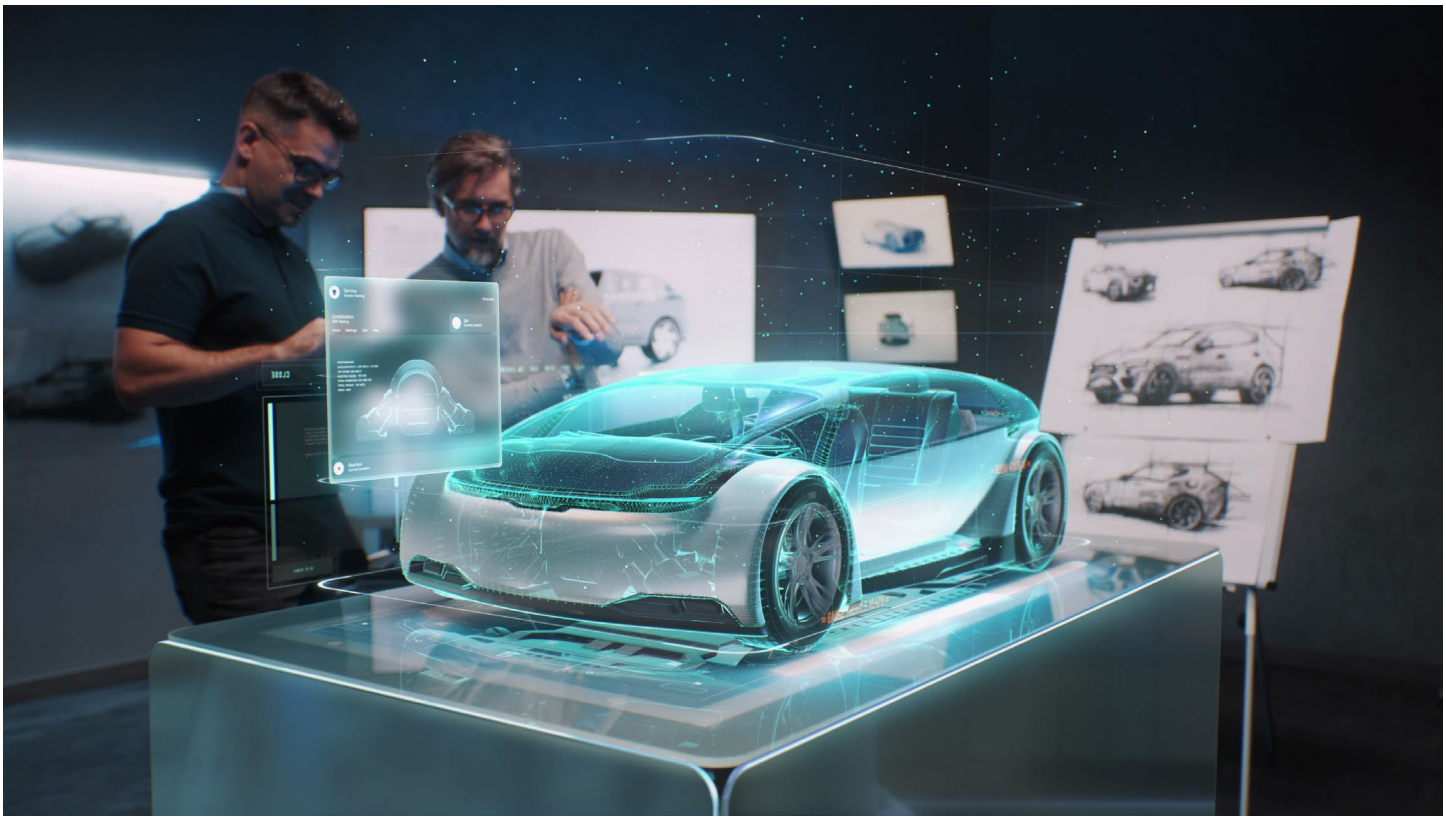
- Technical progress such as safety performance and intervention rates within a defined operational design domain.
- Speed to market measured by launch or permit timelines.
- Capital efficiency such as cost per validated or supervised mile.

As the industry is still developing, there is no universal benchmark yet for evaluating success.

Reassess

Review the partnership annually to ensure continued strategic alignment, evaluating quantitative and qualitative measures to determine whether it is delivering value to all parties involved. Does its work and product align with the key objectives initially outlined? Are you making progress toward these shared objectives? Is communication and trust in place for fruitful collaboration?

By taking these steps, autonomous vehicle companies can reduce the risk of data breaches, protect their intellectual property, and maintain trust and accountability within partnerships.



Closing thoughts

Nearly a decade ago, in Islands of Autonomy, we predicted the autonomous vehicle market would emerge as a complex mosaic of distinct local markets. Today, that prediction is a reality, and it is clear that partnerships are the cornerstone of success within those islands. Companies must prioritize developing robust partnership management skills, rooted in open innovation, to create ecosystems that deliver value across the board—meeting not only business objectives but also contributing to broader industry standards and regulatory goals.

While full integration remains out of reach for most, strategic alliances allow companies to pool resources, share risks, and drive innovation. As the sector continues to grow, the ability to navigate and cultivate these partnerships becomes indispensable. Those that choose wisely will not only survive but also thrive amid the technological and regulatory challenges unique to autonomous vehicle development.

How KPMG can help

KPMG LLP assists clients in the autonomous vehicle sector by leveraging its deep industry knowledge and data-driven approach to help organizations identify, quantify, and prioritize emerging opportunities related to mobility, autonomy, and electrification. As partnerships proliferate in the autonomy ecosystem, clients rely on our advanced global Deal Advisory capability to identify, forge and maintain strategic partnerships.

KPMG helps clients globally—including automakers, rideshare operators, mobility providers, and transit agencies—develop technology investment and development roadmaps, transform operating models, and define new business strategies to capitalize on autonomous vehicle trends.

We also support clients with performance improvement services, helping ensure that organizations are well-prepared to navigate the evolving automotive landscape and achieve long-term success in autonomy-driven markets.

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