



TRANSFORMACIJA OSIGURANJA SA ASPEKTA RAZVOJA AUTONOMNIH VOZILA TRANSFORMATION OF INSURANCE FROM THE ASPECT OF THE DEVELOPMENT OF AUTONOMOUS VEHICLES

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Sažetak

Proizvođači vozila čine velike korake u razvoju samovozećih automobila koja ne štete klimi. Cilj svih, bilo da se radi o velikim industrijskim kompanijama ali i startapima, jeste da inovativnim tehnologijama i razvojem telekomunikacija što pre dođu do vozila koja će biti samovozeća i koja neće emitovati štetne gasove. Udeo vozila u prodaji raste iz godine u godinu. Za očekivati je da će proklamovani ciljevi biti ostvareni u najvećem broju razvijenih zemalja. Samovozeća vozila nude veliki potencijal za poboljšanje efikasnosti puteva, smanjenje saobraćajnih nesreća, povećanje produktivnosti i minimiziranje našeg uticaja na životnu sredinu. Gledajući unapred, elektronska vozila su sve više na putevima, dok su automobili bez vozača i dronovi za dostavu spremni za šire usvajanje u budućnosti. Autonomna vozila će verovatno biti sledeća faza u nastavku transformacije osiguranja automobila. Stoga, autori ovu temu smatraju aktuelnom, kako sa ekonomskog, tako i sa pravnog aspekta.

Abstract

Vehicle manufacturers are making great strides in developing self-driving cars that don't harm the climate. The goal of everyone, be they large industrial companies or startups, is to reach vehicles that will be self-driving and emit no harmful gases as soon as possible through innovative technologies and the development of telecommunications. The share of vehicles in sales is increasing year by year. The proclaimed goals are expected to be achieved in the largest number of developed countries. Self-driving vehicles offer great potential to improve road efficiency, reduce traffic accidents, increase productivity, and minimise our environmental impact. Looking ahead, electric vehicles are increasingly on the roads, while driverless cars and delivery drones are seemingly poised for more widespread adoption in the future. Autonomous vehicles are likely to be the next stage in the continued transformation of motor insurance. Therefore, the authors consider this topic to be relevant both from the economic and legal aspects.

Ključne reči: samovozeći auto, autonomno vozilo, osiguranje, praksa, značaj

Keywords: self-driving car, autonomous vehicle, insurance, practice, importance

Introduction

Many scientists will agree with the claim that the discovery of the wheel is the most important in the history of the human race, because most modern devices use it in their mechanism. Motor vehicles were initially used to transport goods in order to reduce transport time, but later other values of cars became more apparent. According to available data, the number of cars has doubled every 20 years since 1970. If this trend continues, it is estimated that by 2030, two billion cars will have travelled on world roads. The dream of autonomous vehicles is almost a century old. Ever since the concept was unveiled at the New York Motor Show in 1939 under the auspices of General Motors, industrial giants have been racing to produce a truly autonomous vehicle and market it.

Today, thanks to the development of Artificial Intelligence (AI), the dream of self-driving cars is at hand. The day when autonomous vehicles will dominate the roads is approaching.

Insurers need to focus today on what is expected in 15-20 years. Cars are becoming not only a means of transportation from point A to point B, but channels for new personalized services for car owners and mobility users alike, in turn creating new business opportunities for both car manufacturers and the insurance sector. From the creation of the car until today, the insurance business has developed rapidly, observed not only in terms of volume but also the quality of services.

Indicators such as: the number of insured persons, injured parties, types of damages, the international character of motor third party liability insurance and other specifics of motor insurance have made the insurance business especially important and highlighted the need for its permanent adaptation to modern needs of society.

Vehicles of the 21st century

The first motor insurance policy was written more than a century ago - the basic insurance model has not changed much - a contract usually protects the vehicle owner and driver if the vehicle is involved in a collision, stolen or otherwise damaged. Nowadays the future of mobility seems ready to undo that model and change almost everything about car insurance, who the customers are, what products they require and how to place them. Autonomous vehicles have the potential to alleviate traffic congestion, improve air quality and provide better road safety if designed and used thus. AVs are tested on public roads around the world and will eventually create a predicted market of \$ 7 trillion by 2050. The COVID-19 crisis has accelerated the urgency of investing in automated mobility systems that serve the movement of people and goods.

From the beginning of the development of motor vehicles until only half a century ago, it was not difficult for each of us to classify cars. Quite simply, all motor traffic of that time was divided into two major categories: passenger cars and trucks. And in accordance with the type of engine they use, petrol and diesel vehicles. Today, there is a division of all cars in the world according to European, American and Asian classification systems. It is common in Russia to use the European version.

According to the European Commission, the division is as follows: A class is superminis - "microcars", B class includes small cars - "city cars", C class- small family cars, D class - large family cars, E class are large - "business" cars, F class luxury cars. There are also: S class - sports cars (coupes, convertibles, roadsters), M class includes "multipurpose vehicles" (minivans, compact vans, micro vans, UPV) and J class which includes crossovers, SUVs and trucks.

In the last few years, we have witnessed great changes in the car industry, which has largely entered the electric and autonomous era, and at the same time very quickly and easily renounces the technology of the "past". The future is no longer just electric - it is also autonomous.

Self-driving cars

The terms "self-driving" and "driverless" as well as "automated" and "autonomous" are generally used as interchangeable, but there is a difference. In order to better understand and differentiate, we will start from the concept of vehicle automation. The Society of Automotive Engineers (SAE), identifies six separate levels (L0-L5) ranging from fully manual to fully automated systems. This classification system is based on the split of responsibility between the human and the computer system, from all human responsibility at L0 to all computer responsibility at L5, figure 1. [1]

Level 0 refers to automobiles that have no automation whatsoever, whereby the driver performs all actions and driving tasks.

Level 1 refers to the driver assistance stage, whereby the vehicle is still controlled by the driver, but there are some features to assist the individual in their driving.

These exist today in vehicle warning systems, such as blind spot detection, back-up detection, and lane departure detection.

Level 2 refers to partial automation, where there is driving automation in certain aspects of the driving experience, i.e., acceleration and steering, advanced cruise control, parking assist, lane keep assist, and automatic braking. However, the driver needs to remain fully engaged throughout and take over if necessary.



SAE J3016™ LEVELS OF DRIVING AUTOMATION

	SAE LEVEL 0	SAE LEVEL 1	SAE LEVEL 2	SAE LEVEL 3	SAE LEVEL 4	SAE LEVEL 5
What does the human in the driver's seat have to do?	You are driving whenever these driver support features are engaged – even if your feet are off the pedals and you are not steering			You are not driving when these automated driving features are engaged – even if you are seated in "the driver's seat"		
	You must constantly supervise these support features; you must steer, brake or accelerate as needed to maintain safety			When the feature requests, you must drive	These automated driving features will not require you to take over driving	
What do these features do?	These are driver support features			These are automated driving features		
	These features are limited to providing warnings and momentary assistance	These features provide steering OR brake/acceleration support to the driver	These features provide steering AND brake/acceleration support to the driver	These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met	This feature can drive the vehicle under all conditions	
Example Features	<ul style="list-style-type: none"> • automatic emergency braking • blind spot warning • lane departure warning 	<ul style="list-style-type: none"> • lane centering OR • adaptive cruise control 	<ul style="list-style-type: none"> • lane centering AND • adaptive cruise control at the same time 	<ul style="list-style-type: none"> • traffic jam chauffeur 	<ul style="list-style-type: none"> • local driverless taxi • pedals/steering wheel may or may not be installed 	<ul style="list-style-type: none"> • same as level 4, but feature can drive everywhere in all conditions

Figure 1. Levels of driving automation [1]

In Level 3, an automated system can do both actually conduct some parts of a driving task and monitor the driving environment in some instances, but the human driver must be ready to take back control when the system requests. Level 3 refers to 'conditional automation', where the vehicle is given "more control".

Level 4 depicts high automation of the vehicle. The vehicle has the capacity to respond to most aspects of the driving experience, leaving almost full disengagement of the driver. These

systems are currently being tested by Google, Uber, Apple, and Samsung. Additionally, these systems have been tested in trucks by Volvo, Otto (Uber owned) and Daimler (Mercedes Benz). Level 5 - the vehicle is 'capable of performing all driving functions under all conditions' (NHTSA 2017). Based on these policy definitions, an autonomous vehicle at levels 4 and 5 certainly is self-driving, but a self-driving vehicle at level 3 is not autonomous as it is limited in the operating environment and requires a human driver that can take control when needed.

Cars with self-driving capability are currently available, with car manufacturers continuing to add this feature to more models each year. Analysts predict that by 2030 autonomous vehicles will be in use in cities and urban areas.

Self-Driving vs. Driverless

There are differences in the meaning of the terms "self-driving" and "driverless". "Self-driving car" is a term used to encompass the whole idea of a car doing part or all of the job of moving a car from point to point. It is a more general and inclusive term. All driverless cars drive themselves; all self-driving cars are not without drivers.

Driverless cars are those defined as level 5 cars. A car without a driver can not only fully monitor what is happening around it and react safely, but it can also do so without a man in the driver's seat. It is likely that such cars will have neither steering wheels nor pedals in the future. With this type of car, the whole automotive transportation's safety, security and efficiency are increased and the human errors can be eradicated whilst the drive is made to its best. [2]

Autonomous vs. Automated

There really is no such thing as an autonomous car, because the word "autonomy" implies decision-making. It has become a catchall for anything related to a car that can do some or all of the driving by itself. One of the definitions for an autonomous car is: "Autonomous car (also known as driverless car, self-driving car, robot car) and unmanned land vehicle is a vehicle that is able to feel the environment and move without human contribution.

A truly autonomous car would decide the destination and route, as well as the control within the lanes. The automated vehicle will follow destination and route commands and can only adopt some lane keeping or tracking instructions. A "real" autonomous car would be the one we ask to take us to work, and it decides instead to go to the beach, for example. Today, nearly every car that can navigate lanes or traffic or mind speed limits is technically an "automated" car, not an "autonomous" car.

A vehicle with autonomous technology is automated; but unless it is driverless, it is not really autonomous — and even then, if you picked the route, isn't that more automated? Autonomous and automated clearly do not mean the same thing, but because autonomous is being applied to such a broad range of automation, the meanings are fuzzy at best. Semi-autonomous is closer to reality, because some systems can make decisions with the driver's permission — forward-collision and automatic braking are good examples. It is important to note that some producers have already publicly stated that they will undertake the related obligation liability for any accidents that may occur while their vehicles are operating in autonomous mode.

Advantages and Disadvantages of Driverless Cars

Overcoming technological hurdles is not enough for autonomous vehicles to take off. Securing public support is vital as well. People need to feel comfortable about riding in an autonomous vehicle in order to use them and buy them. Although over 40 percent of customers worldwide would be willing to use fully autonomous or semi-autonomous cars, they still have some concerns. More than half of the customers are worried about the safety of autonomous cars and over 30 percent are not sure whether the technologies necessary for autonomous vehicles to operate are advanced enough. [3]

There are many arguments in favour of self-driving cars, but also a lot of questions that show that this path is not easy at all. In the following figure 2 there are just some of the comments that go for and against autonomous vehicles. [4]

Advantages and Disadvantages of Self-Driving Car

- As machines do not get tired and make very rare mistakes, the probability of a reduction in the number of car accidents is very certain
 - *which would lead to a drastic reduction in fatal traffic accidents*
 - People with disabilities or older citizens and childrens be able to experience the freedom of solo car travel
 - *Self-driving vehicles will reduce energy consumption, especially in the transport industry*
 - Self-driving cars could reduce the number of car thefts
 - *This would allow drivers to continue traveling despite interference or fatigue*
 - Drunk and drugged driving would also become a thing of the past
 - *Commute times could be reduced drastically*
 - With fewer associated risks, insurance premiums for car owners would go down drastically
 - *Difficult maneuvering and parking would be quicker, less stressful and require no special skills*
 - A computer malfunction could easily cause a far worse accident than anything human error might typically incur
 - *If the car crashes without a driver, who's fault is it: the software designer or the owner of the vehicle?*
 - The cost of driverless cars is still prohibitive for the average person.
 - *Driverless vehicles have been shown to have difficulty operating in certain types of weather.*
 - GPS and other technologies might not register obstacles like potholes, recent changes in road conditions, such as roadworks, or a public event.
 - *The road system and infrastructure would need radical upgrades for driverless vehicles to operate efficiently on them.*
 - Rural communities would likely be the last to receive this benefit.
 - *It wouldn't stop traffic jams*
 - Autonomous cars have great trouble distinguishing and determining the intentions of human drivers on the roads
 - A major challenge for regulators and the insurance industry
- Sources: Author

Figure 2. Advantages and disadvantages of a self – driving car [4]

The Impact of Self-Driving Cars on Motor Insurance Industry

Business insurance sphere is very orderly, implying certain rules of conduct between participants. [5] The insurance industry, especially the car insurance sector as well as the automotive industry are undergoing a significant transformation. Rapid development is happening on the technological side, such as e-mobility and automated driving, or on the business model, the shift from ownership to use. Insurance must be developed to cope with these developments and the challenges that arise in pricing and resolving claims.

Although the addition of a large number of safety features in cars has not led to a drastic reduction in the number of car accidents, the fact is that the number of deaths related to accidents has significantly decreased. According to the forecasts of consulting companies, by the middle of this century, 80% of the sales of new vehicles will be self-driving vehicles, which will greatly reduce traffic accidents. Autonomous cars are expected to lower the price of insurance premiums, but demand for liability insurance is expected to rise.

At this time, it is difficult to determine the effect of self-driving cars on the insurance industry, it can be concluded that the changes will be gradual and that insurers have time to react and adapt to new situations. If we are wondering whether driverless cars will mean the death of

the car insurance sector, the answer is certainly no. It is more likely to force the industry itself to evolve. Below are a few possible scenarios that could happen as motor insurance adapts to autonomous vehicles. Based on current forecasts, it is concluded that accommodations to construction and operation of roads and cities will not have to be done at this time, however this is the time to develop strategies to enhance positive outcomes and mitigate negative impacts automated and self-driving cars may pose. [6]

1. Insurance Rates Will Drop. As we know, the road to autonomous vehicles is gradually going through five levels of automation. Most cars today have automation level 1 or 2: cruise control, electronic stability control, advance collision warning, automatic emergency braking and self-parking. If we are really heading towards the world of autonomous vehicles of level 5, there will be a period in which both cars driven by people and cars that drive themselves will share roads. The risk for insurers will remain high. As self-driving cars become commonplace and lead to lower rates, insurance companies will have to change their business model to survive. As driverless car technology moves towards the highest level of automation and an increasing number of self-driving cars enter the road, traffic accidents and technology costs will be significantly reduced. As a result, insurance premiums will fall, and providers will have to change their business models to survive.

The EU, recognising the importance of Event Data Recorder (EDR) for accident investigation and enhancement of road safety, has made them mandatory for new vehicles in the EU, under Regulation (EU) 2019/2144 on type approval requirements for motor vehicles.[7]

2. Shifting liabilities. Experts predict that in the case of autonomous cars, the responsibility in the collision will be transferred from the driver to the product. This means that manufacturers and suppliers will be responsible for the accidents caused by product defects in the car.

So far, car insurance has brought a large part of the income to insurance companies. The U.S. auto insurance industry generates about \$ 220 billion in annual revenue. It is predicted that this could fall by a whopping 60% by 2040. Autonomous vehicles will certainly play a role in the decline in revenues for the insurance industry as a reduction in car insurance premiums is expected.

However, this does not mean the collapse of the auto insurance industry. If the product, and not the person, is responsible for the accident, it is logical that the manufacturer is responsible. The shift from consumer to producer responsibility will keep the insurance industry afloat. And as drivers become less responsible for road safety, greater risk of responsibility will be taken by manufacturers, component suppliers and technology companies involved in building autonomous vehicles and the software that controls them.

3. Cyber-security coverage. As vehicles become increasingly automated, the use of hardware and software built into them increases over time. Thus, the risks associated with cybercrime such as cyber theft, ransomware, hacking and misuse of car-related information might also rise. Owners of driverless cars will be expecting insurance agencies to cover the cybersecurity threat, similar to more familiar subjects like accidents and theft. As a result, future companies will likely include or offer additional coverage options for cybersecurity to customers as part of their auto insurance policy.

4. Infrastructure insurance. Factors like cloud server systems, signals, and other safeguards that will be put up for the protection of riders and drivers will offer a hefty annual revenue potential in premiums. The need to insure and secure the public infrastructure is likely to be vast, but governments might 'self-insure' these risks and thus the opportunity for commercial insurance is likely to be lower.

5. No-Fault Liability May Become Standard. No-fault liability may become standard practice. In a world of self-driving cars there is no reason to think collisions will never happen. Faulty technology can cause crashes or cause a car to misjudge distances and hit another car or object. Insurance will still be required to repair damaged vehicles. And these repairs will be costly when high-tech components need replacing.

Additionally, car crashes may decrease with autonomous vehicles, but other risk factors remain. Car break-ins and theft will still occur. Inclement weather and other road hazards will still present dangers. Insurance will still be needed for these risks.

6. Data-informed payouts. Self-driving cars present unique opportunities and challenges in claim processing. On the one hand, autonomous car technology will make it easier to collect valuable data, such as accident timelines and the cars at fault. On the other, insurance providers will need to analyze this information and invest in new data management systems. The reliance on technology for claim-support information will also lead to a heavier emphasis on IT systems, and software solutions will likely take over the work of a claims professional. Eventually, determining and issuing payouts could be entirely automated.

Insurance performance is a crucial feature shaping the demand for insurance coverage.

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In order to remain competitive in the new business and economic environment, banks, institutions, financial services and insurance companies need new strategies and practices. [9] For the longer-term period, which accounts for the emergence of the pandemic environment, the market premium, operating profitability, and conservative investing policy delivered positive factor premiums. [10]

Conclusion

As the automotive industry moves towards total automation, so the insurance industry, which is claimed to be slowly adopting new technologies, needs to work "in parallel" on its automation. As one of the latest trends in the field of insurance, the blockchain offers many benefits to both consumers and insurers. While some startups use the blockchain to protect against real-world risk, others, such as Lloyd's of London, use it to protect crypto assets.

An advantage of using blockchain is its ability to provide financial records without having access to them directly. In this way, law enforcement agencies could see critical information relating back many years, all the way to the first purchase of policies. Blockchain leaves no room for corruption. It also provides customers with a great deal of fairness because insurance companies will be unable to conceal their earnings.

The insurance industry could save billions of dollars by cutting out administrative costs through automation. Furthermore, the user experience would be more convenient for customers since they would not need to file claims or deal with long calls waiting on hold. Some experts, believe insurance will eventually become fully automated by connecting to the internet of things (IoT) and artificial intelligence (AI) to handle all aspects of insurance alone. Insurtech companies are disrupting traditional insurance models by taking advantage of modern technology, and one of these is blockchain. Not only can blockchain help decrease costs for insurers when issuing policies, but it can also increase transparency between all parties involved.

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