

2018 Annual TRL Academy Symposium | London

The future of UK road freight:

Navigating from vision to mission



Introduction

The Academy Symposium is a showcase for areas of research that are of fundamental importance. TRL invites speakers each year to a flagship event it hosts in London, to share the stage with experts from academia, industry and the public sector, to explore and debate diverse topics of interest. Symposium themes from recent years have included automated vehicles, data science and

In 2018, the selected landmark topic was 'The future of UK road freight: navigating from vision to mission'. This is not just highly relevant in terms of the net contribution of the freight industry to 'UK plc', but the inherent strategic importance of logistics to the future development of industry, transport and commerce. This is especially critical in the context of Brexit and a spectrum of economic and political considerations fundamental to the dramatic changes facing society coming to terms with disruptive technologies.

The Academy Symposium this year talked around the challenges facing the freight industry, and while there are many, this report will look at the solutions to these challenges. These debates will help inform how the industry can move forward on the steps that need to be taken to rise to these challenges. Importantly, the industry has galvanised and agreed with Government that urgent action is needed, and as a result of the quality discussions promoted by presenters and delegates at the Academy Symposium, TRL will host a cross-industry workshop to draw up an action plan for collaboration between Government and the various industry stakeholders.

It's time for a real change

The sector is under pressure to operate more efficiently and to reduce emissions. Customer demand is rising, and margins are shrinking. New technologies such as connected and automated vehicles promise solutions. However, they bring a variety of new challenges along with them. Although the future of the freight industry largely depends on the arrival of Brexit, everyone in the sector understands there is a need for real change, and quickly. What most would agree is a risk averse sector, the freight industry is under significant pressure to operate more efficiently, and to reduce emissions in accordance with the Road to Zero policy.

The TRL Academy Symposium invited industry professionals and academics to discuss and address these issues and explore the questions yet to be asked around the viability of future freight concepts. Experts across the industry debated the issues in an open forum to lead the UK freight industry to a safer, greener freight environment.

Topics discussed included the challenges facing the freight industry; the technological, operational and environmental considerations of freight transport; policy considerations, supply chain concepts and new business models; freight traffic control and other innovative ideas; and the feasibility of implementing real-world, on the road trials. All were discussed through key presentations from industry leading spokespeople including:

Nick Gazzard

CEO of Incept and Fellow of the Chartered Institute of Logistics and Transport



Matthew Edwards

Senior Policy Adviser, Energy Technology and Innovation Directorate for the Department of Transport



Professor Samir Dani

Professor of Logistics and Supply Chain for Huddersfield Business School



Professor Tom Cherrett

Professor of Logistics and Transport Management within Engineering and Physical Sciences for the University of Southampton



Gavin Bailey

Freight Specialist at TRL



Wake-up call

Nick Gazzard, FCILT, CEO Incept

Nick Gazzard vividly described the state of the freight industry today and the challenges it would face in the future, including the growth of urban logistics, lack of consistent air quality and the advent of Brexit. His presentation focussed on what the freight industry would look like in the future and how the industry can ensure cleaner and quieter deliveries.

Gazzard advocated a need for a wake-up call within the freight industry. Whilst the world's infrastructure is set to quintuple in size, the UK is continuing to lose its competitive advantage. With revenues of £770 billion (26% of GDP), the sector is one of the most important for UK Government. This is further bolstered by the fact that the industry is a net employer of approximately 1.7–2.2m people (8% of UK employment) within between 63,000 and 192,735 companies, all coming together with a revenue of £770bn (26% GDP)¹.

Gazzard continued by explaining that the industry needs to reduce costs, adapt and make changes faster and more efficiently. He argues that decisions to connect infrastructure must be made but recognised that the difficulty around this includes the frequent change in governments and ministers and a chronic level of underfunding.

“ As a main driver of competitiveness, logistics can make you or break you as a country ”

Uri Dadush, Trade Director World Bank

Meanwhile, Gazzard underlined the human tragedy of inertia: “While we wait 22 years for the 2040 conventional vehicle ban, pollution may contribute to 880,000 premature deaths.”

Considering the recent reports around climate change, the UK freight industry must make significant decisions and improve funding and integration, or it will fall behind when compared to other countries. Brexit may disrupt things, but there is a need to accelerate thinking and change the model we are working within to meet our targets for emissions and air quality. He also called for the UK freight industry to make significant changes to its fleet in a bid to hit the climate change targets set for 2030, explaining that to achieve a reduction in emissions by five times in the next 11 years, focus, dedication and a togetherness across the industry not seen for many years will be required.

Gazzard extended his presentation by explaining that we must prepare the freight industry and the infrastructure surrounding it for the future, given the following:

- The global logistics sector will quadruple by 2050 but UK share of global trade in goods is shrinking.
- UK transport infrastructure ranking is going down rapidly.
- If we don't hit climate change targets by 2030, we never will – need to slash emissions by five times in the next 11 years.
- Air pollution contributes to 40,000 early deaths per annum.
- It will take 42 years to reach legal limits for air quality.
- We will have killed over 880,000 people by the time we do anything.
- Businesses should be paying tax to use UK infrastructure.

We need a workable model for the future. This must include free trade; innovation and investment; impartial advice; faster independent decisions; more relevant research and data.



Zero tolerance

Matthew Edwards, DfT

The Government's Road to Zero strategy was launched in July 2018 with a long-term ambition of decarbonising road transport and to place the UK at the forefront of the design and manufacture of zero emission vehicles by 2040. According to Matthew Edwards, the transport sector is the single largest emitter of greenhouse gasses (GHGs), accounting for 20% of the UK total. In addition, it is a significant contributor to poor air quality, the fourth largest threat to public health in the UK after cancer, heart disease and obesity. If this wasn't enough, in 2017 there were over 147,000 million tonnes.km moved, of which 76% was transported by road and just 9% by rail. The goods moved by road generated 18,599 million vehicle kilometres, 30% of which was empty, all of which is set to grow in the future¹.

This is a large reason why the Road to Zero strategy states that the freight sector is the lifeblood of the UK economy, and is why zero emission technologies must be developed and made available commercially for all types of HGVs.

The latest iteration of the IPCC (United Nations Intergovernmental Panel on Climate Change) report makes it very clear why it is so important to combat the impact of global warming and reduce GHGs. Poor air quality is a serious issue that must be combatted. Although the Euro 6 standards have achieved significant air quality improvements, CO2 levels have remained relatively constant in recent years. This makes the development of zero emissions technology a priority to be available commercially for all types of HGVs.

In support of innovation and improved understanding the Government launched the Low Emission Freight and Logistics trial (LEFT). It was a £20 million commitment to drive innovation, cut emissions and improve air quality by showcasing new technologies to encourage the widespread introduction of low and zero emission vehicles to UK fleets.

The competition included a range of vehicle weights and trialled electric, hydrogen, gas and hybrid alternatives. Testing was completed both on road and within laboratories including the TRL HGV testing initiative.

In summary, Edwards described the Road to Zero strategy as a rallying call to the freight and logistics sector:

- to speed up efforts to clean up road transport;
- to speed up efforts to decarbonise road transport;
- to build on our early momentum, and;
- to grasp a substantial share of the £1trillion available by 2030;
- to bust the myth that traffic has to be polluting;
- to leave the environment in a better state than we inherited it, and;
- to transform the world we all live in for the better.

¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/661933/tsgb-2017-report-summaries.pdf

Commitments made/aims of the Road to Zero strategy include:

- Road to Zero is not all about cars – chapter 2C is about HGVs.
- 40% of new van sales to be ultra-low emission by 2030 – as early as 2019 a significant amount of fully electric panel vans will be coming out on the market.
- End the sale of petrol/diesel vans by 2040.
- Looking to double the use of biofuels by 2032 – it is believed this will have some impact on reducing emissions.
- Extending clean vehicle retrofit accreditation scheme (CVRAS) to include HGVs and vans. The need to reduce emissions will see uptake of alternative retrofit technology as clean air zones are introduced. This scheme provides the certainty that vehicles will be compliant with these zones.
- Continuing grants for vans/HGVs weighing more than 3.5 tonnes.
- Reforming van Vehicle Excise Duty (VED).
- Work with industry to agree on 15% voluntary reduction in HGV GHG emissions by 2025.
- Assess zero emission technologies for HGVs on the UK road network.
- Work is being completed to define what an ultra-low emission truck standard would be – this includes working with the low carbon vehicle partnership to develop this standard.
- Edwards believes that the technology and innovation is there for the Government to achieve the commitments made by the Road to Zero strategy. The need to reduce greenhouse gasses is the driving force behind the Road to Zero strategy, despite its growth over the last three years within the transport sector.



Doing the numbers

Professor Samir Dani, University of Huddersfield

Data is critical. The biggest surprise according to many in the freight sector is the lack of correct information about everything from the size of the industry through to how much it contributes to the UK economy. As Nick Gazzard stated, 2014 estimates of the sector's Gross Value Added (GVA) varied from £55-96 billion, with the variance of £41 billion being larger than the entire UK defence budget!

To be able to develop effective plans in the future, having the right data at the industry's fingertips is a must.

According to Prof. Samir Dani, the proliferation of internet enabled devices and the flood of data these bring with them should provide an opportunity for the freight sector to harness information that will enable efficient logistics operations. However, how the data is delivered and in what format is a critical question that must be answered. Working collaboratively in the future to answer this question is the only way forwards, according to Dani.

Technology innovations, and the speed at which they are being introduced, are happening regardless of the freight and logistics industry, so a question to the sector is whether it is adapting quick enough to this evolution. Innovations including the Internet of Things (IoT) and Blockchain to name a couple are bringing with them hurdles to overcome. IoT is a particularly interesting concept, which Dani believes will have an impact on the freight and logistics sector. Smart containers, sensors that capture data, trace parcels... the list goes on. How the industry secures these advancements of course is something that will require a lot of work.

Dani recognised that decarbonisation and sustainability are required, but these cannot work without technology. For example, asset sharing and shared mobility platforms (or 'uberisation', the latest entrant to our vocabulary), has created a whole new technology area to analyse and incorporate into our thinking. With issues such as a chronic lack of drivers exacerbated by the supply / demand pressure on drivers' salaries, hiking costs are a very real problem for the industry. Asset sharing and shared mobility platforms could be a way to bring costs down and resolve the driver crisis.

Significant numbers of companies are reviewing the benefits of Blockchain and whether to use this to create more secure systems and traceability functions. To assist usage, there is a requirement to create more private networks. However, the associated enabling technologies surrounding this new currency are still in a pilot stage in terms of adapting it to the logistics scenario, meaning more time is required before we see any real-world examples.

Overall, Dani asserts that we must all work together as an industry to find out how we deliver increasing data capabilities in the right format. Technologies will be at the heart of this, but it is how we harness these that will be the key to success.



DHL The IOT Ecosystem

Close up and personal

Professor Tom Cherrett, University of Southampton

Prof. Tom Cherrett added to the Road to Zero debate by discussing the emergence of crowd-shipping and how this can be a viable transportation mechanism. Moving away from motorised delivery for the last mile, Cherrett introduced the concept of portering, whereby people walk and cycle the last mile to deliver parcels. Through ongoing work being undertaken as part of the freight traffic control project – a three-year EPSRC (Engineering and Physical Sciences Research Council) funded programme – the University of Southampton is working with parcel carriers in London to decouple driving from the physical parcel delivery, completed by walking.

According to the study (which represents about 7% of the workers in one part of London), it showed that an average parcel carrier in London completing largely business to consumer work does approximately 130 drops per day, moving their van about 38 times, driving roughly 7 kilometres, but walking up to ten kilometres.

The alarming part of this is that the van will often be stationary for up to 70% of the working day; essentially becoming a wasted asset and contributing to what is already a congested city.

It is important to note that weather and topography can decrease efficiency in some areas of portering when considering cities outside of London and Manchester, underlining the need to assess a number of fit for purpose solutions.

Vertical travel is often an issue when considering deliveries, where dwell time parked can be extended immensely due to vertical travel time. A locker system could prevent issues of drivers needing to be parked outside a property trying to find someone on floor seven of an unfamiliar postcode. UPS in New York in 2017 incurred approximately \$17 million of parking fines just trying to deliver parcels. In the future, diminishing kerbside space, due to more cycle lanes for example, means securing access to the kerbside will be increasingly difficult. This is why further solutions are required.

Overall, decoupling driving from walking could decrease the number of vans on the UK's roads, reduce mileage and in turn cut CO2 levels – food for thought as part of the overarching Road to Zero strategy.

Fit for the future

Gavin Bailey, TRL

There are numerous trials currently being undertaken across the UK all demonstrating the range of options available to the freight industry to meet future needs, explains Gavin Bailey. Technologies including the following, Bailey suggests, should be considered in the future:



Freight sharing

Making better use of the assets already being used on the UK's roads. For example, Nestle and United Biscuits discovered they were shipping to the same location. Through backhauling operations, the two organisations reduced 400,000 vehicle kilometres over one year.

Connected and Autonomous Vehicles (CAV)

TRL is involved in numerous trials, many of which will likely have a positive impact on the freight and logistics sector.

Optimisation and machine learning

The notion of mobility as a service (MaaS) to enable users to exploit opportunities in multiple modes, by synchronising them seamlessly so that parcels can travel across multiple modes quickly.

Ultra-low and zero emission technologies

TRL is working on an Innovate UK funded project trialling 19 different applications of low emissions technologies nationwide, ranging from compressed natural gas, electric batteries, hydrogen/diesel dual fuel, lightweight and dynamic trailers and kinetic energy recovery systems.

Aerial drones

The proposition has been made to use drones to make multi-drop deliveries which would supersede portering.

Hyperloop

TRL is involved with Magway around a concept that is the closest to Hyperloop. The aim is to transport freight through small pipes either above or underground. Removing the issues of vacuum currently being found within tubes and levitated pods, parcels can enter at a single point and be delivered to multiple destinations.



Bailey explained that Optimisation and Machine Learning has a big role to play in bringing the freight and logistics sector into the future. The best demonstration we have of this is synchro modal IT and solutions – the notion of mobility as a service (MaaS) for freight – enabling users to exploit opportunities in multiple modes by synchronising them seamlessly in order that parcels can move across multiple modes quickly.

A recent project tested this idea to try and achieve greener transportation of freight, particularly using rail, sea and inland waterways. It discovered that there are numerous complexities in the planning of multi modal movements, not least due to the fact that freight is a complex problem when considering optimisation.

Currently, scheduling is a highly manual process but can be eased with computation optimisation and machine learning to dynamically re-plan routes, redeploying slack capacity to locations where it can actually be used. This solution will potentially improve all elements of the supply chain and enable faster customs processes with distributed systems such as blockchain technologies to guarantee the authenticity of items as it transfers between modes. It would largely address our aspirations for the perfect logistics system achieving agile logistics and utilising the existing capacity to its fullest.

According to Bailey, many of the concepts discussed could be considered outlandish and a long way off. However, the UK has seen a tremendous rate of change and development of innovative technologies, meaning these concepts may be closer to reality than many think. The future of freight should not be considered as a long timescale, but rather be tackled today for a brighter future.

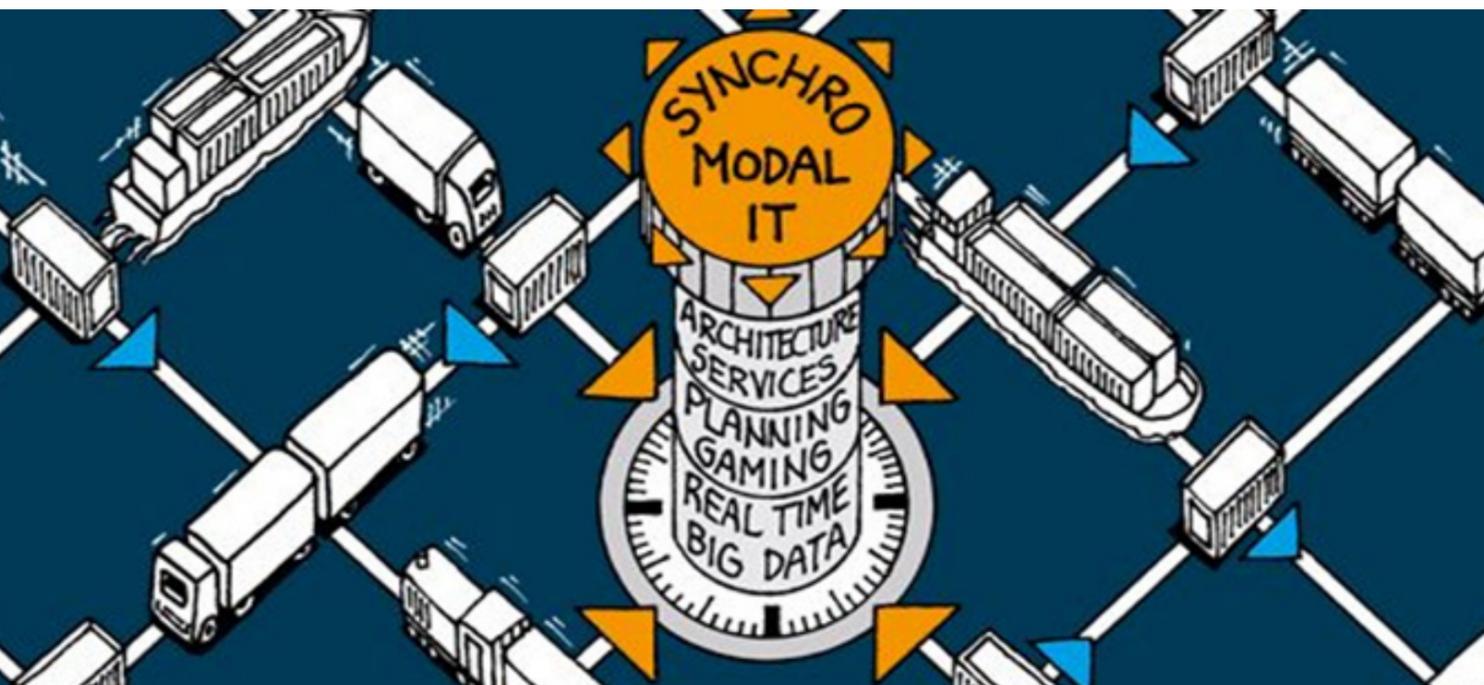
Call to action

Industry action plan

TRL's Richard Cuerden, recognising the strategic imperatives discussed and the urgent need for collaboration between all stakeholders including Government and the logistic industry, committed to TRL hosting a cross-industry workshop to bring clarity to the future direction of the UK Freight Industry. This is to be scheduled in Q1 2019 and all interested parties will be invited to this gathering of key players at a watershed moment for the UK freight, logistics and distribution sectors.

Conclusion

The freight industry is feeling the heat from Government, from its own supply chain and consumers to enable change quickly, efficiently and importantly, successfully. With a wide range of technologies either available or being trialled to be taken advantage of in the future, most agree that it is time the sector took hold of the changes required and delivered a cost-effective, doable plan that will enable it to take charge of its own destiny. To enable this to happen, TRL has promised to hold a workshop in the first half of 2019 whereby key industry players can come together to take hold of the key challenges and provide a workable strategy to resolve them. Watch this space for further information in quarter one 2019.





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