

# The Future of Driverless Haulage

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<b>Contents</b>	Foreword	05
	Introduction	06
	The Financial Impact of Driverless Technology On The Haulage Industry	09
	How The Financial Impact of Driverless Technology Could Affect The Consumer	12
	Conclusion	15

## Foreword /

“Being part of the Government’s driverless cars trials, AXA is delighted to be a partner in bringing semi-autonomous and autonomous vehicles to UK roads.”



### Foreword by David Williams, Head of Underwriting, AXA UK

Driverless vehicles are the future. AXA believes that they have the potential to transform society for the better. Autonomous vehicles can help reduce the needless number of lives lost through road traffic accidents caused by human error and assist in driving down fuel costs and consumption. In cities, the project has the potential to change the idea of car ownership altogether and consign costly and time consuming traffic jams to the history books.

Furthermore, it can play a critical part in helping people currently excluded from driving for whatever reasons to lead more independent lives, thereby improving their quality of life and helping connect people, and keep them connected via driverless cars.

Being part of the Government’s driverless cars trials, AXA is delighted to be a partner in bringing semi-autonomous and autonomous vehicles to UK roads. We are committed to developing insurance solutions for new and emerging risks as technological innovation seeks to improve the lives of our customers, and are proud that our involvement will help create a regulatory framework that will support the most significant transformation in road travel since the introduction of the internal combustion engine.

To date our focus has been more on the individual vehicle and looking at the impact of driverless consumer or retail motor vehicles on society and the UK’s highways and byways.

However, automated technology has the potential to transform the haulage industry, with very significant implications for the UK’s roads, in terms of safety and congestion, for its environment, businesses and the UK economy as a whole.

In commissioning this economic modelling, we wanted to discover the financial impacts of introducing driverless haulage fleets. The results confirmed our suspicion that automated freight will not only be much more efficient and make the roads safer for other users, particularly for those travelling at night, it will also reduce the prices of the end products that we all buy. If logistics can be made cheaper and more efficient, the cost of goods can potentially come down accordingly.

We hope that you find the report of interest. For our part, AXA looks forward to playing a role in making the world of driverless haulage a reality.

**David Williams,  
Head of Underwriting, AXA UK**

## Introduction /

The logistics industry employs over two million people in the UK. Of these, more than 10 per cent work in road haulage. Along with the other forms of air, sea and land transport which make up this vital sector, hauliers contribute at least £55 billion to the UK economy every year.<sup>1</sup> Considered separately, road freight generated £22.9 billion in 2013.<sup>2</sup>

Logistics personnel bring in our imports, distribute our exports, and move everything we take for granted. Despite this crucial function, few of us give much thought to how the items on our supermarket shelves get there, and when the Freight Transport Association took to the streets to ask them about this, the public's understanding of logistics was described – perhaps charitably – as 'modest'.<sup>3</sup> This despite there being more than 450,000 registered Heavy Goods Vehicles (HGVs), on UK roads.

The low profile awarded to logistics is perhaps odd when we consider the significant hazards to those within the sector: 2013 saw more than 6,000 accidents involving HGVs, comprising a total of 8,448 casualties, 258 of which were fatalities. There were around 81 fatal or serious accidents per billion miles. This may seem a small figure, but is only slightly lower than for all forms of vehicles combined. Indeed, the freight figure was as high as 139 per billion in 2003, so much progress has been made toward improving safety in the sector.<sup>4</sup> However, it has been suggested that since then lorries have been involved in an increasing percentage of fatal traffic accidents on >>

## The Logistics Industry



Britain's roads. Indeed, recent analysis has indicated that last year HGVs were involved in more than half of fatal motorway accidents and one-in-five fatal accidents on A-roads, continuing negative trends over the last five years.<sup>5</sup> So there is still a lot more to do in regards to HGVs' road safety. There are consistently about 2000 major injuries and nine deaths every year.<sup>6</sup>

Driverless car technology has featured in the news regularly over the past couple of years, whether it be a Toyota Prius retro-fitted with 'Google Chauffeur', a university department's science project, or just someone with a laptop hijacking Jeep's on-board computer<sup>7</sup>, but you could be forgiven for thinking that they will not make it onto the road anytime soon. There are a number of obstacles to the roll-out of such 'autonomous vehicles', ranging from security, ethical aspects, insurance implications and the most important issue of all - whether consumers want them.

However, there are many reasons why we should want driverless technology. For example, we could eliminate those accidents caused by human error, as well as road rage and free up the "driver's" time while travelling. Furthermore, just as the huge rise in fraudulent 'whiplash' claims has driven up insurance costs, the knock-on effect of fewer collisions could be a lowering of insurance premiums. Eventually, with the removal of things like a steering wheel and dashboard, a driverless vehicle should also have the capacity to carry more passengers than a driven counterpart, thus resulting in less cars on the road and a reduction in congestion. Significantly improved fuel efficiency would bring significant cost and environment benefits too.

While the positives may outweigh the negatives, the fact remains that even the best driverless prototypes have a considerable way to go, and it appears that Google has its work cut out if it really wants its driverless cars to retail by 2017.<sup>8</sup> That's not to say that we have not come a long way since the dream of autonomous transport was born – one glance at 1956's Firebird II should convince even the most sceptical. Certainly, semi-autonomous automotive features, ranging from ABS systems and cruise control to automatic 'safe distance

technology', have been available to consumers for years, and it hardly seems improbable that the true driverless experience is within our reach.

And if there are benefits to cars driving themselves, then the autonomous HGV has at least as much to contribute to society. Safety levels in the logistics industry have improved greatly over the last decade, but this does not mean they should not, and cannot, get better by the introduction of driverless technology. Indeed, it may prove easier to trial prototypes within a logistic role instead of with consumers, who may well desire a more refined product than an industry user. After all, we might trust a driverless-prototype more readily with our groceries than ourselves.

This is why more work needs to be done to make functional driverless technology a reality, as is reflected in the Government's backing of the Bristol-based VENTURA project and UK AUTODRIVE in Milton Keynes. AXA, as a leading insurer of UK drivers, is extremely pleased to have been selected to assist in this work. A driverless future will change the insurance business at its core, but it could also change society for the better.

<sup>1</sup> Pwc.com, accessed 30/07/15 - <http://www.pwc.co.uk/transport-logistics/transport-and-logistics-logistics-posts.html>

<sup>2</sup> gov.uk, Department of Transport Statistical Release, Road freight: economic, environmental and safety statistics (2015), accessed 30/07/15 - [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/405225/road-freight-economic-environmental-and-safety-statistics-2013.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/405225/road-freight-economic-environmental-and-safety-statistics-2013.pdf) accessed 30/07/15

<sup>3</sup> Love Logistics Website, 'Public Attitudes to the Logistics Sector' (2009/2010), accessed 30/07/15 - [http://www.lovelogistics.co.uk/export/system/modules/com.fta.sites.lovelogistics/resources/v1/downloads/public\\_attitudes\\_to\\_the\\_logistics\\_sector.pdf](http://www.lovelogistics.co.uk/export/system/modules/com.fta.sites.lovelogistics/resources/v1/downloads/public_attitudes_to_the_logistics_sector.pdf)

<sup>4</sup> Gov.uk, Department of Transport Statistical Release, Statistical Release, Road freight economic, environmental and safety statistics (2015), accessed 30/07/15

<sup>5</sup> <http://www.bettertransport.org.uk/media/21-10-2013-lorry-fatalities-research>

<sup>6</sup> Health and Safety Executive, Logistics (2013), accessed 30/07/15 - <http://www.hse.gov.uk/logistics/sic2007.pdf>

<sup>7</sup> <https://next.ft.com/2baf3e0-321f-11e5-8873-775ba7c2ea3d>

<sup>8</sup> ft.com, 'Clock Ticking on Google's Driverless Cars' (May 14, 2014), accessed 30/07/15 - <http://www.ft.com/cms/s/0/062d0f98-daec-11e3-8273-00144feabdc0.html#axzz3hHun5Moj>

# The Financial Impact of Driverless Technology On The Haulage Industry /

## Rationale and Methodology for this Study

Driverless vehicles will have a profound effect on society at large and many industries – particularly those predicated on transportation – will witness a paradigm shift. Almost every industry in the UK relies to some extent on transporting goods from one place to another and the cost of doing so is ultimately fed through to consumers. If the cost of haulage decreases dramatically as a result of driverless technology, it stands to reason that the cost of many goods will also fall.

On this basis, this study – undertaken in conjunction with Douglas McNeill, an independent financial analyst and expert in the transport and logistics sector – assesses the macroeconomic savings that could result from the use of driverless vehicles over the next ten years for the transport and delivery of goods.

## The potential savings

The potential savings fall into four main categories: labour, fuel, insurance and vehicle utilisation:



**1. Labour savings** would arise as driverless vehicles reduced the need for drivers. Owing to the demographics of the driver workforce, it is likely that this could be accomplished without compulsory redundancies – there are already concerns that drivers are set to retire at a faster pace than they can be replaced.<sup>9</sup>



**2. Fuel consumption savings** would arise because computer-controlled vehicles drive in a more efficient manner than those driven by people, thanks in particular to the practice of 'platooning'.<sup>10</sup>



**3. Insurance savings** would arise if driverless vehicles proved less accident-prone. Insurers, who bear the cost of accidents, would see those costs fall, and would be able to pass on the benefit to the haulage industry in the form of lower premiums.



**4. Vehicle utilisation savings** would stem from the fact that driverless vehicles would be free of the constraints imposed by restrictions on driver working hours and would thus be able to operate more hours in a given day or week, and to drive through the night with greater safety for other road users. Thus fewer vehicles would be required overall, and it would become unnecessary to replace every vehicle at the end of its working life.

For each of the four categories where cost savings are expected to be made, we have calculated three possible scenarios – a Low Case (where the saving to the haulage industry over ten years is at the lower end of expectations), a High Case (where the saving is at the upper end of expectations) and a Base Case, which sits between the two.

<sup>9</sup> "The transport and storage sector currently employs around 8 per cent of the UK workforce, but will need approximately 1.2 million additional workers by 2022 to meet its needs." UKCES, Understanding Skills and Performance Challenges in the Logistics Sector, Evidence Report 86, Gwenn Winters, Skills for Logistics, 2014. Re skills and driver shortages facing the haulage industry see also: [http://www.fta.co.uk/export/sites/fta/\\_galleries/downloads/logistics\\_report/Web\\_files/LR15\\_WEB\\_270415.pdf](http://www.fta.co.uk/export/sites/fta/_galleries/downloads/logistics_report/Web_files/LR15_WEB_270415.pdf)

<sup>10</sup> Lammert, M., Duran, A., Diez, J., Burton, K. et al., "Effect of Platooning on Fuel Consumption of Class 8 Vehicles Over a Range of Speeds, Following Distances, and Mass," SAE Int. J. Commer. Veh. 7(2):2014, doi:10.4271/2014-01-2438. "Platooning" is the grouping of vehicles as a method of increasing the capacity of roads, via the electronic or mechanical coupling of groups of smart (automated or semi-automated) vehicles.

**Underlying assumption**

The economic modelling is based on the hypothesis that all vehicles in the UK fleet are replaced by driverless vehicles over a period of ten years. It is not assumed, however, that this would eliminate the need for drivers. It is likely that drivers would still be required for such purposes as delicate manoeuvring at the start and end of journeys (in depots, for instance), accompanying vehicles in order to be able to intervene in the event of technical problems, and handling administration at the point of delivery.

**Summary of Findings**

Here we summarise the anticipated cost savings across the four main categories described above:

Labour costs, fuel costs and insurance costs will generate a recurring annual saving. However, we are assuming that the gains start off small and build up over time.

The figures in the table below are the estimated annual cost savings per year by year 10 of having introduced driverless haulage vehicles.

**Estimated annual cost savings**

	Labour Costs	Fuel Costs	Insurance Costs
Low Case	£734m	£631m	£853m
Base Case	£1.5bn	£1.4bn	£1.1bn
High Case	£2.2bn	£2.2bn	£1.7bn

The savings for vehicle utilisation are not annually recurring. Rather, these are totals that would arise over the course of several years as the non-replacement of vehicles reduces the fleet to a new, lower number of vehicles required due to the driverless vehicles' ability to operate for more hours in a day. Thereafter, vehicle replacement would have to resume.

	Vehicle Utilisation
Low Case	£8.4bn
Base Case	£13.5bn
High Case	£16.9bn

The table below shows the impact of introducing driverless haulage vehicles over a ten year period, assuming that the savings on labour, fuel and insurance are accrued gradually throughout that period as the market adjusts to incorporate driverless haulage and the total vehicle utilisation saving remains fixed year on year as non-replacement of vehicles reduces the fleet to the new, lower, number of vehicles required.

**Total savings in £ billions**

	Year	1	2	3	4	5	6	7	8	9	10	Total
Low Case	Labour, fuel, insurance	0.0	0.2	0.5	0.7	1.0	1.2	1.5	1.7	2.0	2.2	11.1
	Vehicle Utilisation	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	8.4
												<b>19.5</b>
Base Case	Labour, fuel, insurance	0.0	0.4	0.9	1.3	1.8	2.2	2.7	3.1	3.6	4.0	20.1
	Vehicle Utilisation	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	13.5
												<b>33.6</b>
High Case	Labour, fuel, insurance	0.0	0.7	1.4	2.0	2.7	3.4	4.1	4.8	5.4	6.1	30.6
	Vehicle Utilisation	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	16.9
												<b>47.5</b>

As the table demonstrates, we expect that the financial impact of introducing a significant number of driverless HGVs on the UK haulage industry will be between £19.5bn and £47.5bn over the next ten years, with total cost savings of £33.6bn over the ten year period being our Base Case assumption.

## How The Financial Impact of Driverless Technology Could Affect The Consumer

Lower costs to businesses using driverless haulage should ultimately result in lower costs to the end product. Currently, the cost of haulage is factored into the cost of a product – one would expect the reduction in cost per delivery to be similarly reflected in pricing.

To illustrate the financial impact to households of bringing driverless haulage vehicles to UK roads, this report looks at the likely impact of more efficient, cheaper haulage on retail costs. Comparing the potential savings to current UK retail expenditure after 10 years of driverless haulage vehicles delivering goods

around the country, we estimate that – as a Base Case – the annual savings from lower fuel, insurance and labour costs would amount to over half of a person’s weekly retail expenditure or almost one and a half weeks’ worth of groceries.

In a High Case scenario, the savings roughly equate to a week’s total retail expenditure or two week’s food shopping.

### UK retail sales - £bn

	All items	Food only
Per annum	373.5	151.8
Per week	7.2	2.9

### Annual Savings by scenario - £bn

	All items	Food only
Low case	2.2	2.2
Base case	4.0	4.0
High case	6.1	6.1

### Annual savings by scenario – as multiple of weekly totals above

	All items	Food only
Low case	0.3x	0.8x
Base case	0.6x	1.4x
High case	0.9x	2.1x



## Conclusion /

- Beyond the well-known road safety, traffic congestion and environmental benefits, AXA's research finds that there would be significant economy-wide business and consumer advantages with the advent of automated haulage and logistics vehicles
- AXA has outlined four major potential savings that would arise from the introduction of driverless haulage fleets: fuel, labour, insurance and vehicle utilisation
- Estimated £33.6bn of savings (potentially as high as £47.5bn) after 10 years from the introduction of driverless haulage vehicles
- If cost savings from fuel, labour and insurance were passed on to consumers, this would equate to over half of a person's weekly retail expenditure or almost one and a half weeks' worth of groceries, and could possibly be as much as a week's total retail expenditure or two week's food shopping
- Driverless technology already occupies a prominent position in the new Government's agenda; the UK has the opportunity – with continued political support and industry innovation – to be a world-leader in a new frontier for transportation





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