

A SELF DRIVE TO UTOPIA

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ABSTRACT

This study expansively explores into the emerging sector of transportation segment showcasing the intricacies and opportunities of autonomous vehicle technology (AV). The paper prima facie focuses on the government regulations, transportation policies, insurance, policy challenges and liability that surfaces as a consequence of such AV's. It also focuses on the benefits that are procured from AV's on the general public pertaining to accessibility and the transportation expenses incurred and the effect of such. This study analyses the current market of AV's and the liability of such manufacturers on the general public. It also states whether AV's provide a greater opportunity for an efficient road transportation system with intelligent routing system.

Several outcomes are identified regarding the adoption of such technologies primarily focusing on the legal aspect and then the social adoption through which the adoption of such technology could be analysed and stated as beneficial or harmful. The paper investigates on the most important element of autonomy, the choice which is an essential aspect that demarcates a human to a machine and on how such choice would provide the essence of legal framework around such technology.

This study contributes to the literature on various fronts (i) it brings about an opportunist approach on the on future opportunities as well as possible hurdles associated with AV technology (ii) it effectively states the liability clause that is associated as an hurdle in the implementation of the technology (iii) It states the progress and efficient development of the technology and its implementation and finally (iv) The regulations and legal frame work in existence or legal framework being formulated by various countries on AV'S.

This paper shall hence would comprehensively analyse the effects of the driverless future, and the economic, social, environmental and legal ramifications arising thereof.

INTRODUCTION

Technology is always at a brink of evolution, there is constant innovation and creation of new ideas. Henry ford introduced the first functional automobile the model T in 1908 and it has been an uphill ever since through constant evolution in the area. autonomous vehicles or AV's are vehicles which function through Automated driving systems (ADS), These vehicles eliminate the human factor which is omnipresent and make the navigation more efficient and intelligent.

In 2015 in the United States there have been 7.2 million motor vehicle-related fatalities which is an unsteady rise of 5 percent from 2005¹.

Of all the accidents that occur 94 percent of all fatal crashes is due to human error. AV'S are introduced to help curb such instances by taking out the root cause of the problem and possess the potential to save millions of lives.

Certain governments have already begun implementing certain necessary policies in anticipation of the AV's. Though there are certain hurdles faced by the legislative body to regulate the system in correlation to issues such as insurance, liability, cyber security, safety, ethics and performance standards.

In consumer technology, the self-driving vehicle (SDV) or autonomous vehicle (AV) is called transformational. Observers have noted that self-driving vehicles may change not only the way we drive, but also how we use time and how urban landscapes are developed there won't be any necessity of parking lots or spaces in buildings or on roads. There will be a multi-year

¹ AUTOMATED DRIVING SYSTEMS 2.0: A VISION FOR SAFETY, U.S. Department of Transportation, NHTSA

boom in landscaping as such spaces would be opened up for conversion for a better productive usage.

The curb ball that's hindering the implementation and usage of such technologies are due to the various social and legal factors being lack of government regulation and laws in this sphere, affordability, viability, insurance and liability. Regulation and laws pertaining to motor vehicles revolve around the quotient being the driver. An essential question that arises in case of AV'S is pertaining to who could be considered as the "driver" in the self-driving realm

The AV is associated with a variety of positive societal impacts such as a safer transport system, a lower cost of transport as well as enabling a modicum of mobility to the non-ambulatory and disabled as well as to those in lower income households. It is estimated that the direct societal value that will be created will be between 0.2 and 1.9 trillion dollars annually by 2025²

This is not to ascertain accidents cannot happen, a man in Florida using tesla's auto steer (these are semi-autonomous cars which needs human guidance constantly not to be confused with the fully autonomous vehicle) crashed into a truck and was killed. In this case true there was a crash and the software was not perfected at the time but it did statistically reduce the fatality compared to millions of accidents that occur worldwide.

An adoption of these will slash accident and fatality rates and save millions of lives all around the world. And most importantly it will remove 1/3rd – 1/2 of all vehicles from the city streets. When parking decks are cleared up, the streets become pedestrian walkways, city layouts become flexible. Large parts of the city would be set up into parks and recreation

² Manyika J, Chui M, Bughin J, Dobbs R, Bisson P, Marrs A (2013) Disruptive technologies: advances that will transform life, business, and the global economy. McKinsey Global Institute New York

CURRENT MARKET

Over the past few years various companies have come out with various prototypes for full autonomous vehicles. The production cars that have hit the market are semi-autonomous cars mainly from a company known as Tesla.

The company has stated to go fully autonomous by an update which would be released to all the cars in August 2018, this would not lead to any introduction of a new AV but would convert nearly half a million of all the Tesla vehicles into fully autonomous vehicles in a day.

Elon Musk *“true autonomous driving will be achieved in the next 5 to 6 years, by which time one would be able to get into their car, go to sleep and wake up at their respective destinations”*.³

Uber has already stepped up its game in the market as it expects the entire fleet to be driverless by 2030. Trial run of driverless Uber cabs have already begun in Pittsburgh, Singapore and San Francisco and are already facing regulatory hurdles⁴.

Looking to cash in on the emerging software space relating to driverless cars, Blackberry announced plans to invest around \$76 million and establish a hub in Ottawa, Canada under its QNX platform to develop software which could supplement the functioning of the driverless vehicle. Current Canadian Prime Minister, Justin Trudeau has commended Blackberry's push for software innovation.

Honda Motor. Co. in December 2016, announced that it is in talks with Waymo, the autonomous driving unit of Google, to strike a deal that would put Waymo's self-driving technologies into some of its cars. Both companies are laying emphasis on research rather than full production of vehicles at this point.

³ Kaufman, Alexander C. “Elon Musk: We’ll Have Driverless Cars By 2023.” The Huffington Post. TheHuffingtonPost.com. Web. 14 Feb. 2016.

⁴ Martha C. White, Uber Is Testing Driverless Cars in This West Coast City Now, 22 September, 2006,

Analysing portfolios of Apple and Tesla it is forecasted that these two could potentially become very effective partners in shaping the driverless future⁵. Soon enough, there will be no way of distinguishing technology and software companies from automobile companies as collaborations between the two will blur all boundaries between them.

A recent study published in October, 2016 by consultants A.T. Kearney estimates that the global market for self-driving vehicles and related services to surge to \$ 285 billion by 2030 from \$ 51 billion in 2020.²⁴ It will be the major cities of today that will be the main competitive battleground for companies to test and market their driverless technologies and related services with the ever increasing need to reduce congestion and pollution and pave the way for intelligent transport systems in the cities of tomorrow.

IMPACTS OF AUTONOMOUS VEHICLES

1. LEGAL

Various countries around the world have adopted the Vienna Convention on Road Traffic 1968 (“Convention”)⁶ which required a driver to be in control of his/her vehicle at all times. This prevented Governments from allowing test drives on autonomous vehicles or marketing them for public use up until recently.⁴⁸ In May 2014, an amendment was made to Article 8⁴⁹ of the Convention⁵⁰, allowing for the car to drive itself as long as the system “can be overridden or switched off by the driver”, albeit requiring a driver to be present. Due to this there are concerns that US manufactures would gain optimum advantage over their EU counterparts as they are not party to the Convention and are undeterred by its extensive obligations.

- U.K has been using electric driverless pods since 2011 to shuttle passengers to and from the terminal to their cars in the parking lot and will soon also be testing autonomous vehicles on public roads through an initiative by Intelligent Transport

⁵ 3. IP and Science business of Thomson Reuters, The State of Self-Driving Automotive Innovation. 2016. Web. 17 Feb. 2016.

⁶ Vienna Convention on Road Traffic, 1968

Environment (CITE) who are undertaking a project worth £5.5 million for the cause.

- In U.S.A ON June 2011, Nevada became the first state in the world to allow autonomous vehicles on public roads. Nevada, California, Florida, Michigan and Washington D.C. have successfully enacted laws with respect to autonomous vehicles
- In Germany A section of the A9 Autobahn in Bavaria has already been designated for automated vehicle testing. Currently each Federal state can grant exemptions from the German road traffic licensing regulations allowing the testing of automated vehicles, provided that there is a driver in the driver's seat who has full legal responsibility for the safe operation of the vehicle
- France published its roadmap for automated vehicles as early as in July 2014 indicating pilot zones for testing, changes to driver training and research and development projects running till 2018, with the authorization of experimental on-road testing of highly automated vehicles
- Various other countries too such as Japan, Sweden, Singapore, Australia, Canada, United Arab Emirates have taken steps for the development of AV'S

Indian laws

1.1) Motor Vehicles Act, 1988

In India the Motor Vehicles Act, 1988 ("MV Act") states and regulates all the laws regarding motor vehicles and their application on the Indian roads. It specifically mandates that a motor vehicle may not be driven without a driving license⁷.

Secondly, it states that no individual under the age of 18 is allowed to drive a motor vehicle.⁸ The Motor Vehicles Act through these provisions places the responsibility on the owner of the vehicle to ensure that the above mentioned provisions are complied

⁷ Sec 3, Motor Vehicles Act, 1988

⁸ Sec 4, Motor Vehicles Act, 1988

with. The pivotal question that contravenes the said provision and question that arises is whether the concept of 'owner' would still exist in the event of autonomous cars.

There would be a dire need to amend the legislative and statutory provisions especially the MV Act allowing for a special sort of license for autonomous vehicles or none at all. Given that most of the functions of the autonomous would be controlled by the system the question which would arise is does the mv act needs to amend sec 3 and 4 to allow the individuals without license and individuals below the age of 18 to operate the said vehicle or any other provision to be brought up.

Another issue that requires attention pertains to the requirement of registration of cars as provided for in the MV Act, in the procedure as provided for in Section 41. Importantly, the State Government, by virtue of the MV Act currently holds the power to restrict the use of vehicles 'in the interest of public safety', as well as 'make regulations for the driving of motor vehicles'. It is therefore a possibility that states might differ on the regulations that govern autonomous cars. Further, provisions of the law that ban driving when mentally or physically unfit, under the influence of substances, would possibly be redundant in the case of autonomous cars.

The MV Act initially provided for the award of compensation on the principle of "fault" only. The Supreme Court in *Manushri Raha v. B.L. Gupta*¹ as well as the Law Commission of India had recommended the introduction of "no fault" liability which was subsequently not incorporated. In the amended MV Act of 1988, Sections 140 to 144 provide for award of compensation resulting from an accident arising out of the use of motor vehicles. Section 144 attaches strict liability to the owner or on their behalf to the insurance company. In case of award of compensation, it is based on the principle of "No Fault"

1.2) *Consumer Protection Act, 1986*

In the case of a driverless car getting into an accident, the issue of liability may lead to legal complexities initially. Manufacturers will be held to a higher standard of

responsibility than they are currently. Issues pertaining to negligence, manufacturing defects, design defects, failure to warn, misrepresentation, unfair trade practices, breach of warranty and strict liability will fall under the Consumer Protection Act, 1986 (“CPA”).¹¹⁸ The CPA also establishes the right to consumer education. The consumer will have to be educated accordingly, on how the driverless cars operate and how not to panic and take control in case of emergencies. Since driverless technology discounts the possibility of human error, the liability would lie either with the manufacturer or the technology provider, as the case may be, for a defect in goods or deficiency in services, respectively. Considering that consumer concerns about liability could represent a roadblock to acceptance of driverless cars, Volvo, Google and Daimler AG’s Mercedes-Benz have all pledged to accept liability in the event that their vehicles were to cause an accident.

1.3) *Information Technology Act, 2000*

Privacy and data protection would primarily come under the Information Technology Act, 2000 (“IT Act”) and Information Technology (Reasonable security practices and procedures and sensitive personal data or information) Rules, 2011. (“IT Rules”) which inter alia, lay down provisions for the protection of Sensitive Data and Personal Information (“SDPI”). Section 66 of the IT Act classifies hacking as the situation where someone who, with the intent to cause wrongful loss or damage, or knowledge of the same – destroys, deletes or alters any information in a computer resource, or diminishes its value, or affects it injuriously. The scope of such provisions will have to be enlarged accordingly to account for scenarios where a hacker may take over complete control of a vehicle, by hacking into a computer or a central processor operating driverless cars and coordinating traffic. Laws will also have to incorporate necessary provisions dealing with protection and responsible utilization of passenger data, along with increasing threat of hackers, cyber espionage and warfare.

1.4) *Geospatial Information Regulation Bill, 2016*

Driverless cars would require enhanced mapping technology and increased investment in satellite infrastructure in order to ensure that such cars are provided a detailed and

highly accurate global positioning system, not only to autonomously and accurately arrive at its destination, but to also circumvent the various obstacles en-route.

2. ECONOMIC

The introduction of Autonomous vehicles has an unfettered impact on the economy.

They would be having a potential positive externality as it would reduce the number of accidents, reduce traffic congestion, create better landscape and land use, provide a better environment and most of all safety wouldn't be an issue.

Insurance companies cover the costs which are incurred due to road accidents caused by human error. The insurance is availed on the basis of human error and then liability kicks in whereas if that element is taken out Manufacturers and infrastructure providers will now need to be the subject of liability, rather than the direct consumers (drivers). If the human element is taken out and the autonomous systems are efficient and do reduce the accidents to a bare minimum eventually nullifying them that would eliminate the need for car insurance at the outset.

It has been forecasted that approximately \$ 200 billion in personal car insurance premiums would hold steady for another seven to eight years, then slide to about \$ 40 billion in 2040. It however projects that around \$ 100 billion of the \$ 200 billion could migrate to product liability insurance and coverage bought by ride sharing businesses⁹. While the insurance sectors long term prospects look bleak, in the short term, increasing automation is driving up the cost of car over as gadget equipped cars are more expensive to fix than basic models if damaged in a crash.

Another concept which is bound to change is ownership of motor vehicles,

⁹ "Driverless Cars Threaten to Crash Insurers' Earnings", Leslie Scism, Wall Street Journal. Web. 26 June, 2016

Automakers are already looking forward to adopt new business models of car rentals, car sharing, or taxi services. If cars could be summoned whenever required, ownership of cars would become irrelevant and the idea itself would become obsolete.

3. SOCIAL

The biggest contributing element to road accidents is human error. Drivers distracted while using their phones, drinking and driving, lack of skill, and road rage, these are a few accident inducing errors.

The essence for the introduction of automated vehicles by major players in the automobile industry is to achieve a better human experience by reducing various problems faced by regular vehicles such as traffic congestion, accidents. They aim to achieve a better road design with a coordinated traffic connected with all the vehicles which would prima facie reduce most of the complications faced.

In countries like INDIA which is not very pedestrian friendly like most European countries it would lead to better infrastructure as cars would take lesser space and the certain roads can be done away with making them pedestrian friendly, this would lessen the burden on the government in the long run and would be beneficial to the public and would lead to a lot of benefits such as increased tourism , safer roads, better accessibility to facilities such as healthcare. Even the handicapped and the elderly would have equal access and the ability to get from place to place, making them self-reliant. Human productivity is bound to increase by a great measure as people will be able to utilize the time that is spent driving on other more productive activities.

It is still debatable whether such change is necessary or whether it leads to a derailed train track. By a survey conducted it was revealed that 3 out of 4 U.S drivers would feel “afraid” to ride in self-driving cars, and just 1 in 5 would entrust his or her life to a driverless vehicle¹⁰. By eliminating unnecessary driving, we can attain a greater degree of fuel efficiency of up to 50% and reduction in associated carbon emissions by more than 90%.⁴⁵ Due to reduced road congestion, additional roads needn't be constructed which would help

¹⁰ Survey by American automobile association (2016) , chapter 12 (pg 133)the driver in the driverless – vivek wadhwa and alex salkever

maintain and free up green spaces. This is very necessary as it would have a positive effect on the environment and would lead to effective Rules and regulations that could be enacted to penalize cars that drive unoccupied or reward those who allow their vehicles to be used for ride sharing. This is absolutely necessary with the view of public welfare.

INSURANCE AND LIABILITY

In case an autonomous vehicles gets involved in an accident, The pivotal question that arises after safety is the liability clause which could get complicated as resolving the question of fault would arise and will indeed require consideration challenging questions Usually during such an incident there would be a trial held to examine and determine the extent of driver's liability and adjudicate accordingly, but in certain cases where there's no driver and the car runs entirely through the help of a software assist, there needs to be different parameters of consideration. Traditionally, the underwriting criteria for insurance companies depended on the number and kind of accidents an applicant has had, the miles he or she expects to drive, and the place where the car is to be garaged. While these criteria would continue to apply, the make, model, style and the manufacturer of the car may assume greater importance. In the driverless future, actuaries may have to replace calculations about individuals with issues such as hacking of cars, analysing which parts of the country have better satellite imagery etc. They will also have to identify the difference in quality of the safety features across driverless cars.

A recent accident wherein an American citizen lost his life when he put his Tesla-S into its autopilot mode, and the car's sensors failed to distinguish an 18-wheel truck against a bright sky has brought attention to the lack of regulations surrounding autonomous cars. The Tesla car crash highlights the various issues that remain unresolved. The accident has raised ambiguities regarding ascertainment of liability and whether it ought to rest on the car manufacturer, driver or the third party. In another accident in Indianapolis of a Tesla wherein

two people lost their lives, the police are currently investigating if the Autopilot played a role in the accident or not¹¹.

The issue of liability would be very precarious to determine whether any personal cover is warranted by the driver. It is argued in certain instances that the manufacturer or seller ought to be held liable if the autonomous system failed to properly control the vehicle, rendering the car in a defective and unreasonably dangerous condition. Given that autonomous vehicles promise to provide and improve safety standards manifold, one may have to pay a much higher premium if one chooses to drive cars on their own rather than let the system take over

CONCLUSION

Are AV'S perfect definitely not but they are the key stepping stone towards a utopian society wherein pivotal problems faced today such as parking, accidents would all sound trivial and nonexistent as all of those would be solved and would have already led on to a better and sustainable future.

The reality is that it won't be an easy journey. As seen by the negative publicity that tesla obtained due to a driver in Florida who lost his life while the car was in autopilot. He trusted the system more than he should have even though it was stated by the company itself as it was not completely autonomous to not rely on the driver at all due to this tesla got all the blame.

There were appeals to ban this technology all together in the U.S but the legislature and the government denied the said appeal though. Surely there would be further fatalities if technological imperfection and human error go hand in hand.

The transition would be as stressful as a battle between horses and horseless carriages (cars) for the supremacy of the roads. In that battle the cars came victorious and led to a whole lot of revolution leading to change in every single sphere from economic, social, environmental and legal leading to a formation of a whole set of laws regarding road transport and motor vehicles.

¹¹ Available at <https://guardianlv.com/2016/07/tesla-accident-highlights-issues-with-self-driving-cars-and-insurance/>

While this move too was extensively criticized while a few called cars magic, devils. It was a necessary development and has led us to where humanity stands. It is up-to the legislature to frame necessary laws and the government to implement them to ensure such developments in that sphere would not go ahead and focus on the efficient and intelligent development of technology that would conform to all legal norms and helps us achieve a true sense of utopian society.

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