Enders Analysis – Written evidence (AUV0085)

Enders Analysis is an independent research group focusing on Technology, Media and Telecommunications sectors

Impacts and benefits

1. What are the potential applications for autonomous vehicles?

Autonomous vehicles (henceforth referred to as AVs), have the potential to drive innovations in numerous sectors aside from transportation, including media and telecoms. We believe the most immediate applications of AVs will be commercial for numerous reasons. Primarily, the cost of the components to build one of these vehicles, though declining, is still high, and therefore a barrier to most consumers. Equally, commercial ventures can exploit the novelty of the technology to build consumer trust, and demonstrate that these vehicles are both safe and easy to use.

We think ridesharing will be the most immediate application of AV software that the general public will access. Rising giants, like Uber (and recently Tesla), see the market opportunity offered by AVs. Autonomy will enable them to offer more competitive pricing as the cost of human labour will be removed. Equally, AV technologies will not be limited to cars, and general consensus is that self-driving automation will come quickest to commercial applications such as truck platooning and final mile transfer (e.g. drone deliveries as piloted in the UK by Amazon). At some point private AV ownership will become more commonplace, but in the near future this will be targeted at premium models, such as Tesla vehicles, and perhaps next it will be extended to target those with mobility difficulties.

2. What are the potential user benefits and disadvantages from the deployment of autonomous vehicles?

There are a range of benefits offered by AVs: from increased mobility to lower carbon emissions; but equally a range of disadvantages: from cyber security to job losses from automation.

Advantages

In 2015, the average person in the UK spent 368 hours travelling: 83% of this time in cars, vans and taxis. AVs will be more convenient than a personal commute in a car. As 95% of car accidents are due to human error, we believe that AVs will be safer than vehicles with a driver, whether passenger cars or HGVs. But safety is still a wider concern, and as such is also a disadvantage.

For the elderly and disabled, AVs would increase their mobility; in the UK 15 million people are over 60, and 12% of the population have a mobility difficulty. In our work we argue that the over 50s are more readily adopting new technology than any generation of over 50s
before them. This could make them a key target market for privately owned AVs, especially as people live longer and move out of urban areas.

There are environmental benefits of moving towards autonomy, which are explicable to users as a whole group. In terms of urban planning, when combined with ride sharing, much better land use could be achieved, with less need for parking spaces in city centres. Electric vehicles are better suited to autonomy than combustion engines, and many manufacturers are integrating autonomy into their electric vehicles, most notably Tesla. A study by Berkley labs in 2015 argued that a fleet of driverless taxis would greatly reduce per mile emissions of greenhouse gases (GHG). However, AVs are not required to be electric, and this is another barrier in terms of higher cost.

**Disadvantages**

Public safety remains the biggest barrier to adoption. These vehicles require appropriate and considerate safety, security and privacy testing to be conducted by a third-party, independent of the developer. Cyber security is a clear concern, cars are just as vulnerable as laptops to hackers. The ‘trolley problem’, an example of an ethical dilemma, is frequently cited in the case of how an autonomous vehicle would choose to make difficult ethical choices. Understandably, this is a minefield that AV developers so far have been avoiding, insisting that it is far more important to maximise AVs safety than attempting to overcome a range of hypothetical ethical situations that will rarely occur.

Automation will likely lead to the loss of many jobs in the transportation sector, notably in low-wage positions such as taxi and bus drivers. Reskilling this part of the workforce must be a priority in the near future.

Public perception represents that final hurdle and tech companies may be in danger of underestimating the slowness of consumers to embrace new technology in the auto industry, just look at the long adoption of hybrid cars.

In balance, we think that once the technology has been developed to ensure total safety that the social and environmental benefits massively outweigh the disadvantages.

3. **How much is known about the potential impact of deploying autonomous vehicles in different sectors?**

Our research primarily covers TMT, advertising and e-commerce industries. However, in the context of AVs, we believe that AVs will cause significant disruption in the automobile industry. Traditional car manufacturers face two existential threats: that transportation as a service (ridesharing, etc.) will replace traditional models of ownership, especially among urban dwellers. And the rising capex and opex costs on tech, from in-house software to bought-in sensor and mapping systems (e.g. Google maps).

We forecast growth for both media and advertising sectors. Passengers in autonomous cars will likely spend more time interacting with media services, therefore increasing the time they consume content including advertising. As AVs are ‘connected’ to GPS and the internet
in order to operate, location data can be used for advertising in the same was as it is for mobile phones, to connect targeted ads to the consumer. In this case this is a captive and affluent audience. Tech giant Google’s venture in AVs make sense in this context; their understanding of consumers’ habits and attitudes enables them to target their advertising to deliver timely, localised and personalised ads. This results in an overall higher revenue per ad for all parties involved.

As detailed in response to other questions, mass adoption of AVs will affect multiple sectors as transportation is such a fundamental sector. For example, the nightlife industry could benefit: a customer drives to the pub and their car drives them home, or they use increasingly competitively priced ridesharing services. For the media industry, less time focusing on the road opens up more time to watch TV or smartphone browsing, which also benefitting telecoms. The list is extensive and the potential for other sector growth is massive and beyond a scope we could possibly forecast.

5. **What is the scale of the market opportunity for autonomous vehicles?**

We break the traditional car manufacturers into two broad groups: premium and mass market. We believe that on the whole, car ownership will decline when fully AV cars have rolled out, and that mass market car makers will see a sharper fall in total sales, whilst premium carmakers will see an increase. This is as premium carmakers can continue to trade on their brand strength and have the potential to dominate models used for premium ride-sharing services.

Car brands also face the threat currently posed by ‘tech’ giants including Google and Uber. Whilst partnerships are forming, the issue that arises is a question of who gets access to the data and intellectual property generated by pilots. Companies like Ford and BMW, by developing their own automation systems, will maintain control. Similarly, BMW, Mercedes and VW banding together also gives them control, and in the long term could protect themselves from losing business to Google and Uber. The reality facing most carmakers is that autonomous technology adoption is vital for their long term survival.

It is key to note that the fortunes of Google and Uber are likely to be dependent on very different factors to that of Apple and Tesla. The former will target mass-market ride sharing and transportation as a service. Whilst Apple and Tesla, who rely on the strength of their brand and products, are more likely to target the premium market where car ownership is still valued for reasons of status and performance. We believe that the auto industry, despite attempts to dictate terms of change, will lose out as start-ups and tech giant’s capture an increasing share of the market.

**Creating an enabling environment**

10. **Will the successful deployment of autonomous vehicles require changes to digital or physical infrastructure?**

Yes. For AVs to operate, especially for ridesharing, software, and the infrastructure that supports it, is vital and more important than hardware. At present 4G is not fast enough to
support full automation, but 5G is expected to resolve this issue. Therefore the digital and physical infrastructure to roll-out 5G is necessary, especially with an increasing number of AVs expected on the roads.

In terms of the current climate in the UK, the DoT’s current ‘step by step’ approach to regulatory reform at present does not enable testing of level 4 (fully autonomous) AVs; this needs to be amended as this is a clear requirement to ensure that safety standards can be developed. The more ‘autonomously driven’ miles that are accrued for both level 3 (partially) and level 4 (fully) AVs, the safer they will become. Only with real road experience can AV developers refine their software to be ready for what might happen on the road.

Due to the nature of our research into specific applications of autonomous technologies, mostly in relation to their relevance for the media sector, we have not provided answers to questions 4, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18.

2 November 2016