Changing the pattern of mobility: another digital battle

by

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Overview

Will the autonomous car of the future look anything like the way in which it is portrayed in science fiction films, namely a very comfortable sitting room or a mobile office, speeding along roads in complete safety? Some people thought this would be the case, but others, such as Google and Uber, are now imagining that it will be different. Abandoning the dream of a universal, driverless vehicle, they are working on less spectacular versions, but ones whose numerous advantages could hasten their implementation. The emergence of private or collective driverless robot taxis (also known as Personal Rapid Transit or podcars), limited to strictly defined environments, would be an ideal solution in cities which are saturated with passenger cars. These robot taxis would reduce problems (such as pollution and noise), lower the number of accidents, ease traffic flow, and encourage intermodal networks. Consequently, alongside already well-advanced technical solutions, the ability of politicians to reconsider urban space and mobility in a different way will play a key role in this radical transformation.

Report by Pascal Lefebvre • Translation by Rachel Marlin

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The city is the ultimate mobility ecosystem into which all innovations must blend. My experience in the car industry has allowed me to follow what Uber has accomplished over the past seven years, and observe Google which has been working on the driverless car since 2009.

In this context, three crucial factors must be considered in order to understand the way in which mobility is changing. The first is based on growing demands of clients or users who want more practicality and ease of use, an instantaneous 24/7 service using mobile telephones, instant identification on the app due to previous transactions, and an adapted and cheap service. This is undoubtedly the most important factor which prompted the emergence of Uber. The second factor is related to environmental concerns on a local (particles, nitrogen dioxide) and planetary (carbon dioxide) level. The third and final factor is the realisation that saturation points or even crises can exist in urban vehicle circulation. These three crucial factors have finally been taken into consideration because of the convergence of a group of technologies which have been assembled together, thereby initiating profound change. And this is just the beginning...

The change has started

A great deal of the available data comes from the United States, and New York in particular, where the city authorities have to be notified of all taxi, Uber or similar rides. This is currently the best collection of data on this subject and is therefore the source which I have used for my analysis.

From January 2015 to January 2018, the number of taxi rides in New York almost doubled. However, whereas Uber and Lyft (Uber's main rival) grew very quickly, taxis lost ground to the point of accounting for less than 40% of all rides. Uber and Lyft operate within destinations which are very badly served by New York's traditional yellow taxi cabs (ie. the other New York boroughs apart from Manhattan), and this fact accounts for an increase of 300% in rides during the period studied in the borough of Brooklyn, for example. The result is that there is an abundance of vehicles in New York – between 100,000 and 150,000 – if one also includes 'black cars' (taxi cabs which cannot be hailed on the street, but which are dispatched).

Uber realised that the taxi service no longer corresponded to customers' new demands, and that the technology associated with a new business model would enable things to function differently. The client of an Uber 'on demand' ride now receives a reply in a matter of seconds. The ride price is shown; the client can see the geographical position of the driver on his mobile telephone screen as his car approaches the client's location; the service is transparent and practical (payment is by credit card and includes the tip; an invoice is sent by email; there are monthly statements); and one can leave a comment about the service in two clicks. The cost may even be less if one shares the car with someone else (using the 'uberPOOL' and 'Express POOL' app services). Uber now has 2.5 million drivers throughout the world and operates 3 billion rides every year. Its Chinese rival Didi Chuxing has 7.4 billion rides.

Two studies were carried out at the end of 2016 by UC Davis (University of California at Davis) and the National Household Travel Survey (NHTS). UC Davis' study, which uses data from seven cities and 70 million inhabitants, shows that in the main metropolitan areas of the United States, 5% of people use Uber or Lyft at least once a week. The NHTS study, based on 70 million inhabitants of cities with populations of more than 1 million inhabitants which have full public transportation systems (trains, buses, underground, ferries), shows that taxis and chauffeured vehicles together accounted for nearly 2% of motorised journeys compared to 9.4% for public transport. This is not very much, but the underlying phenomenon is no longer marginal and is growing fast.

Driverless cars

A few years ago, Daimler was the pioneer of the driverless car before it abandoned this project and decided just to monitor technological development instead. The true trailblazer was Google. Google began its research in 2009, and by 2012 its prototypes were already driving on the roads around Palo Alto alongside pedestrians, lorries and cyclists, and were as successful or more so than its rivals today. In 2015, Google went one step further by launching its driverless Google Car in Silicon Valley, Austin (Texas) and Phoenix (Arizona). Rare problems occurred when passenger cars went into the back of them as the Google Car drove sometimes too carefully.

In 2016, Google created a specialised subsidiary, Waymo, and launched the 'Early Riders' programme in Phoenix, based on 'real' users, in other words, vehicles driving on public roads without drivers. Waymo has just signed a deal with Jaguar which will supply them with 20,000 electric 'I-Pace' cars, and more recently with Fiat-Chrysler for 62,000 minivans, all intended for the commercial market by the end of 2018.

The fact that Waymo chose Jaguar shows that price was clearly not the deciding factor, but that Waymo were looking for an innovative (electric) car with advanced electronics (developed with Altran). In 2017, Uber chose the manufacturer Volvo, and ordered 24,000 XC90 cars, and stated explicitly that their choice of Volvo had been dictated by the car's superior electronics. In 2012, Tesla was the first car manufacturer to create a radically different electronic architecture which enables continual 'over-the-air' software updates which do not require the vehicle to go back to the garage (these are similar to continual updates which are available on mobile telephones). To date, very few other manufacturers have achieved this, and it is a remarkably rare fact that such a fundamental innovation is taking so much time to be implemented throughout the car sector.

While its rivals were still hesitating, Waymo continued its road tests, simulating 3.8 billion kilometres from data obtained during 8 million kilometres driven on public roads. Therefore, they were able to recreate a variety of driving situations which they used to 'educate' their system with 'machine learning' techniques (where computer systems can 'learn', i.e. improve performance on a task with data without being programmed), a sector in which they are one of the world leaders, if not 'the' world leader.

On the manufacturing side, progress started only in 2013, when Mercedes and Nissan announced, almost simultaneously that they were making driverless cars. Nissan intends to market driverless cars in 2020. As for Mercedes, there is no fixed date, however the company demonstrated its know-how by reproducing with its driverless car the famous 108-kilometre run made in 1888 by Bertha Benz, an exploit which at the time contributed to the reputation of the brand. Volvo announced a pilot manufacturing project of about one hundred driverless vehicles in Gothenburg. General Motors has announced that it will be ready in 2019, and now everyone else is following suit.

In January 2015, at the Las Vegas Consumer Electronic Show (CES), Dieter Zetsche, Daimler's CEO, announced, with respect to Mercedes, that 'the car is growing beyond its role as a mere means of transport and will ultimately become a mobile living space.' He followed the line of thought that changes in the automobile industry begin as usual in the luxury sector before moving on to other sectors.

Most of the time, manufacturers refer to a six-level driving automation classification system ranging from 0 (no automation) to 5 (full automation without a driver in all circumstances). Today, driving equipment exists to reach level 1 ('hands on' driver assistance, where the driver and the automated system share control of the vehicle) or level 2 ('hands off' partial assistance where the automated system takes full control, but the driver must be prepared to intervene). Some manufacturers now offer level 3 ('eyes off' conditional assistance where the driver should be ready to intervene if necessary). All manufacturers' efforts are being focussed on levels 3 and 4 ('mind off' high automation where the vehicle is completely autonomous in predefined circumstances, for example on a motorway or during valet parking when the car can park itself).

While Dieter Zetsche was talking in Las Vegas, Uber was recruiting half of the researchers from the best American robotic laboratory, Carnegie Mellon in Pittsburgh, making it very clear that Uber was in the race for production of the driverless car. This was a surprising decision. Until then, Uber was not considered to be a potential