Economic, Social and Ethical Analysis of Autonomous Vehicles As The Main Form Of Transportation

SE 451 : Senior Team Project II

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**Introduction**

Throughout history there have been many society changing events with the invention of agriculture to the domestication of farm animals to advancements in medicine and science, but probably the fastest growing and fastest changing field of development that is changing all aspects of society and raising all new questions to be answered with each new invention is the transportation sector. For the majority of human history the mode of transportation was walking, then with the domestication of animals, the horse became the mode of transportation for the wealthy and then gradually became more readily available as society was able to adapt to the change with the creation of carriages, the boat was the first major development that had the effect of providing the ability for large groups of people relatively available access to leave and start a new life on a new land, causing a new mode of economics in global trading of goods. The advancement in boats lead to even more people to easily leave and start a new business or family in a new location. The creation of aircraft had the same effect, but reduced time to destination making the world feel like a smaller place, because an individual can go from part of the world to another in a matter of minutes. The introduction of automobiles had the effect of providing urban transport to everybody making going from point a to point much faster on a local or city scale.

The introduction of automobiles was the first major change in transportation that reduced the safety moving from one place to another, because the increased congestion of cities from people getting to work, going to the store, or other forms of leisure activity lead to drastic increase in transportation related injuries and deaths, which can be correlated to the fact that almost every instance of a car is at the control of an individual person, whereas for boats or planes the majority of individuals are not incontrol of the vehicle, which leads to a smaller of variables for others to interact with, and the majority of car drivers are not optimally trained, as for pilots or boat captains the training is much more rigorous. Which comes the next major change in the transportation industry, with the creation of Autonomous vehicles, which is defined as the vehicle driving and controlling itself on its own with the need for interaction from the passengers, and the ability to communicate with other vehicles and traffic signs/lights and pedestrians. The main difference with the development and introduction into society of autonomous vehicles is the fact that it is the first form of transportation that will completely remove human interaction from the mode of transportation, which have drastic effects on the economics, social and Ethical aspect of the transportation industry, therefore autonomous vehicles (AV) are so far the most society changing development in the scope of transportation and will lead to a safer and more efficient society

**Economics**

The economic effects and implications of adding driverless vehicles, according to many reports, would have the largest impact on jobs, with trucking and driving based jobs (uber, lyft, taxi) would be put out of work without a replacement and most of the current workers in the industry don’t have a fall back job in the event they are replaced.

According to sources the introduction of AV into mainstream society will create a whole market similar to SASS (software as a service) which is having a program that can be used by others to expand their programs or service their needs, the AV will create MASS (Mobility as a service), which will spawn more companies with providing vehicles for people to use purely as a mode of transportation rather than owning a car, with reports of that industry alone being worth $7 Trillion by 2050.

Another aspect of a boost to the economy of transportation is the cost of vehicle crashes, in 2009 there were 10.8 Million crashes, with 2.3 million injured and 30,000 deaths, with a remaining 5 million crashes that did not result in an injury, costing an estimated $317 Billion in damages for fatal crashes when combined with the non-fatal brings the estimated cost up to $226 Billion. When the time spent in a vehicle because of traffic or one of the aforementioned crashes the DOT estimates there would be a $99 Billion in time savings from the introduction of AV transportation.

The introduction of AV transportation would potentially provide $642 Billion in savings that can be used for other forms of contributions to society, therefore the AV transportation will have the effect of saving the country as a whole from spending close to a trillion dollars on vehicle repairs.

**Social**

The main social benefit from having AV be the main form of public transportation again revolves mainly around the numerous amount of car crashes in the current form of automobile transportation. According to sources over 1.3 Million people around the world are killed in car crashes, where in over 90% are caused by some degree of human error. With these statistics it can be clear that removing the human variable would therefore leave only 10% of crashes that are outside of the drivers control.

Another Social benefit from adopting AV transportation would be the convenience factor of not having to spend hours stuck in traffic because someone down the line does not merge properly and slows down the whole flow of traffic, whereas an AV would know precisely the speed the other AV were travelling and vice versa, would be to perfectly inject itself into traffic at speed with only causing a negligible ripple effect from the merge, for example.

Lastly, another major benefit of AV transportation would be the mass adoption and transition of electric vehicles which would lead to cleaner and quieter cities, more efficient vehicles and the removal of so many gas stations, which can be replaced with more beneficial and useful structures.

**Ethical**

The main ethical concerns from the adoption of AV transportation is the premiss of the trolley problem, where there is a trolley on a track that splits into two tracks with 1 person or a group of 5 people, and the decision has to be on what path to take. This is the main argument that is made against the adoption of AV, which is just another discussion that needs to be made and that a choice can be chosen that benefits and protects everybody, such as hitting an inanimate object rather than a person.

**Conclusion**

The benefits of adopting a system for AV transportation with mobility as a service is clearly and undeniably beneficial to society as a whole, however the ethical issues of computer determining what the optimal way to avoid a collision with a pedestrian or other car would require a lot of discussion from the government, engineers and the general public as to find a solution to it.

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