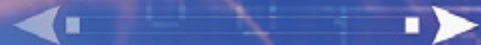




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NEWS

THE TRUE VALUE OF AUTONOMOUS DRIVING

Recent innovations will make autonomous driving a reality in the foreseeable future. This disruptive technology will make fascinating new mobility features possible, while potentially providing efficiency benefits and improving safety. As governments work to provide required infrastructure and regulatory guidelines, companies from a wide variety of industry sectors – automotive, IT, insurance, logistics, and more – are positioning themselves in this new field. All of these players hope to see benefits, but to succeed they will need to know where autonomous vehicles offer real business value and what business models are best suited to tap into this potential.

The degree of automation in cars has increased steadily over the past few years. Today's most advanced systems can take over driving during a traffic jam – as long as the driver's hands are on the wheel. There is also technology that can automatically park the car with limited input from the driver or stop the car before it is involved in an accident. In the future, vehicles will be able to make lane changes and merge into traffic on their own on the highway. Automakers also have shown that they will soon have vehicles that will be able to park themselves after the driver has left the car. Fully automated chauffeur-ing, driverless operation on highways, platooning, and highly automated driving in cities are expected to be available by 2025.

Juergen Reiner
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Joern Buss

The prevailing view is that the speed of these breakthroughs is limited by regulatory constraints and liability issues more than by the underlying technologies. Within the next ten years, two advanced vehicle types are expected to be on the road:

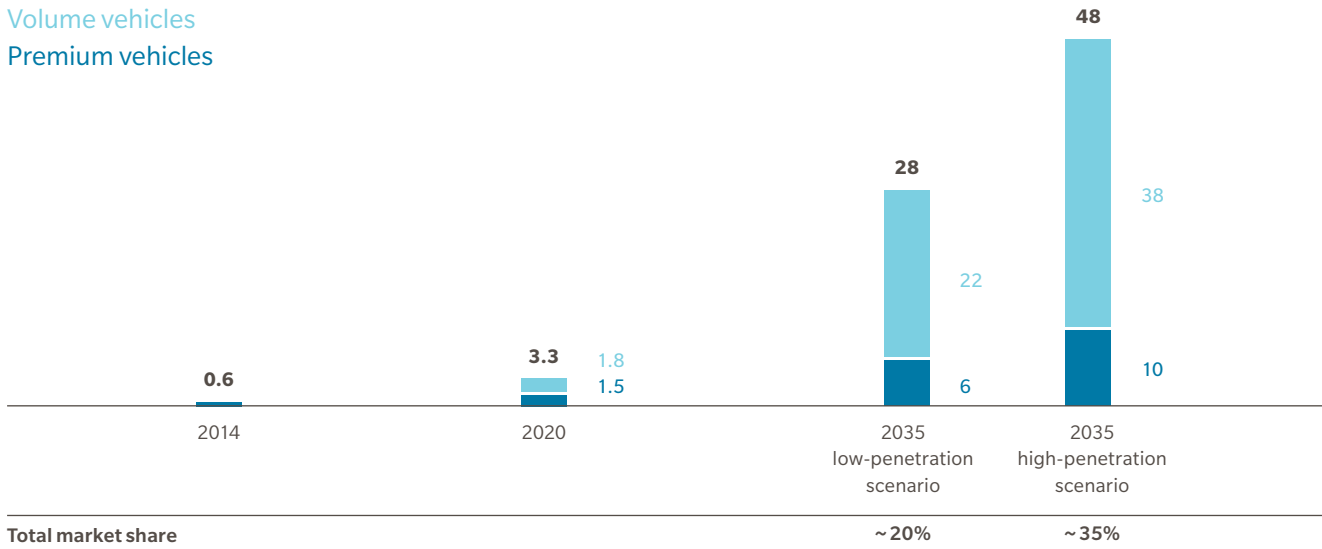
1. Fully autonomous vehicles that circulate in closed areas, such as city centers, airports, and universities with no person behind the wheel
2. Semi-automated vehicles outfitted with features that can take control on the highway or during a traffic jam, as long as there is someone in the driver's seat

This article looks even further into the future, to the year 2035, by which time a large number of fully autonomous vehicles are expected to be on the road. A key success factor between now and then is for automakers to correctly

Global production forecast for semi- and fully automated vehicles

In millions of units: passenger cars and light commercial vehicles, 2014-2035

Volume vehicles Premium vehicles



Source: LMC AUTOMOTIVE GCAT Q2/2014; Oliver Wyman analysis

anticipate the evolution of autonomous-driving regulations and insurance coverage. This will have a huge effect on market penetration. On the technology side, making functions operate seamlessly to ensure driver comfort and reducing the cost of these advanced systems are key challenges. In addition, issues such as liability, privacy, and international harmonization have to be tackled before large-scale deployment can occur.

STEADY GROWTH

Given the hurdles described above, experts forecast that there will be a mixture of semi-autonomous and fully automated vehicles on the roads in the next decade, with steadily increasing penetration of both. With a minimum starting cost of approximately US\$10,000 to equip a midsize vehicle with fully autonomous driving capability, the technology is expected to be found mostly in the premium segment and on commercial vehicles at first.

Assuming that all hurdles can be overcome, a significant portion of the passenger cars and commercial vehicles built 20 years from now will be either semi- or fully automated. Oliver Wyman's forecast shows that these autonomous cars will account for 20 to 35 percent of total global production by 2035. By then, the market segment should be well established and include many mature, experienced companies along the value chain.

NEW VALUE POOLS

As end customers get excited about how this new technology will transform transportation, companies are preparing to take part in this revolutionary trend. Which industries will benefit most? What can the various players contribute? Which business models will emerge? Will automotive firms dominate or will software giants take the lead for on-highway solutions? How can off-highway industries (agricultural, construction, and defense) profit from this innovation? And, most importantly, why would end customers adopt autonomous driving and spend money on such vehicles and related services?

To answer these questions, companies need to understand the source of future value from autonomous driving. Over the past two years, Oliver Wyman has researched multiple aspects of mobility and autonomous driving. The five largest “value buckets” have a combined estimated value of more than US\$200 billion:

Improved safety: Sophisticated autonomous vehicles are estimated to have one-tenth of the likelihood to be involved in an accident than a car operated only by a person. While most customers expect improved features in their new cars, the radical safety innovations offered by autonomous vehicles could coax car buyers to invest in high-tech options, creating a new revenue stream. End customers, however, will expect a continuous flow of innovations and will expect what is revolutionary today to become standard tomorrow, which will increase price and innovation pressure for both automakers and suppliers.

As car accident numbers decline, there will likely be a corresponding decline in traditional motor insurance premiums. In addition, vehicle insurance is likely to change from being an end-customer responsibility to a product liability for manufacturers. This anticipated shift to more specialized insurance products may be offset by a premium erosion of US\$50 billion to US\$75 billion in the global traditional motor insurance market.

Enhanced mobility: Customers are projected to be willing to pay extra for the convenience of having a vehicle that can park itself or run an errand alone. Such features might also ultimately reduce the number of cars per household, resulting in a potential decline in US vehicle sales of up to 15 percent by 2035. As mobility and related services evolve, autonomous vehicles are expected to provide motorists with more available time during the ride that can be used to plan adjacent activities, giving online advertisers another opportunity to reach customers. Integrated mobility concepts, such as using autonomous vehicles in car-sharing or car-pooling fleets, will allow for innovative B2B, B2C, and P2P concepts. Self-driving cars also will serve an untapped customer base that includes people who are physically unable to operate a vehicle. These examples show how autonomous driving will be a major enabler of the emerging global mobility services market. It is estimated that self-driving cars will enable up to 30 percent of these mobility services, resulting in a value contribution that could easily exceed US\$100 billion in 2035.

Data leverage: Big data, which describes the increasing amount of data available, collected, stored, analyzed, and monetized, and the autonomous vehicle make a perfect match. During operations, autonomous cars will generate a large volume of data that could be used by automakers or suppliers for R&D purposes or optimized, customized marketing based on a holistic customer value management approach. Autonomous vehicles could potentially expand the global market for location-based services, creating a multi-billion dollar business that could reach as much as 15 percent of the global online advertising market, assuming privacy hurdles will be overcome.

\$50 billion-
\$75 billion

Potential insurance premium erosion globally

>\$100 billion

Potential value of mobility services enabled by self-driving cars in 2035

New logistics schemes: Current logistics schemes could be turned upside down as autonomous vehicles eliminate constraints for commercial vehicles, such as driving-hour limits, resulting in higher asset utilization and improved productivity. The first step could be having autonomous vehicles take over while the driver adheres to mandatory resting hour regulations.

Improved urban infrastructure: Urban infrastructures are likely to be affected in a number of ways by the autonomous vehicle. Because of freed-up driver time and improved congestion, cities will extend further into lower density urban areas. Certain parts of the infrastructure could become autonomous-driving-only zones. And with a reduced need for parking lots within city centers, such locations could be used for other urban building purposes.

WHO WILL PROFIT?

Companies will have the opportunity to benefit from the five value buckets if they leverage the right assets and capabilities, if they can adjust to the required structure of new business models, and if they can monetize the value from end consumers, data, and/or the emerging B2B network.

The newly emerging autonomous driving value chain, which includes component suppliers, automakers, software integrators, infrastructure providers, third-party data processors, and service providers such as insurers and advertisers, involves many companies that are currently in separate business fields and that compete for the above-described value buckets. The matrix in the exhibit on the facing page shows how the different players could benefit from the various value buckets. For example, an IT company such as Google could generate additional advertising revenue by targeting drivers who are no longer forced to pay attention to the road. Innovative automakers and suppliers might benefit from offering sought-after safety relevant time-saving technology to end customers, but also could suffer if the rise of the autonomous car reduces overall vehicle production.

Automakers, suppliers, and IT companies will need to invest more in R&D to make autonomous driving a reality in a risky environment. Regulatory hurdles could slow the launch of autonomous cars and overall customer acceptance has not yet been proven.







For insurers, an extremely large global field of business is emerging where new policies will be required, but the long-term associated risks will need to be dealt with as well. Insurers likely will partly shift their business away from end customers and toward product liability for OEMs, suppliers, and mobility service providers.

Dedicated suppliers could benefit from offering the required components and technologies to equip global fleets with the new technology. IT companies (and service providers) may gain entry into the market by bringing in their data processing and service management capabilities.

SUCCESS FACTORS

Oliver Wyman has identified a range of success factors for companies that aim to play a role in autonomous vehicles. First of all, business models for the sector need to be developed similar to those found at start-ups. Test-and-learn cycles need to be institutionalized in R&D processes and data privacy and IT security need to be guaranteed.

Matrix of players that could potentially profit from autonomous vehicles

| VALUE BUCKETS | | | | | | |
|---------------|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| PLAYERS | SAFETY | MOBILITY | BIG DATA | URBAN INFRASTRUCTURE | LOGISTICS | |
| Consumer | X | X | X | X | X | |
| Automaker | (X) | (X) | X ² | | | |
| Supplier | (X) | (X) | X ² | | | |
| IT company | (X) | X ¹ | X | | (X) | |
| Insurance | (X) | (X) | X | | | |

X : directly dependent
 (X) : indirectly dependent (e.g., due to increased willingness to pay or shifting demand)

1 Especially the online advertising market
 2 Leverage, e.g., for R&D purposes

Source: Oliver Wyman analysis

Depending on their original business model and their position in the autonomous driving value chain, segment-specific success factors can be derived by the various players. Automakers, for example, need to quickly identify relevant value buckets, because they will need to help offset their high upfront R&D investments. Timely strategic partnerships will guarantee fast-acting automakers an early-mover advantage. Suppliers, on the other hand, need to provide cutting-edge technology at a competitive price. Due to the high complexity of autonomous driving technology, suppliers will need to offer automakers, especially those in volume segments, a comprehensive “autonomous driving package.” IT and software players will have to collect as much data as possible and position themselves as gate keepers for data flows between automakers and downstream service providers. Insurers will need to translate this flow of new data into relevant insights on changing claims patterns and shifting or arising demand for risk protection from both end customers and automakers.

Companies from various industries have the chance to position themselves within this promising but challenging market. Overall, rational forces are expected to shape this sector. End customers will choose mobility solutions that provide the best comfort, value, and availability. Winning players in this market will anticipate these requirements to offer tailor-made solutions.