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AUTONOMOUS VEHICLES
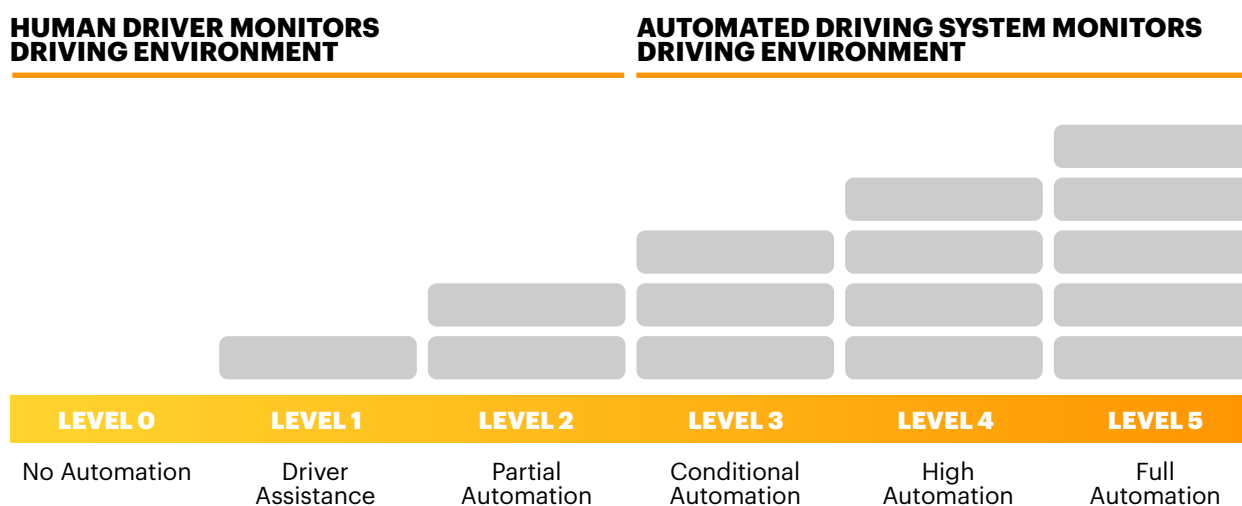
PLOTTING A ROUTE TO THE DRIVERLESS FUTURE

THE AUTOMOTIVE AND TRANSPORTATION INDUSTRIES ARE CURRENTLY UNDERGOING WHAT IS PROBABLY THE MOST DISRUPTIVE PERIOD IN THEIR HISTORY SINCE HENRY FORD FIRST DEVELOPED THE MASS PRODUCTION ASSEMBLY LINE BACK IN 1908.

A reduction in fossil fuel dependency is driving the largest adoption of electric vehicles (EVs) yet seen. Societal shifts and new ways of owning and using vehicles are contributing to a steady decline in car ownership, especially for younger generations. And perhaps most importantly, cheaper chipsets, sensors and software components are enabling the production of intelligent vehicles that can drive on their own. We're set to enter the age of the autonomous vehicle (AV).

While the long-term benefits of AVs are genuinely exciting, the route to true autonomy in transportation will likely be long and full of uncertainty. The precise impact of AVs on individuals, communities, industries and workplaces is, as yet, unclear. One thing's for sure, though – every industry will be affected. Some will find themselves disrupted; others will find new opportunities for growth and innovation. Both outcomes create a pressing need for businesses to understand the current direction of AV travel, and to develop a plan to prepare for a future in which AV use is widespread.

AVS TODAY...

AV adoption is still in its infancy. While various forms of intelligent driver assistance are now making their way into production models, high or full levels of automation (that is, levels 4 and 5 on the U.S. Department of Transportation's National Highway Traffic Safety Administration scale set out below) are still confined to the testing ground.

HUMAN DRIVER MONITORS DRIVING ENVIRONMENT

AUTOMATED DRIVING SYSTEM MONITORS DRIVING ENVIRONMENT

LEVEL 0	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
No Automation	Driver Assistance	Partial Automation	Conditional Automation	High Automation	Full Automation

The industry is still at the beginning of its journey to translate its undeniable successes in controlled environments into seamless autonomous experiences in the real world. But as the technology is tested and refined, demand for AVs is certain to grow, particularly among the young. BI Intelligence's 2017 survey on AV acceptance reveals that 18- to 29-year-olds are more receptive to driverless vehicles than any other demographic, and are likely to spearhead future AV adoption.

WHAT'S DRIVING THAT TREND?

There are three particular factors in play:

1. Customer expectations

Today's consumers increasingly compare their experiences across different domains. They've become accustomed to intuitive, personalized and seamless experiences, especially when they interact with digital technologies. This is most evident in the phenomenal transition from bulky feature phones to sleek smartphones. Today's high-spec, design-focused smartphones, which offer countless mobile applications, have established high expectations for user experience. Those expectations are now being transferred to other experiences and other sectors – and that's having a big impact on the automotive industry. Drivers and passengers alike increasingly expect their vehicles to offer carefully designed intuitive, interactive and, yes, automated experiences, just as their smartphones do.

But that doesn't mean customers want automated experiences at all costs. Neither drivers nor manufacturers are ever going to compromise on safety, which means thorough testing by the automotive industry and certification by transportation authorities must precede any large-scale adoption of new services. Additionally, more personalized automotive experiences will likely require customers to release more of their personal information, which they'll only do if there is a fair exchange of value.

2. Advances in technology

AVs exist at the leading edge of technological disruption, meaning a great deal of collaboration will be needed in the automotive ecosystem to make them production-ready. But the technologies are evolving quickly: "intelligent infrastructure" is increasing accuracy and safety, and cost reductions in radar, LiDAR and camera systems are each bringing AVs one-step closer to reality, notwithstanding current line-of-sight limitations. "Vehicle to X" (V2X) technology is being developed to provide 360-degree, non-line-of-sight awareness, extending a vehicle's ability to "see" farther down the road, even at blind intersections or in bad weather conditions. And when 5G wireless technology hits the mainstream, AV communications will be transformed – broadband multimedia streaming and high-volume transmission of sensor data will be possible over the same medium.

3. Transportation-as-a-service

Consumer attitudes to vehicle ownership are undergoing a revolution. Ridesharing – or transportation-as-a-service – has seen a meteoric rise in recent years and has disrupted traditional mobility service markets, especially for incumbent taxi businesses. Uber now serves a global monthly rider base of 40 million[1] people, for example. These ridesharing providers have low fixed costs and offer user-friendly applications, making them an ideal solution for consumers without access to public transportation or their own vehicle – and even for those that do. And, as urbanization continues to drive greater population density, AVs are ideally placed to capitalize on this ever-increasing preference for access rather than ownership.

… AND IN THE FUTURE

How will roadways dominated by high or fully automated vehicles impact future industries, economies and populations? What shifts in leverage and underlying business models are imminent? What new pathways for ecosystem innovation might arise from the data explosion that comes with AV proliferation?

The answers to these questions can be revealed by examining the immediate impact of AV adoption on three industry segments: automotive sales and service; logistics and supply chains; and auto insurance.

AUTOMOTIVE SALES AND SERVICE

NOW

Customers' automotive sales and service experiences have remained unchanged for decades. Manufacturers' technological advances have focused mainly on aesthetics and mechanical performance, meaning dealerships still rely on three traditional revenue streams: car sales, interior and amenities customization, and maintenance. But this model relies on large numbers of people owning their own cars. As automation and ridesharing models continue to grow, those numbers will surely decline, especially among the young.

FUTURE

Dealerships will be in the firing line of these disruptive shifts, and the auto sales and service industry must alter its strategies accordingly. Future sales and service models will likely evolve to focus on differentiation via maintenance services and service option sales, closer to the way the air travel industry operates today:

- **Maintenance services.** Dealerships will likely become hubs for storage and charging. The large physical footprints of these premises make them ideal locations for vehicles pulled from service or awaiting new passenger assignments. And they'll be equally well-placed to meet the ever-growing demand for EV charging points. Most importantly, dealership hubs will focus on software maintenance and hardware upgrades. Around 30 percent of connected vehicles (CVs) will have over-the-air (OTA) software updates by the end of this decade.

- **Dealerships can transform themselves into maintenance centers for these capabilities.** And as applications increase in complexity, corresponding hardware upgrades will likely be required. Automotive manufacturers could find themselves offering annual technology upgrades, just as mobile service operators do.

- **Option sales.** AVs will force a paradigm shift from "drivers" to "passengers." Without a driver, everybody in a high or fully autonomous vehicle is effectively a passenger. Those passengers will expect truly immersive and sublime experiences.

Dealerships will therefore be able to extend vehicle customization options beyond aesthetics and mechanical features to specific journey comforts – seating configuration, monitor placement, included applications or media. AV passengers will also have more time to consume content via personal or in-vehicle devices – again, closer to today's air travel experience. From television to in-vehicle Wi-Fi, this is fertile ground for dealerships to seed partnerships with media and technology providers.

NOW	FUTURE
Selling Cars	Selling Transporation-as-a-Service
Selling Options	Comfortability and Content Options
Maintenance Services	Software Maintenance

THREE STEPS TO CONSIDER NOW

ONE
Allocate resources to understand customer demands and potential service offerings for mid-level AVs (Level 3 – conditional automation).

TWO
Establish partnerships with multimedia service providers to obtain first-mover advantage in the marketplace and initiate feasibility studies or proofs of concept.

THREE
Plan new dealership infrastructures to match coming AV storage and maintenance needs.

LOGISTICS AND SUPPLY CHAINS

NOW

Digital commerce has enabled consumers to shop anytime and anywhere. Customers have come to expect the freedom to choose same-day and one-hour delivery, reinforced by merchants' willingness to bundle these options with retail transactions – in a sense, treating expedited service as a differentiator.

While great for customers, this has presented a challenge for the logistics industry. Logistics companies have seen a digitally fueled growth in order volume, but have had to manage their fleets ever more effectively to keep pace with demanding service-level agreements. And because dominant e-Commerce marketplaces struggle to pass additional costs on to end customers due to price sensitivities, they demand volume pricing for deliveries in accordance with upticks in business. This has put fulfillment and transportation costs under pressure, further exacerbated by the first-mile (pickup) and the last-mile (drop-off) requirements of logistics networks.

Logistics companies face further challenges in predicting asset and personnel allocations, especially during peak holiday seasons and unplanned spikes in demand. Their capacity is being stretched, and purchased transportation – the hiring of independent contractors – has grown significantly in recent years. These pressures are pushing top logistics providers to initiate extensive cost takeout programs. And AV adoption represents an opportunity to take this to the next level.

FUTURE

Trucking is big business – truck drivers represented the majority of full-time working adults in 29 of 50 U.S. states in 2014[2], for example. Even the U.S. Bureau of Labor and Statistics projected that demand for truck drivers would nearly double from 2014 to reach 2.76 million in 2022.[3] AVs could change that picture dramatically. In an environment where safety regulations limit the amount of time a human can operate a vehicle, Morgan Stanley conservatively estimates that the freight industry could save up to $168 billion annually by leveraging autonomous technology. And as much as $70 billion of that figure would come from staff reductions.[4]

How will this happen? AV's impact on logistics is best understood by breaking down the network into three legs: **first mile, middle mile** and **last mile**.

The **middle mile** is characterized by the least amount of navigational complexity, requiring fewer turns and less traffic negotiation. It will therefore serve as an entry point for AV adoption in the logistics industry. This could mean leveraging platooning techniques, where one manned truck leads several AVs along a highway – effectively requiring only one driver for multiple loads. Truck platooning would address a lack of skilled drivers and improve fuel economy for trailing trucks on long routes.

The **first and last miles** pose the greatest challenges for AVs, given the complex navigation requirements and dense traffic in urban areas. But if the middle mile reaches a point of standardization, logistics companies would have to differentiate themselves in these first and last legs.

There are two opportunities to do so:

- **Specialized customer experiences**
  The first and last mile experiences can be redesigned with an emphasis on logistical convenience for the end customer or business. Collection and delivery currently occur in three principal ways: mailboxes, in-store drop-offs, and carrier pickups. But AVs could serve as "storefronts on wheels," facilitating delivery anytime, anywhere. Imagine if consumers could use their mobile devices to locate and reserve delivery space and set up rendezvous points for deliveries. And AV pickup services could provide tailored home and business pickups, using customer smartphone locations.

- **Specialized functional services**
  Although not exclusive to AVs, additional functional services could offer logistics companies added layers of differentiation. Storefronts on wheels could include payment acceptance, product returns, scanning, and sorting integration as a

part of their service, for example. This would not only improve customer convenience, but also streamline logistics operations by speeding-up depot facility processing. Carrier booking systems could also be integrated with car-sharing services. This would not only allow the nearest AV courier to be hailed for completion of the end customer delivery, but more broadly, it would offer carriers flexible, just-in-time options for shipment pickup and optimizing cargo capacity.

AVs can also drive cost efficiencies in maritime ports and airports. Initially, they could complement the capabilities of Automated Guided Vehicles (AGVs), currently used for repetitive container transportation. Existing AGVs are predominately guided by electromagnetic sensors and transponders, and come with high upfront costs and inflexible navigation capabilities. Ports and airports are showing increasing interest in autonomous navigation systems using LiDAR and radar as an alternative solution.

NOW	FUTURE
First Mile	Storefront on Wheels
Middle Mile	Standardized and Autonomous
Last Mile	Specialized Customer Experiences / Specialized Functional Services

THREE STEPS TO CONSIDER NOW

ONE
Logistics companies should actively partner with OEMs to develop truck-sharing service models they can leverage during spikes in demand or peak seasons. This will reduce both purchased transportation and fixed transportation costs.

TWO
Logistics companies should build analytics capability roadmaps and start collecting extended sets of operational data – AV adoption will require sophisticated analytics modeling to fully realize its benefits.

THREE
Ports and multimodal logistics hubs should consider investing in AV technologies like LiDAR and radar for potential AV applications.

AUTO INSURANCE

NOW

Insurance companies have been operating some of the most profitable business models in recent history. But auto insurers are not immune from digital disruption. Online sales, usage-based insurance, data analytics and telematics are having a negative impact on profits – all while consumers perceive auto insurance premiums as overpriced and providing questionable claims benefits.

Technology advances in the automotive industry are closing the gap between traditional vehicles and the future state of AVs. New vehicles equipped with Advanced Driver Assistance Systems (ADAS) have already been proven to reduce fatalities on the road. Higher levels of automation are expected to yield even better results. Fewer accidents and safer roadways mean fewer claims and a corresponding reduction in risk premiums. While the automotive insurance industry is braced for a decline in premium-based revenues, they are yet to fully understand the new types of risk that will accompany AV adoption.

FUTURE

AVs are expected to drive a $26 billion loss in revenues for insurance companies by 2035.[5] This is not quite the doomsday scenario for insurers it may initially seem. Massive disruption in the industry presents an enormous opportunity – the Accenture Connected Transport practice has identified and modeled four key new revenue streams for insurers:

- **Cyber-security risk**
  While cyber-security risk has traditionally been associated with vehicle theft via third-party telematics system entry points, in fact AVs represent an even greater risk of cyber-security attack. Hackers could theoretically take control of vehicles remotely and engage in serious cyber-physical tampering, from privacy invasion to vehicle navigation control. Insurers could respond with comprehensive coverage models.

- **Software or hardware failures**
  Because AVs require no driver intervention, the nature of liability shifts from personal to commercial product liability. Similar to the traditional collision coverage model, insurance premiums are collected to compensate in case of an accident, but the burden is on manufacturers to take full liability of the hardware and software that support vehicle operation. Thus, as we move closer to full autonomy, accident liabilities are shifted from drivers to manufacturers, who redistribute this burden across their tier 1 and 2 suppliers.
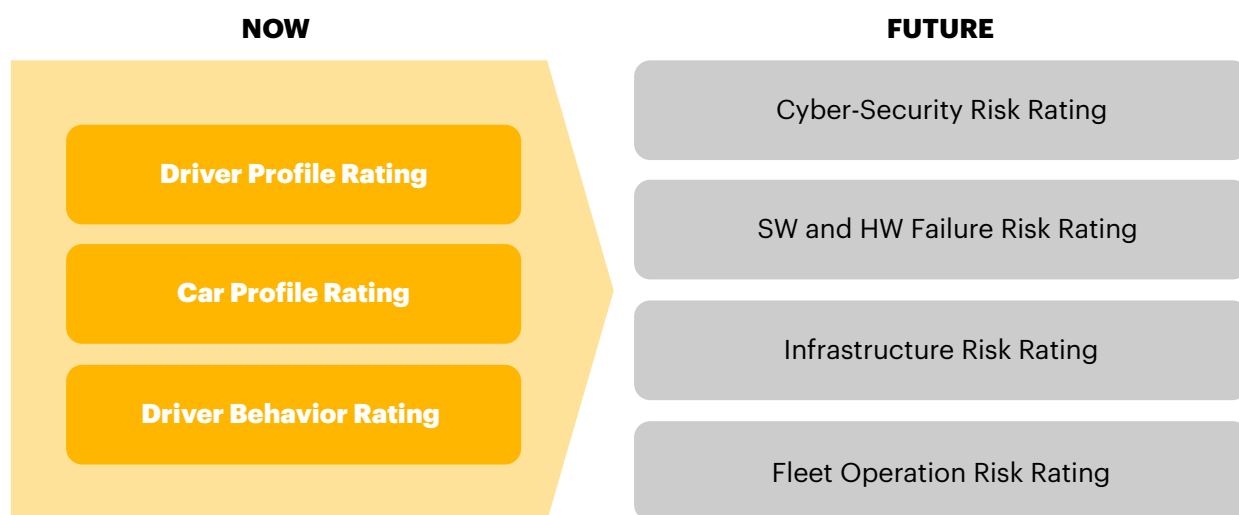
- **Infrastructure risk**
  V2X communication is key to autonomous driving – AVs must communicate with road infrastructure and other vehicles to determine their driving actions. But any communication loss or failure could result in serious traffic incidents, and will need to be accounted for as an infrastructure risk, with liability assigned to whichever entity manages road infrastructure.

- **Fleet operation liability**
  With little or no manual control in an AV, interactions between vehicle and driver are greatly reduced or eliminated. Vehicle owners will thus likely be far less emotionally attached to the idea of vehicle ownership, and consequently fewer people will own vehicles. But, in conjunction with fundamental shifts toward car sharing, this trend will present new opportunities for insurers in the fleet management space. New insurance models will be required to accommodate increasing demand for AV fleet operations.

Together, these business models will offer more than $22 billion in new revenue opportunities by 2035.[6] Insurers who pivot their businesses, and begin investing in incremental technologies, will be best positioned to capture this revenue. Those who don't will find themselves struggling to catch up in a complex and fast-paced future ecosystem.

NOW

- Driver Profile Rating
- Car Profile Rating
- Driver Behavior Rating

FUTURE

- Cyber-Security Risk Rating
- SW and HW Failure Risk Rating
- Infrastructure Risk Rating
- Fleet Operation Risk Rating

THREE STEPS TO CONSIDER NOW

ONE
To capitalize on revenue opportunities, insurers must begin to identify and invest in new, scalable insurance products and services for AVs.

TWO
As commercial and product insurance becomes increasingly widespread, insurers must build new relationships with those directly impacted – auto manufacturers, governments and tech companies.

THREE
Insurers must build internal capabilities and knowledge in telematics, advanced driver assistance systems and machine learning to capture early mover advantage and maintain market share.

CONCLUSION

These three industry segments demonstrate that the AV future is closer than it looks. Key players have already started investing to ensure they have a strategy for emerging AV opportunities. The synergies between expectation and innovation are setting the pace of AV adoption, and these early movers will have a significant role.

Nothing will change overnight, but AVs will undoubtedly bring dramatic shifts across numerous industries. Now's the time for each business to start considering the impact of AVs on its own industry and create a game plan. And now's the time to reassess collaboration models, especially with unconventional partners, to ensure a business gets a seat at the table when AVs really hit the mainstream. Act now to ensure your business is a beneficiary – not a victim – in the coming AV revolution.

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5 Accenture internal research

6 Accenture internal research

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