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Workshop on "Innovation in railways"

Summary of presentation from Mr. Paul Campion

Submitted by CEO

I Introduction

The Transport Systems Catapult (TSC ts.catapult.org.uk) is one of 10 Catapult centres created by the UK Government (the Department of Business, Energy and Industrial Strategy, with the funding flowing through Innovate UK, which is the UK government's innovation agency).

It is a not-for-profit company. It is not in the public sector. It is privileged to receive some government funding which enables it to achieve its mission: to progress innovation to commercialisation. We are focused on the Transport Systems market and work to identify the barriers to the commercialisation of innovation and remove them. We do not seek to grow our own business. Our job is to grow the UK economy and UK employment.

The TSC works primarily in collaborations with industry, universities and other academic institutions, and the public sector. It has headquarters in Milton Keynes. 200m from the headquarters of Network Rail but it works across all modes of transport.

II. The UK rail ecosystem

The UK rail system has about 16000 km of track about 1/3 of which is electrified. It carries about 2% of the total trips made per year by UK travellers, and delivers about 8% of the traveller km per year.

Over the last 20 years it has nearly doubled ridership without adding any significant amount of track. Simultaneously it has consistently increased safety and is one of the safest railways in the world.

It has a very complicated structure with both public and private sector organisations working together to deliver journeys. The complexity, the (necessary) focus on safety and the pressures of dealing with significant increases in ridership have created a culture and processes that make it difficult to innovate.

A lot of money is spent in the UK on research into improvements in rail. The focus areas will be familiar to other countries: customer experience, decarbonisation, safety, cost, service reliability to the second and so on. Historically not enough of the research done has been implemented on the operational railway.

The rail research and development infrastructure has been organised into the UK Rail Research and Innovation Network (UKRRIN www.ukrrin.org.uk). This is formed around three centres based at Universities with industry and other universities included in the network through the three centres. In addition, there are three UK rail testing and demonstration locations. The TSC works with UKRRIN.

The UK government funds the rail ecosystem in five-year settlements called Control Periods. The next Control Period (CP6) starts in April 2019. Over the following 5 years the UK government will invest about £35bn in rail.

Included in the CP6 settlement is £247m for research and development which will be matched by (at least) £110m of private investment.

III. Observations about rail innovation

The largest barriers to innovation are not technical. We may be only half-way through the transformation driven by the creation of digital technologies several decades ago. The analogy we could look at is the electricity supply industry. The first central electricity generation systems were set up in the 18880s but the major increases in productivity from the transformation of industry and society driven by electrification did not happen until after the first world war and were not complete until after the second. In order to get the benefits of transformational technologies we have to fundamentally change the way systems and processes work: this is slow and difficult and involves cultural changes, changes to organisational boundaries and measures of success.

Historically the rail industry has focused on infrastructure and vehicles (i.e. trains). Of course, these things are important, and we must continue to invest in them. However, the size of the asset base and the length of the asset lifetimes mean we cannot make the transformational changes we need to at the speed we need to make them in the infrastructure and vehicle layers. It is in the services layer that rapid but transformational change can be delivered. In other words, the ways that assets are used to deliver outcomes. This is not necessarily natural thinking for many of the organisations that currently make up the rail industry.

Transformational change seems frightening and hard. But it is necessary. There has never been a mono-modal train journey because no passengers live at one train station and work or shop at another. (The same is true for freight). But change is happening in other modes very rapidly and new modes (for instance autonomous aerial drones and marine vehicles) are being created. Travellers will expect the ease of journeys including rail to be the same as their other online transactions. If rail does not recognise this and urgently and actively seek out ways to play a part in future multi-modal journeys, then it risks being cut out of those journeys. Of course, there will always be journeys which, for some reason or other, are obviously and naturally best done by rail. But if rail starts to lose out at the margin and rail ridership starts to fall then governmental and societal support for rail will be harder to maintain and a downward spiral could start. It is not too dramatic to say that there could be an existential challenge to rail in the next two decades.

As a final, extra observation I emphasised that, despite the political changes going on at the moment, that the TSC, and the UK rail industry in general continued to be completely committed to play an active role in the international rail ecosystem.