



Deploying autonomous vehicles

Commercial considerations and urban mobility scenarios

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The case for autonomous vehicles

Over the past 24 months, almost every major vehicle manufacturer (VM), supplier and technology company has announced projects or collaborations around the autonomous vehicles (AVs) theme. While the notion of AVs has been alive for some time through science fiction and various media, the urgency to make them a reality has gathered pace as companies outside the auto industry have illustrated the feasibility and benefits that self-driving vehicles present. The deployment of AVs today is less about technological capabilities and more about the ability of stakeholders to handle the various commercial and governance complexities associated with having such vehicles on the road.

EY's Global Automotive Center has developed the following points of view:

- ▶ AVs offer several benefits once deployed, however, the road to autonomous driving has a number of challenges that will need to be resolved to achieve a sustainable mobility ecosystem in the future.
- ▶ Given the implementation complexities, we expect AVs to be launched through multiple controlled scenarios in and around urban areas.
- ▶ As the benefits outweigh the costs, and liability, safety and security concerns are addressed, these controlled scenarios will expand and merge across vast urban areas and eventually integrate intercity mobility as well.
- ▶ AVs represent a significant paradigm shift to the mobility ecosystem – not only a technological revolution, but a value chain transformation. The commercial deployment of AVs will have far-reaching implications for stakeholders across all levels of the mobility value chain.

“The introduction of AVs could accelerate the move away from vehicle ownership to having access to different integrated mobility solutions such as car sharing programs and first-mile/last-mile connectivity. AV fleets may also deploy a greater share of alternate powertrain vehicles.”

Mike Hanley
Global Automotive Leader, EY

Trendicators

8th

leading cause of death globally: road accidents

95%

of road accidents caused due to human error

2X

increase in delay hours due to congestion by 2050

6.3 billion

urban dwellers accounting for 70% of population by 2050

AV deployment timeline

5-10 years	10-20 years	Beyond 20 years
<ul style="list-style-type: none"> ▶ Controlled, AV-only environments ▶ Moderate level of automated driving ▶ Low to medium speeds 	<ul style="list-style-type: none"> ▶ Less restricted environments ▶ High level of automated driving ▶ Medium to high speeds 	<ul style="list-style-type: none"> ▶ Large, connected AV networks, allowing multiple mobility scenarios ▶ On demand mobility and fleet services ▶ Customizable AVs

Source: UN World Urbanization Prospects, World Business Council for Sustainable Development, Factiva, Navigant Research, EY analysis European Commission, Directorate General Information Society and Media, Informal document No.: ITS-13-07

AV benefits to the mobility ecosystem - challenges to deployment

In order to overcome the challenges associated with autonomous driving, it is crucial that key AV stakeholders (governments, VMs, technology/telecom players, suppliers, automotive councils and academic institutions) work together to implement commercially viable business models that facilitate the deployment and adoption of AVs.

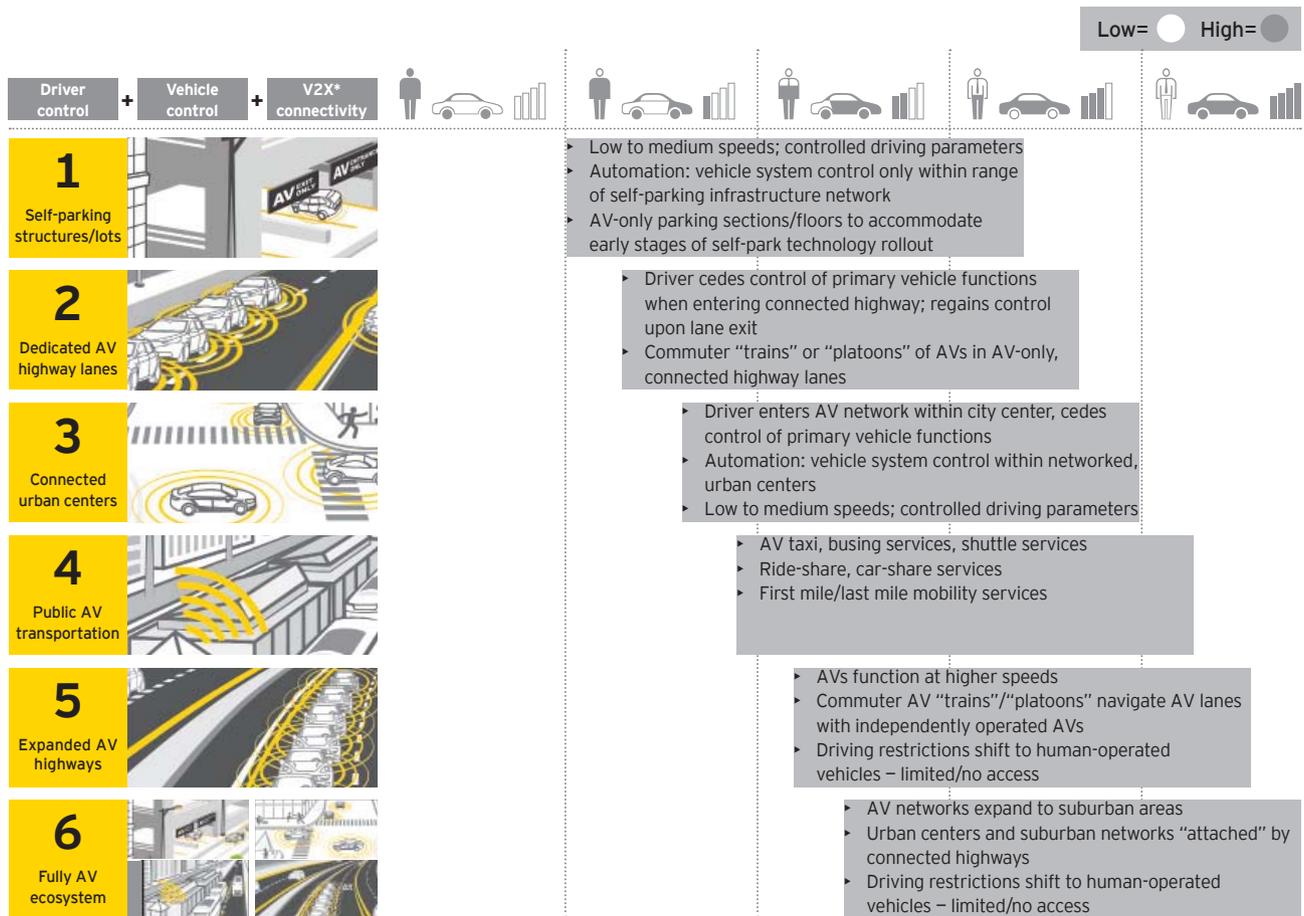
Low= Medium= High=

		Development phase (5-10 years)	Controlled deployment scenarios (10-20 years)	Connecting deployment scenarios (beyond 20 years)
Benefits				
Safety	Traffic safety improvements			
	Reduction of traffic accident-related costs			
Mobility	Increased mobility for elderly, disabled			
	Expanding car- and ride-share programs			
Efficiency	Traffic network efficiencies			
	Decline in vehicle ownership and vehicles per family			
	Decreased fuel consumption			
Challenges				
Capital	Cost			
	Infrastructure			
Governance	Regulations			
	Liability			
	Insurance			
Technology	Cybersecurity			
	Data quality			
	Privacy			

Deployment scenarios that support increasing automation of driving

As the benefits outweigh the costs, and liability, safety and security concerns are addressed, these controlled scenarios will expand and merge across vast urban areas and eventually integrating inter-city mobility as well.

Evolving levels of driver control, vehicle autonomy and connectivity



*V2X includes vehicle-to-device, vehicle-to-vehicle, vehicle-to-infrastructure and vehicle-to-home.

Implications of AV scenarios for stakeholders

AVs represent a significant paradigm shift to the mobility ecosystem. Not only a technological revolution, but a value chain transformation. The commercial deployment of AVs will have far-reaching implications for stakeholders across all levels of the mobility value chain.

Low=  Medium=  High= 

	Self-parking structures/lots	Dedicated AV highway lanes	Connected urban centers	Public AV transportation	Expanded AV highways	Fully AV ecosystem
Benefits/advantages						
Challenges/constraints						

AVs offer several opportunities to key stakeholders with varying degrees of impact

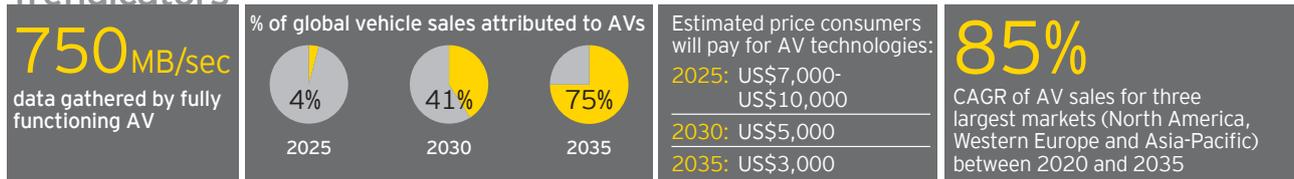
VMs (passenger vehicle)						
VMs (commercial vehicle)						
Suppliers						
Technology/telecom companies						
Dealer/retail network						
Government/regulatory bodies						
Car-sharing companies						
Public transport/integrated mobility providers						

Strategic considerations for AV stakeholders

Key stakeholders	Strategic considerations
VMs	<ul style="list-style-type: none"> ▶ Use new business models that optimize new sales and service opportunities, such as AV sharing, innovative finance programs, targeting fleet customers ▶ Collaborate within and outside the auto industry on R&D to maintain leadership position in AV innovation and be the first to market with new AV technologies
Suppliers	<ul style="list-style-type: none"> ▶ Focus R&D investments on AV solutions that generate the most value for your customers – breakthrough technology pioneers ▶ Partner with technology and telecom companies to accelerate innovation and reduce costs
Technology/ Telecom companies	<ul style="list-style-type: none"> ▶ Consider expanding scope of business to include all aspects of AVs' technology and data requirements – holistic solutions for connectivity, security and privacy, data processing, management and analytics ▶ Investigate opportunities to establish partnerships with existing VMs to develop new, AV-only offerings ▶ Identify and partner with cities and integrated mobility providers to address impact of autonomous vehicles on their respective business models, infrastructure and networks
Government/ regulatory bodies	<ul style="list-style-type: none"> ▶ Develop future state urban network plans that address the gradual increase in vehicle automation, network connectivity and data requirements of AVs ▶ Engage early (and often) with key stakeholders in AV policy and legislation design and implementation, certification, license requirements and training ▶ Conduct independent research and analysis of automated driving and the implication for urban infrastructure and mobility planning over the next 50 years
Dealer/retail network	<ul style="list-style-type: none"> ▶ Establish integrated service offerings (maintenance, software upgrades and customization, insurance, charging stations) to maintain brand recognition and consumer connection ▶ Consider developing new service opportunities such as AV driver training and certification ▶ Restructure aftermarket business model to address new retail competition that may spawn from AV deployment
Integrated mobility providers*	<ul style="list-style-type: none"> ▶ Evaluate investment opportunities within urban networks most likely to adopt AV usage and establish a presence in these areas ▶ Collaborate with VMs on new AV fleet and commuter services that are likely to grow in the new AV ecosystem

* includes car sharing companies

Trendicators



Source: Factiva, Navigant Research and CNET

Operating and investment considerations for AV stakeholders

Key stakeholders	Operating and performance considerations	Investment and capital considerations
VMs	<ul style="list-style-type: none"> ▶ Devise methods of data analytics to manage and interpret significant volume of AV data ▶ Assess readiness for regulatory changes in local markets ▶ Manage warranty costs owing to rising technological complexities ▶ Institutionalize checks to ensure data privacy and security 	<ul style="list-style-type: none"> ▶ Form need-based and strategic alliances, JVs and acquisitions to gain technology and reduce costs ▶ Create a network of partners to enable new revenue streams – car-sharing programs, on-demand mobility, AV fleet service, in-vehicle entertainment/ advertising, etc.
Technology/ telecom companies	<ul style="list-style-type: none"> ▶ Explore a more active role in the automotive value chain by providing the requisite infrastructure, data mining, privacy and bandwidth solutions 	<ul style="list-style-type: none"> ▶ Explore opportunities to emerge as a mobility solutions provider ▶ Potentially partner with existing VMs in expanding deployment of AV scenarios ▶ Partner with local government, VM's, other technology companies for investment in requisite infrastructure; targeting cities as customers
Government/ regulatory bodies	<ul style="list-style-type: none"> ▶ Institutionalize a framework to enable and run smart and integrated megacities ▶ Provide regulations and policies around deployment of AVs – data privacy and cybersecurity, safety and liability, incentives and taxation ▶ Seamlessly integrate public transportation into smart cities ▶ Integrate vehicle registration, state taxes and tolling charges ▶ Re-license drivers to be certified for using AVs ▶ Collaborate and develop industry-wide certification process for levels of autonomy and safety 	<ul style="list-style-type: none"> ▶ Invest in requisite infrastructure to enable deployment of AVs ▶ Support AV research through R&D incentives, testing infrastructure, and encouraging local stakeholder participation in process
Dealer/retail network	<ul style="list-style-type: none"> ▶ Invest in employee (on-floor, sales and technicians) and driver training, and customer awareness ▶ Use digital media and smartphones to promote features and facilitate customer transactions ▶ Service the AV network and infrastructure 	<ul style="list-style-type: none"> ▶ Adapt business model to the evolving landscape and compete with non-automotive retail competition ▶ Explore other revenue streams, such as car-sharing programs and on-demand mobility

Want more?

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