

Understanding The Future Of Mobility

by [Jonathan Matus \(@matusjon\)](#), [Stefan Heck \(@Stefan_Heck\)](#)

We recently had the opportunity to participate in two important conferences focused on the future: one on the on-demand economy (*On Demand Economy 2015*) and the other on mobile communications (*Rutberg Future Mobile 2015*).

While each conference covered a range of fascinating topics, if taken together, one can develop from the conversations and presentations a clear picture of the future of mobility. This future, creating both great opportunities and economic dislocations, is being driven by established tech players as well as a new generation of innovative startups.

We see three key trends shaping mobility, both personal and commercial:

- the move to on-demand mobility,
- the impact of driverless vehicles and
- the growth of electric vehicles.

Together, these trends will bring about a future that is safer, cheaper, offers more choices and is more resource efficient.

In an early sign of the changes to come, last week it was [reported](#) that Uber's CEO is planning to buy 500,000 of Tesla's autonomous vehicles as soon as they are available. Why is Uber willing to make this bet, and why are the plans of these companies so important to the future of mobility?

Let's examine each of the trends in turn.

On-Demand Mobility

On-demand mobility is without doubt one of the most important trends in transportation and in the global economy today. And by this we mean mobility (moving people, goods or services) based on a mobile app that allows for ease of scheduling and payment.

The recent and ongoing exponential growth of ride sharing, car sharing and last-mile delivery services is just the beginning of a global shift away from personal vehicle ownership to a shared, on-demand model.

According to the *Economist*, car sharing alone will reduce car ownership at an estimated rate of one shared vehicle replacing 15 owned vehicles.

The cost of vehicle ownership, increasing commute times, limitations on infrastructure expansion, the need to conserve resources and cut greenhouse emissions and even the change in the relationship between the millennial generation and automobiles are all contributing to the growth in on-demand mobility. So much so that we believe within three-five years most miles driven in urban settings globally will be on shared platforms (ride share, last-mile delivery, car share and public transit).

That may seem shocking to those of us in the West, but consider what is happening in the two most populous nations on earth, India and China. At present, only about 5 percent of Indians own a personal vehicle, and already the roads are jammed almost to the point of impassibility. The same is happening in China.

Yet both nations have a rapidly growing middle class with money to spend. It will be impossible for them to replicate the current U.S. model of car ownership, so on-demand mobility will serve the mobility needs of the hundreds of millions of newly affluent Indians

and Chinese, without personal vehicle ownership. This is why growth in on-demand mobility in India and China has already eclipsed that of North America and Europe.

Driverless Vehicles

What immediately comes to mind when talk turns to autonomous vehicles is Google's high-profile efforts to develop a driverless car or, perhaps, rumors that Apple plans to create a competing vehicle. They are not alone. Tesla, Volvo, Mercedes-Benz, Ford and others are all working on autonomous vehicles. The first such cars are expected to be available to consumers in the next few years. Driverless trucks operating on public roads are a few years further out, but are definitely coming.

Yet the imperative for an autonomous vehicle is not being driven by consumer demand, but by a powerful economic force central to the success of the on-demand mobility market. This is why Uber is investing heavily in developing autonomous vehicles: Eliminating the driver in the on-demand model radically changes the economics to the considerable benefit of the service provider.

Under Uber's current business model, approximately 60-80 percent of revenues stay with the car owner. Driverless vehicles would put most of that revenue into the coffers of the on-demand services providers.

Based on the fact that on-demand mobility companies are highly motivated from a profit perspective to develop driverless cars and trucks, we can expect that over the next 5-15 years, autonomous vehicles will profoundly alter the mobility landscape.

In addition to the very real and very significant impact on transportation economics along national transportation routes, we should expect the safety of driverless vehicles to become a paramount area of focus and regulatory scrutiny. After all, roads are filled with many tons of steel hurtling around at 75 miles per hour, which can get really dangerous really fast if proper measures aren't taken.

If you speak to most actuaries — the math and stats experts responsible for quantifying and measuring risk at insurance companies — they'll tell you that currently, risk is for the most part measured via DMV driving records and demographic signals. Different segments of the population tend to cluster into similar risk buckets.

Clearly, this approach does not work for autonomous vehicles. We need a new risk-monitoring standard, a driving-analytics benchmark that is largely behavioral. The emphasis here is on "behavioral" as it is meaningless to use demographic criteria for safe driving evaluations in case of autonomous vehicles.

Electric Vehicles

Stalled for years, with global auto companies given them little more than lip service, advances in battery, control and electric motor technologies — coupled with consumer concerns about greenhouse gas emissions and gas price volatility — are finally driving electric vehicles into the mainstream auto market. Recent entrants to the market, such as Tesla, have shown Detroit's Big Three that electric vehicles can be sexy, fast, safe and convenient — not to mention environmentally friendly and resource efficient.

Here again, it is the on-demand mobility market that will be a significant catalyst of the shift to electric vehicles. The continued explosive growth in the demand for on-demand services and the expansion of autonomous vehicles creates the need for a transportation platform

that is reliable and cost-effective to operate and maintain. Electric motors are far more dependable than internal combustion engines; they require significantly less maintenance, have much longer life expectancies and are far cheaper to operate.

When you think about a vehicle that is manufactured with on-demand usage in mind, it will not be sitting in a garage 96 percent of the time like privately owned, human-driven vehicles. Rather it will be designed to remain in operation 24/7/365, and the most economical solution for this usage profile is electric (assuming battery swapping during off-peak hours). As the on-demand mobility market dramatically increases demand for electric vehicles, that demand will put downward pressure on the price of such vehicles (and the battery and electric motor technologies that scale them) while driving improvements in performance. This sets up a virtuous cycle that will rapidly expand the number of electric vehicles on our roads.

While initially we'll see an increase in hybrid vehicle adoption for the on-demand segment, the second generation of vehicles will be quite different. These vehicles aren't today's electric vehicles. The new generation of vehicles designed for on-demand services will not only be optimized for continuous operation and cheap maintenance, but also for the efficiency and convenience of the payload (whether passenger or goods).

We imagine electric vehicles designed with passengers in mind (private modular passenger pods, Wi-Fi, "first class" seating, etc.) that not only drive themselves but also stop for rapid charging/switching of batteries and communicate with one another via mesh technology to optimize routes and per-mile utilization.

Conclusions

We stand on the threshold of what can realistically be described as the largest and most important shift in transportation in a century. The benefits will be enormous: An 80+ percent reduction in the cost of transportation. Reduced pollution. Reduced stress and road rage. A dramatic decrease in accidents and traffic deaths. Gaining back time lost to commuting — and the associated increase in productivity. Freeing up two lanes on many urban roads by eliminating parked cars. Even the reclaiming of the space allocated to home garages.

This future is being driven by the nexus of three significant trends. Each is important in and of itself, but combined they create an unstoppable force for change.

As with most significant changes to the way we live our lives, safety and trust and data are key to enabling the potential of on-demand mobility. Consider the adoption of electricity in the late 1900s or of the automobile in the 1920s or the airplane in the late 1940s — all were contingent upon building public and regulatory trust in these technologies.

Today, ride-sharing services such as Uber, Lyft and many others are under intense scrutiny in communities across America and around the world. The ability of the leaders of the new on-demand mobility market to build trust with key stakeholders — consumers, regulators, insurers, investors — is essential to their success. Deploying technologies that independently monitor and improve road safety are an essential part of creating the trust needed to accelerate the future of mobility.