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The self-driving car, a niche market or a true revolution?

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The car is at the center of our mobility system. It has shaped cities and territories, imposing its infrastructures, norms, and speed. By monopolizing public spaces (roads, parking spaces, parking lots...), it has relegated other forms of transportation (walking, bicycling...) and practices (playing games, strolling...) to a small portion of the road. However, today, its negative effects are unanimously denounced (air pollution, emission of greenhouse gasses, accidents, traffic, noise ...), first and foremost by civil society. Public authorities, notably in cities, are also starting to take on these issues. In this context, what role will autonomous vehicles play?

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The risk: make changes only so as to maintain the status quo

The media widely broadcasts the many tests on the autonomous vehicle, fostering a sentiment that the driverless car's technology is rapidly advancing, thus making its circulation inevitable. Autonomous vehicles are strongly mobilizing public opinion, investors and of course public authorities. Certain local governments are competing in a race to test the car and be seen as pioneers, such as Rouen which declared its ambition to

be "the European capital of the autonomous vehicle" last fall.

All of this lends credence to the idea that the autonomous vehicle is already on the roads. But is this really the case? An autonomous vehicle is a vehicle that does not need a driver to move, stop or park... without having an accident of course. The driver becomes a passenger, no longer required to think about driving and free to spend their time in the car sleeping, consuming entertainment, or working. In reality, however, full autonomy is far in the future.

In order to reach a level of automation that provides the full driver-less experience in all situations, the OICA states that it is necessary to move from levels 1 and 2 – simple driving assistance with the driver's supervision – to levels 3 and 4 – automatic driving without the permanent supervision of the driver and without human interaction, in certain situations. PSA, for example, plans to reach level 2 of autonomy by 2020, level 4 by 2030 and the timeline for level 5 – full autonomy – is yet to be determined. While some manufacturers promise full autonomy in the next 30 years, a relatively slow evolution, this timeline is highly debated. Certain engineers working on the topic doubt the feasibility of fully autonomous vehicles sharing the road with non-autonomous vehicles, pedestrians or bicycles. And this is before we even consider weather conditions (rain, snow, fog...).

If we are not careful, the automobile industry will shape how we envision mobility by painting a picture of a future where mobility is smooth, clean, secure and accessible to all. We then risk seeing the current automobile system endure without finding solutions to its negative effects.

Towards the progressive development of a niche market

Be that as it may, in the coming years, manufacturers like PSA and Renault are preparing to progress towards the first levels of autonomy. Autonomy will first be offered as an option in luxury models, similar to the integration of reversing cameras or the option to add autonomous parallel parking over the past few years. Its price would restrict this technology to the wealthy, confining the autonomous vehicle to a niche market that comes at a high cost in terms of public spending (development of adapted and connected signage). In this development model, the autonomous vehicle would be a direct descendant of today's car: privately owned and for individual use.

If this industrial project were to become a reality, it would further deepen inequalities in mobility. Partially autonomous vehicles would offer the wealthy the opportunity to travel more comfortably and so encourage longer trips. In this context, the rise of autonomous vehicles would worsen traffic. In the more distant future, it could increase congestion by adding empty driverless vehicles to the roads. In turn, this would aggravate the negative environmental impact of the "car system," prolonging travel distances and increasing the consumption of energy and the rare materials required to build and run these vehicles.

Citizens show openness and caution

Citizens have expressed many concerns about this 'progressive' scenario. In order to avoid letting the manufacturing industry determine the future of our mobility system, citizens were asked to take part in a debate co-organised by the Mobile Lives Forum in January 2018 in the French cities of Toulouse, Rennes, Sophia, La Rochelle, and Conflans-Sainte-Honorine. The 360 participants were asked to define the role they would like the autonomous vehicle to play (or not play) in their lives, and how they would hope or accept

to see their lives change. It was an opportunity to understand people's aspirations before the technology takes to the roads.

Citizens have no doubts - the autonomous vehicle is a luxury product in a niche market, simply adding to current levels of traffic. They did not demonstrate enthusiasm for the technology in and of itself, but rather a desire for it to contribute to a global change in the organization of our mobility system, leading to mobility that is more inclusive, safe and allows for better living conditions.

To reach this point, citizens would like public authorities to lead the charge. They expect authorities to be particularly attentive to how it will impact employment and the environment, reduce mobility inequality, ensure the protection of personal data, contribute to the improvement of living conditions (air pollution, sound pollution, visual pollution, traffic...) and preserve the quality of the mobility system.

Finally, while the arrival of the driverless vehicle is presented as being inevitable by some, participants asked us to imagine alternative scenarios to those presented by manufacturers.

Imagining alternative, more disruptive, scenarios

It is possible to imagine a very different scenario in terms of the number of autonomous cars on the roads and their impact on the environment. To meet citizens' expectations, the autonomous car should support the transition of our mobility system by allowing, for example, for the implementation of a hybrid system of autonomous shared vehicles, substituting the personal vehicle and complementing the public transportation on offer. This would decongest city centers and connect peri-urban and rural areas. To achieve this, citizens expressed their willingness to change their habits. They indicated that autonomy could lead to a triple renunciation: from driving cars, from owning them and from travelling alone. While this system better corresponds to the aspirations of citizens and would truly transform our transportation system, it would still be heavily dependent on the extraction of rare materials. This raises a number of questions. How would it be financed? How could it be put in place without confronting the inertia of the preexisting system? Why would people be more likely to share an autonomous vehicle rather than a human-driven vehicle? Finally, this distant and uncertain scenario depends on mature, level 5 technology.

A tool to support an environmental revolution

First of all, this delay is good news. The time needed to develop the technology provides authorities with the flexibility they need to guide the development model. They will be able to ensure it represents the interests of citizens and leads to better mobility - cleaner, and not the product of short-term economic arguments. At a time when public authorities are tasked with finding more sustainable forms of mobility, they must politicize the debate in order to promote their vision of the future of mobility.

This delay is also important in the fight against climate change. Recent data show that the transportation sector - which represents one-third of CO2 emissions in France, 50 percent of which comes from car traffic - has seen emissions rise since 2015.

In order to maintain France's international commitments on climate change, public authorities must react without delay. While the autonomous vehicle may truly revolutionize mobility in the distant future, today and tomorrow it is destined to remain niche. In order to reduce the carbon footprint of mobility, it is necessary to support and

develop alternatives to solo driving such as car sharing, active forms of transportation (biking and walking) and the use of public transportation. It is also necessary to discuss the role mobility plays in our lives: is it destined to increase? For public authorities, this means coming to terms with the amount of work that needs to be done to tackle the challenges related to the use of personal vehicles, all while avoiding placing false hope in the autonomous vehicle, an error that would only result in the loss of precious time.

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Mobility

Broadly, the word mobility can be defined as the intention to move and the realization of this movement in geographical space, implying a social change.

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Car sharing

Car sharing is the pooling of one or several vehicles for different trips at different times. Three types of car sharing exist: commercial car sharing, peer-to-peer car sharing and "informal" sharing between individuals.

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Disciplines : **Humanities**

Transport mode(s) : **Automobile**

¹ <https://www.aaeena.fr/group/l-ena-hors-les-murs/169/articles>

² <http://en.forumviesmobiles.org/marks/mobility-450>

³ <http://en.forumviesmobiles.org/marks/car-sharing-2137>

⁴ <http://en.forumviesmobiles.org/disciplines/sciences-humaines>

⁵ <http://en.forumviesmobiles.org/modes-transports/automobile>