

The evolution in self-driving vehicles

Trends and implications for the insurance industry



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Executive summary

A number of social, economic and technological trends are working together to disrupt mobility. The automotive industry, in particular, is experiencing a massive amount of change. In the not-too-distant future, fully autonomous vehicles will be the norm rather than the exception, redefining urban mobility as we know it – and they will be shared, connected and green.

The general expectation for the future is captured by a comment by Mary Barra, Chief Executive Officer of General Motors. Last year, she said: “We’re going to see more change in the next 5 to 10 years than we’ve seen in the last 50.”

These changes will not only affect the global automotive market. Perhaps the most complex challenges will be faced by the global auto insurance market which is valued at an estimated US\$700b.





An evolving competitive environment

All major car manufacturers are active in this space, with new partnerships continuously being announced. Most automakers are racing to differentiate their premium models with intelligent driver-assist functions, such as smart cruise control, accident avoidance, and crash monitoring and reporting. These efforts will hasten consumer trust in driverless technology and accelerate the proliferation of the technology for all car models.

Some manufacturers are going even further; for example, Volvo, an automaker known for safety although relatively small in terms of global sales, predicts that it will be able to eliminate crashes altogether for anyone driving one of its cars by 2020.

In addition to traditional players, new competitors are gaining traction in this space. Uber, despite recent challenges, has been testing autonomous vehicles in California. Waymo - Alphabet's self-driving company - has completed millions of miles of testing. Tesla has been increasingly adding autonomous features to its cars with each software update.

Some of these players have deep pockets that they might use to offer cheaper insurance or increased warranties, to hasten adoption and to grab market share.



A long-term game with short-term implications

Despite this high level of interest and investment, widespread adoption of completely autonomous vehicles is not expected to take place before 2030. Part of the challenge is related to regulation, with regulators likely demanding a large amount of statistical data to demonstrate increased safety. Additional challenges include the need for modern infrastructure that sensors can reliably read, security concerns, including cybersecurity, and, of course, the cost implications.

Furthermore, the expectation is that these vehicles will initially be introduced in closed ecosystems, such as city centers or dedicated highway lanes, and integration with “traditional” vehicles will occur only when safety has been thoroughly demonstrated.

While the road to completely autonomous vehicles is still long, there are several markets where uptake is expected to be faster. Over the short term, the expectation is that commercial vehicles will lead the way, specifically trucks on highways and other off-road vehicles for mining and construction. Ride-hailing companies are another niche for experimentation, as this will significantly reduce their cost base.

Incremental automation is changing the rules of the game

Certain assisted driving systems pertaining to low levels of automation – level 1 and level 2 in the illustration on page 6 – are already in place; for example, lane keeping, self-parking functionalities and autonomous emergency braking (AEB). In particular, AEB – which stops the car before it hits an obstacle if the driver does not respond in time – has been proven to reduce low-speed accidents by 20%. Other systems have also reduced accidents; for example – according to the U.S. Department of Transportation – Tesla’s Model S and 2016 Model X crash per million miles has decreased by 38% after the installation of autosteer functionality.

Even a relatively modest adoption of incremental advanced driver assistance technology, such as smart cruise control and crash avoidance, would significantly relieve congestion and reduce the number of congestion-related accidents.

Not only are the different levels and systems important because they make driving a car safer, but also they change the risk profile of the car. The expectation is that fewer accidents lead to lower premiums and, if this is not the case, manufacturers may take things into their own hands.

Tesla CEO Elon Musk made this point in a recent earnings call, saying: “If we find that insurance providers are not matching the insurance proportionate to the risk of the car, then, if we need to, we will in-source it.”

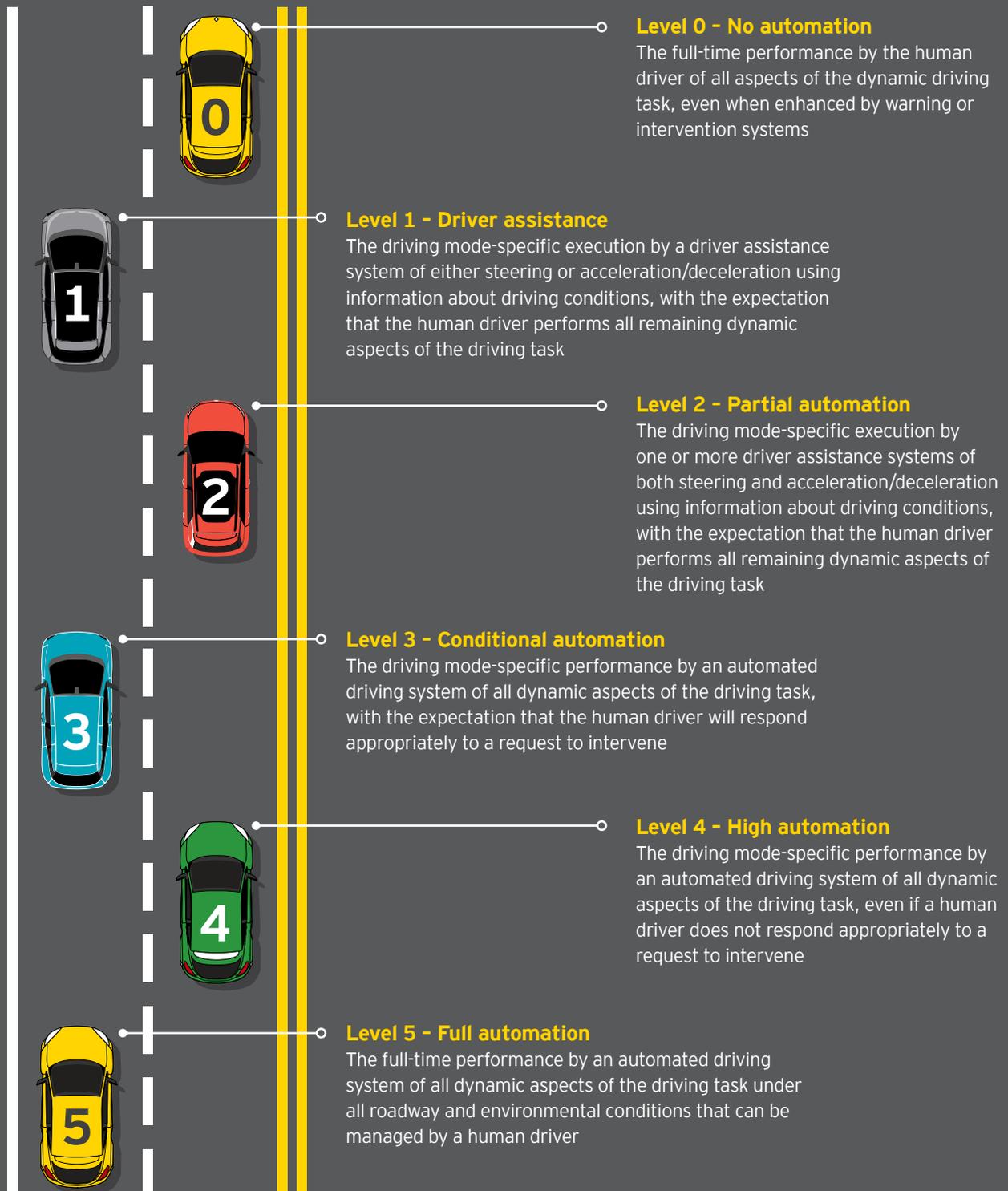
Long-term implications for the automotive and insurance industries

Overall, the expectation is that the effect of this revolution will result in reduced growth in the number of vehicles on the road, particularly in developed markets and some developing ones, such as China. In addition, the emergence of car-sharing fleets will further reduce the total number of vehicles. The combined effect will be a decline in the need for personal insurance coverage.

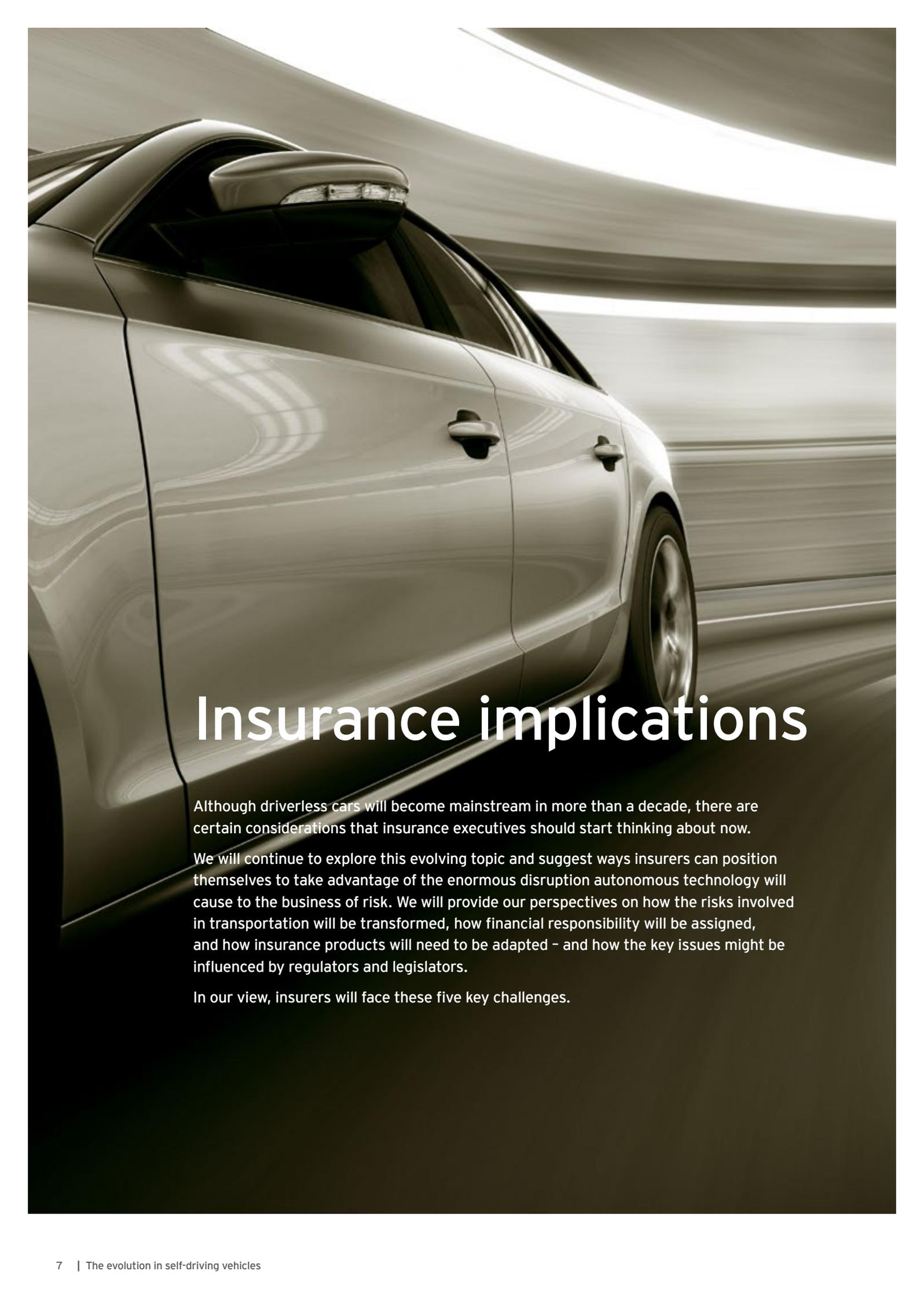
Over the long term, these changes and the reduction of risk profiles and accidents are likely to be massive. Widespread adoption of self-driving cars will eliminate a substantial number of automobile accidents, although this will likely be accompanied by an increase in severity of these accidents.

Because premiums lag actuarial data, insurers will face strategic choices. Forward-looking insurers are starting to prepare for the future. Innovators experimenting with usage (or mileage-based insurers) might create a stronghold around connected data and autonomous vehicles, nibble at the edges of the market and be best prepared to take advantage as the disruption grows.

In the journey to fully autonomous vehicles, there are several intermediate levels that are evolving and will continue to change the way we interact with vehicles. In this context, the SAE J3016* definitions offer a useful framework to understand incremental automation:



* Source: https://www.sae.org/misc/pdfs/automated_driving.pdf



Insurance implications

Although driverless cars will become mainstream in more than a decade, there are certain considerations that insurance executives should start thinking about now.

We will continue to explore this evolving topic and suggest ways insurers can position themselves to take advantage of the enormous disruption autonomous technology will cause to the business of risk. We will provide our perspectives on how the risks involved in transportation will be transformed, how financial responsibility will be assigned, and how insurance products will need to be adapted - and how the key issues might be influenced by regulators and legislators.

In our view, insurers will face these five key challenges.

Challenge 1: What risks will remain - and will new ones arise?

A primary aim of autonomous technology is to reduce the number of traffic accidents, and the public's and regulators' expectations in this area will be very high. We will examine what the residual risk of collisions could be and how the cost of injuries and repairs could change. We will offer our view on how new technologies will improve reporting of claims and change the potential for fraud.

At the same time, new risks will emerge, such as cyber attacks, software bugs and control failures. What will the exposure to systemic risks mean for insurability?

Challenge 2: Who is the customer, and how will we do business with them?

Who is liable for risk will be the key question, especially if a high proportion of remaining accidents will be attributable to failures in control software and systems. We will consider how original equipment manufacturers (OEMs) and manufacturers could become liable for claims in the future, and whether they can shift the legal or financial burden to others in the supply chain. For example, could vehicle end users be required to purchase policies to indemnify OEMs, or will the cost of product liability insurance be passed to new vehicle purchasers? If transportation is consumed on a pay-per-use basis, could insurance be wrapped into the charge?

Whatever the outcome, the current insurer-consumer relationship - along with marketing, sales and distribution methods - will be fundamentally altered. Retaining control over this relationship will be essential if insurers are to avoid becoming redundant or marginalized by other players.

Challenge 3: How will the insurance product have to change?

Changes in liability and use will necessitate major revisions to the insurance products to meet the market's needs. We will examine how autonomous products can be developed and configured to cover gray areas of liability and negligence resulting from the overlap between human and computer control. Would product tiers correspond to the "one-to-five" scale of the vehicle's automation capability? Pay-per-use (versus "blanket" cover) could imply that short-term rather than annual renewable policies would become the norm - and lessons learned from current ride-sharing products could be employed. How will regulation affect or keep pace with the new products? Considerations for commercial lines might be significantly different when the rate of adoption is expected to increase the fastest and different technologies and enhanced safety overrides could be economical to deploy.

Challenge 4: How will we price it - and can it still be profitable?

The relative importance of different rating factors in pricing will change markedly. First, analysis of risk would depend primarily on the degree of self-driving versus manual control. For autonomous operation, pricing would be based on assessing the vehicle's level of automation in terms of its technology, quality of implementation and anticipated types of driving. There are nuances between manufacturers even for relatively basic, standardized technologies, such as AEB. For example, fuller automation capability may vary depending on the OEM, sensor quality and software used. How would data on the technical capability and usage statistics be collected? Could this be centralized in some way and retrieved transparently by insurers, rather than having to be disclosed?

The economics of the product will also be very different given a much reduced number of claims, and we will examine the speed of change, the resulting size of the market over time and the return on capital it might sustain compared to the present. Key questions will be to what extent this might be offset by increased overall demand for transportation, given the surge in accessibility of car transportation combined with the anticipated benefits to congestion. Could any alternative, discretionary coverages become more relevant?

Challenge 5: What influence will legislators have?

A large number of agencies are managing pilot programs and their policies will have a major influence by encouraging or inhibiting adoption in each different country. We will give an overview of the current progress in each jurisdiction and highlight leading models that we foresee will become the templates for broader rollout.

Starting from an overview of the applicability of current insurance legislation to autonomous vehicle operation, we will review how legislation is likely to guide the cover and scope of autonomous insurance products in the future and the likely compulsory minimum cover requirements.

Conclusion

As we have seen, autonomous vehicles will revolutionize mobility and inevitably automobile insurance. While we cannot predict the pace of these changes, we encourage insurers to prepare accordingly.

The lessons from other industries are stark. Companies content to wait and see, or worse - are oblivious to the threat until it is too late - could share the familiar fate of other household names that have been left behind by a wave of new technology.

In considering the next steps, insurers should analyze their business portfolios and strategies to understand their exposure to these changes. They should conduct what-if scenario analysis to model potential effect and evaluate what actions will be required to transform their organizations in parallel with various levels of car automation.

Early innovators are likely to generate substantial benefit for their businesses. To be successful in this space, insurers will need to aim for agile innovation and improve the way they use increasing volumes of data. They should also explore new collaborative models to shape a connected automotive ecosystem that will include insurers, auto manufacturers, technology companies and regulators.

Our deep sector knowledge, extensive contact base, broad experience and vast resources make EY perfectly positioned to support insurers in this once-in-a-generation transition.

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