

INSURANCE FOR THE
UPCOMING
AUTONOMOUS
VEHICLE. WHO
TAKES THE FALL?

Abstract

Autonomous vehicles (self-driving vehicles) are hitting the road. The autonomous vehicle market is expected to reach \$65.3 billion by 2027. The industry is intriguing, but it is also leading to new risks and insurance issues.

Nevertheless, many companies are investing on the future of self-driving: Tesla already has launched cars with the feature of autopilot and are expected to launch fully autonomous vehicles by 2020, Uber has already begun testing self-driving cars on public roads, Ford is expected to have a fully autonomous vehicle for the public by 2021, Google and Apple are working on making it possible too.

All vehicles need insurance, and autonomous vehicles are no exception. Supporters of autonomous vehicles point out that the technology has the potential to make our roads significantly safer. This is indeed one of the huge attractions of self-driving technology. A study found that 94% of motor vehicle crashes are caused by driver error and the other 6% of crashes are caused by the vehicles themselves, the environment, and other reasons.

However, autonomous vehicles bring new risks with them. We know that human drivers can make mistakes, but we shouldn't assume that self-driving vehicles will be incapable of errors. The software could misinterpret the data it receives or malfunction which could result in severe accidents. The risk of breaches into the software of the car is enormous. A data breach could reveal sensitive user information, including information on travel patterns. Even once the technology is perfected and the regulations are ironed out, consumers will have to be convinced that autonomous vehicles are safe. According to a survey in America, in 2017 63% of American drivers surveyed said they would be too afraid to ride in a fully self-driving vehicle; in 2018, that figure increased to 73%. Safety concerns aren't the only barrier to consumer acceptance. The technology also threatens to put many people including taxi and truck drivers out of work. And driving is a major part of the modern culture, so millions of drivers will lose their jobs.

The causes of crashes with autonomous vehicles will change: Driver error will not be an issue, while product liability will become an issue. This would shift the blame away from drivers and towards the manufacturers and the licensor of the software that drives the vehicle.

The claims will also improve as when the car crashes, all the details would be recorded by the car's software. This would reduce fraud of staging an accident. Insurers will have a ton of data for the claim filed and they will be able to administer it effectively.

Ultimately, it comes down to the cause of crash. By analyzing the data of the crash provided by the vehicle's software, insurers will cost the person at blame. The costs, however, are assumed to be high due to the expensive repairs of the vehicles and the autonomous features.

Table of Contents

The Autonomous Vehicle Industry.....	1
Technology in the making of the Autonomous Vehicle	2
Insurance for Autonomous Vehicles.....	5
Who does the onus fall onto?.....	6
Pricing the Insurance and the role of Manufacturers.....	8
References	9

The Autonomous Vehicle Industry

The automobile industry is constantly growing like any other industry. New concepts are being launched every other day: from fuel efficient cars to fully electric cars and to self-driving cars. Autonomous car (self-driving car) is programmed to read and sense the environment and its surrounding and to operate accordingly, without human interference.

Currently, many companies are investing on the upcoming autonomous vehicle industry. Numerous companies have been working on their prototypes to bring autonomous vehicles into the real world. The world market for the autonomous vehicles is predicted to grow exponentially in the years to come. It is proposed that the world market will grow over compound annual growth rate of 26.2% during the period 2016 to 2027 from \$3.6 billion to \$65.3 billion.¹

Technology in the making of the Autonomous Vehicle

The spectrum of the technology is categorized from dependent on human control to fully autonomous.

- **Level 0 – No Automation:** The automated system issues warnings but does not have any vehicle control. The human driver executes steering, acceleration/deceleration, monitoring the environment, and performing dynamic driving tasks (operational and tactical aspects of driving, such as steering, braking, changing lanes, using signals, etc.).
- **Level 1 – Driver Assistance:** The automated system shares control of the vehicle with the human driver. Both can execute steering and acceleration/deceleration. While only the human driver can monitor the environment and perform dynamic driving tasks. Some driving modes (cruise-control, auto-pilot, etc.) are offered.
- **Level 2 – Partial Automation:** The automated system shares control of the vehicle with the human driver. The automated system is able to take full control of the vehicle. Although the driver must be cautious and be ready to take control at any given moment. The system executes steering and acceleration/deceleration. While only the human driver can monitor the environment and perform dynamic driving tasks. Some driving modes are offered.
- **Level 3 – Conditional Automation:** The automated system shares control of the vehicle with the human driver. The system is capable of driving the car itself, but only under ideal conditions. The system executes steering, acceleration/deceleration, and

monitoring the environment. While, the human driver performs dynamic driving tasks. Some driving modes are offered.

- Level 4 – High Automation: The automated system shares control of the vehicle with the human driver. However, the human driver's attention is not required for any circumstance, the system can drive safely. But this is only limited to spatial areas or under special circumstances. The system executes steering, acceleration/deceleration, monitoring the environment, and performing dynamic driving tasks. Some driving modes are offered.
- Level 5 – Full Automation: The automated system has the complete control of the vehicle. No intervention from the human driver is required. The system executes steering, acceleration/deceleration, monitoring the environment, and performing dynamic driving tasks. All driving modes are offered.²

There are mainly three technologies that are used in the autonomous vehicle: sensors, connectivity, and software/control algorithms. Sensors are used in advanced safety features such as blind-spot monitoring, lane-keep assistance, and forward collision warning. Connectivity allows the car's software to have the latest traffic, weather, surface conditions, construction, maps, adjacent cars, and road infrastructure. Software algorithms control these sensors and connectivity to gather data required to make decision on steering, braking, speed, and route guidance.³

Google and Tesla have made groundbreaking advancements in the industry of self-driving vehicles. Google uses lidar sensor technology. Lidar utilizes ultraviolet (UV) or infrared (IR) light to measure an image of the objects and creates a map of the surface at high resolution.⁴

Tesla's autopilot operates by using cameras, which allow the car to track the position of cars and any obstructions around the car and then the car can maintain the speed and steer accordingly.

Insurance for Autonomous Vehicles

Advancements result in advanced problems. With the introduction of autonomous vehicles, accidents caused by human errors, which cover up to 94% of the accidents, will end. However, the other 6% of the accidents which are caused by the cars' defects will persist. Along with that as the vehicles get advancements, new risks will arise that could cause fatal accidents. Therefore, like every vehicle, autonomous vehicles also require insurance.

However, the problem that has arisen is that who takes the blame if an autonomous vehicle is found - will the owner of the vehicle be liable, or the manufacturer of the vehicle, or the software provider for the automated vehicle - in a car crash and that what would be charged as premiums for the autonomous vehicles, it cannot be the same as the conventional vehicles due to the tremendous fall in the frequency of accidents.

Who does the onus fall onto?

Firstly, human drivers do make mistakes but we must not expect that the automated system will not make any mistakes or will not malfunction. There are various obstacles to implement the use of autonomous vehicles. Possible obstacles for the implementation of autonomous vehicles are:

- The existing roads, highways, and city streets will be used by the autonomous vehicles. However, the roads have not been developed for the autonomous vehicles to operate and therefore, might lead to severe accidents.
- The automated system can potentially be compromised or hacked, along with communication system between the cars.
- The automated system might malfunction due to possibly a glitch or a weather condition.
- An increase in the exposure to electromagnetic field radiation could hurt the health conditions of the living beings.
- The automated system would be startled in the situation where collision is inevitable and the least costly choice has to be made, such as hitting a pedestrian or a car.⁵
- With the implementation of automated vehicles, taxi drivers and bus drivers would lose jobs and it will hurt the economy.

Fortunately, sensors and cameras on and in the car can be used to collect essential data about the accident, which would help the insurers by assisting them in the claims process. Insurers would be allowed to analyze the data and call on the body that is liable i.e. the owner, the manufacturer, or the software provider of the autonomous vehicle.

Moreover, fraud would be diminished or nearly eliminated in providing the wrong details of the accidents.

Pricing the Insurance and the role of Manufacturers

The insurance for autonomous vehicles is thought to be charge lower premiums than the conventional cars, as there will be a substantial reduction in the number of accidents. Insurance firms are expected to lower their prices in order to stay competitive in the industry. However, as the high-tech parts for the autonomous vehicle are very expensive and it requires expertise to be able to repair the car, restoration of the car is expected to be extremely expensive. Currently however, according to Bloomberg, an entrepreneur wanted to know how much it would cost to insure a Tesla (Autonomous Vehicle) and the quote he received was of \$10,000 per year.⁶ According to a study, the national average cost of car insurance is \$1,600 per year.⁷

However, the consumers will no doubt demand lower premiums due to fewer accidents. So, in order for the insurance firms to provide lower premiums, they will either have to move out from the industry of autonomous vehicles and let the manufacturers of the vehicles insurance their cars or they will have to partner with the manufacturers and provide insurance to the consumers who own the autonomous vehicles. As the manufacturers already have the parts and the skills required for the repair, it will not lead to a loss for them to provide insurance for their manufactured autonomous vehicles due to the number of accidents being substantially low. As a matter of fact, Tesla has launched their insurance service for Tesla vehicle owners.⁸

References

- ¹ <https://www.marketwatch.com/press-release/autonomous-vehicles-market-size-industry-growth-share-opportunities-emerging-technologies-competitive-landscape-future-plans-and-global-trends-by-forecast-2023-2018-07-31>
- ² https://cdn.oemoffhighway.com/files/base/acbm/ooh/document/2016/03/automated_driving.pdf
- ³ <https://www.fi.edu/science-of-selfdriving-cars>
- ⁴ <https://www.azosensors.com/article.aspx?ArticleID=1110>
- ⁵ <https://www.technology.org/2019/02/26/top-5-dangers-of-self-driving-cars/>
- ⁶ <https://foundersshield.com/insurance-for-autonomous-vehicles-self-driving-cars/>
- ⁷ <https://www.nerdwallet.com/blog/insurance/car-insurance-basics/how-much-is-car-insurance/>
- ⁸ <https://www.cNBC.com/2019/08/28/tesla-starts-selling-its-own-car-insurance-in-california.html>