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1 INTRODUCTION

1.1 Fundamentals of rail

In order to attempt to answer the questions posed by this inquiry, it is necessary to appreciate some fundamentals of the railway.

First, throughout the long history of the railways, very few companies have been financially successful over extended periods. In the world now there are examples of economically viable private passenger railways in Japan, and few, if any, elsewhere. For freight, the USA has an extensive and well patronised railway, but its' passenger railways are negligible. The single characteristic which makes passenger railways profitable, is its presence in regions of very high population density. Even in Japan, although the Tokyo, Nagoya, and Osaka corridor is disproportionately dense, and many railways in and between the cities of this region are profitable, the same is not true of the regions of Japan with low population density, such as the islands of Hokkaido in the north and Shikoku in the inland sea. In these extremities the railway has suffered the same problems of historic decline in competition with road traffic and the same closures that have been experienced in the UK. However, in Japan as a whole the railways still enjoy a mode share of ~30% compared with 9-10% in the UK and 6-7% in western European countries.

2.1 Infrastructure is a major cost

Aside from the capex cost of building a new railway, the opex costs can only be recovered by high patronage. In Japan the measure of thousands of passenger kilometres per route kilometre per day (DPD, Daily Passenger Density) is used to assess the output of the railway. For example, Tokyu Private Railway in Tokyo has only 100 route km, but generates a remarkable DPD of 236 and is one of the few examples of a stand-alone economic railway in the world. Conversely the railways in the island outposts of Hokkaido and Shikoku produce DPD of 5 and 5.8 from systems of route length 2500 and 1815 km respectively. A figure of 4 is regarded as the point below which profitability becomes impossible. The major expense of the operating cost is infrastructure maintenance and renewal. Most of the railway infrastructure in the UK dates from the Victorian era. For long periods in its history maintenance and renewals have been skipped or postponed. In recent times Network Rail, with strong Government financial support, has been addressing this backlog. This is the Achilles Heel of railway finance. All too often what should be an asset has become a liability.

But this is not to say that one should not run railways below this critical density figure: but the key questions to be answered are, what is the societal purpose of such a railway, can we be certain an improved railway will achieve its intended wider economic benefits, particularly in job creation, and how and by whom is it to be paid for?

1.3 Importance of population density

To examine the case of Wales, over many areas of the population density is extremely low. To quantify this, Greater London, concentrates about 1/7 of the UK's population, about 9.4 million people, within its area such that nine boroughs have a density > than 10,000 people per km², in contrast, the population density of Cardiff is 2500 / km² per square and in second place Swansea at only 650 / km². Rural areas of Wales include Gwynedd (49), Ceredigion (41) and Powys (26), with almost vanishing small populations. The provision of a whole raft of public services from libraries to rail, from hospitals to schools, from buses to waste collection, internet and mobile connectivity, is clearly facilitated by high population density and conversely, significantly hampered by the opposite.

1.4 Rail length and usage in Wales

Wales has 1485 km of rail route, some 9.4% of the UK total, to serve a population of 3m, about 4.5% of the UK total. With 2 times the length of railway /head, it is tempting to claim that per route km Welsh rail is underfunded. But is this input measure a sensible comparison and is this apparently generous route length sufficiently utilised?

It would seem more persuasive to compare output measures, such as pass km/route km, the DPD parameter mentioned previously, or passengers/operated train km. Values for this are difficult to search out in the open literature and often are not published with sufficient granularity. These notes try to bring together what little data can be found.

In terms of mode share, car use completely dominates. By trips taken, in the UK, the % share is car 62, bus 6, rail 3. By distance, the shares are, 7, 5, 11 and mode travel to work, 68, 7, 11. The most striking feature of rail is that its mode share has approximately doubled in the last 20 years, and, although fares have risen by more than inflation, the economic performance of the system has deteriorated. Very few industries have managed to achieve this perverse result. The most important passenger income to the railway comes from commuting. But this is an essentially one direction flow from the suburbs to the city centre in the morning with a more spread evening peak in the opposite direction. Trains in the counter-flow directions are lightly loaded, so that overall the passenger load factor is much reduced. Sufficient rolling stock must be provided to meet the morning peak which is then often underutilised for the rest of the day.

For the UK as a whole, the DPD is about 11. But consider the variations within the UK, with data taken from ORR Table 2.x 2015-16.

	Pass km m	Route km 1000	DPD
Arriva Wales	1.2	1.6	2.1
Chilton	1.3	0.4	8.9
Scot Rail	2.9	3.1	2.6
Southeastern	4.5	0.7	17.6
Thameslink	8.7	1.2	19.9
TfL Rail	0.5	0.03	45.7
Virgin East	5.3	1.5	9.7
Virgin West	7.5	1.3	15.8
C2C	1.1	0.12	25.1

Wales (and Scotland) appear as outliers and immediately fall well below the Japanese minimum DPD criterion of 4. It is worth recalling that the Beeching plan of the 1960s called for the closure of nearly all the railway in Wales, with the exceptions of the east west routes into England and some commuting lines from the Valleys into Cardiff. Thankfully this did not happen, but the parlous state of railway finance in Wales should be noted. **It is suggested that in the future line-by- line data is collected in order to drill down into the operations of the railway and to separate the traffic which shares parts of the infrastructure, mainly of the major east-west routes.**

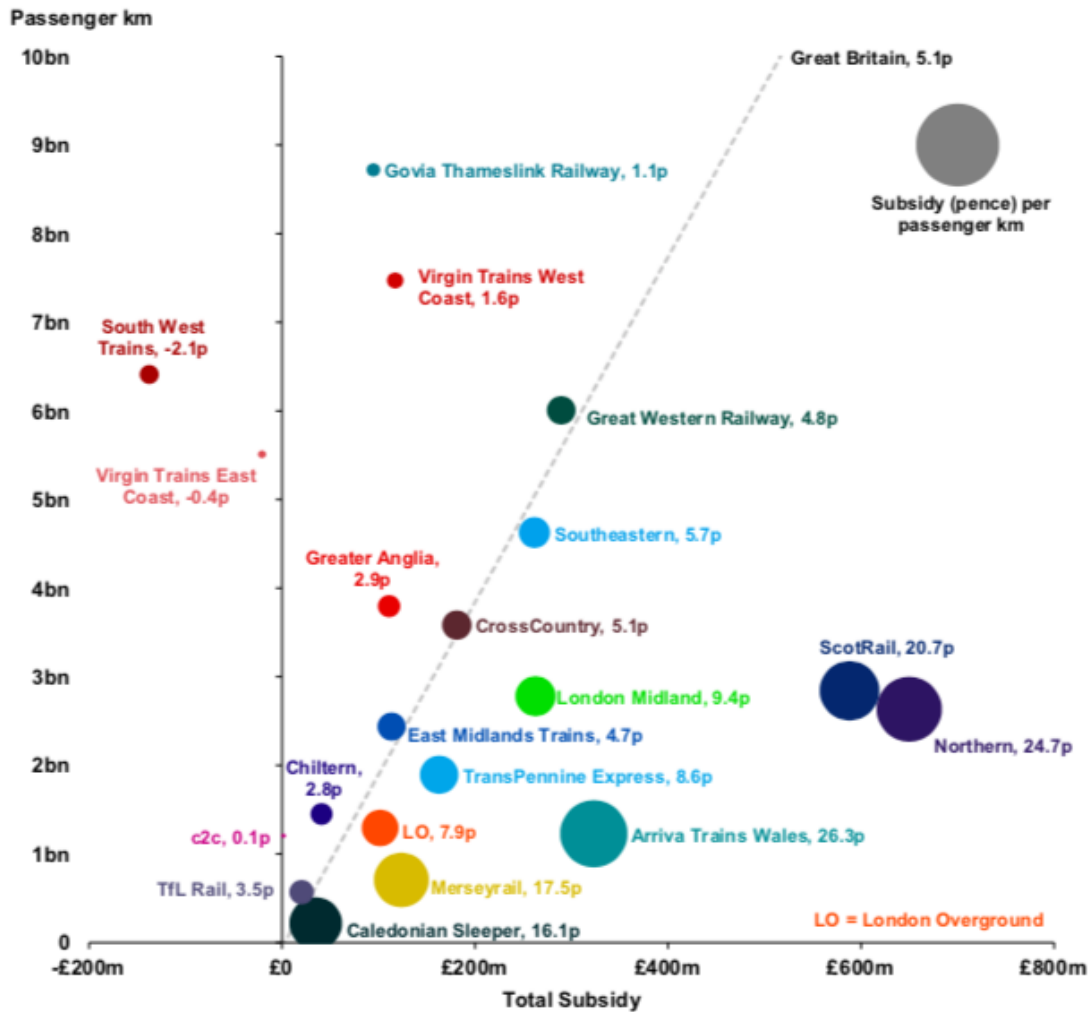
1.5 Rail emissions: carbon reduction

Road emissions from road transport are 1/5 of UK total emissions. Rail emissions accounted for just 0.5% (1.4% of transport) CO₂ emissions in 2018, but 10% of all passenger kilometres were made using rail. So rail as a whole “punches above its weight”. **But trains with low load factors do not have this advantage.**

Even if, in some way train operations became carbon-free overnight, the effect on total emissions would be hardly noticeable. **The most effective way in which train can contribute to the carbon reduction agenda is to substantially increase its mode share by abstraction from cars. This will be both difficult and very expensive to achieve.**

1.6 Subsidy to the railways of Wales

Figures published by the ORR, shown below, enable us to compare the subsidy per passenger km on the railways of Wales with other components of the UK rail system. Note that over the UK system as a whole the subsidy per passenger km is 5.1p. In Wales it rises to the highest figure in the UK of 26.3 p per passenger km.



Transport now takes 27% of Government expenditure, of which 70% is spent on rail, 3% on buses. Rail has enjoyed a good run, which may not continue in the difficult circumstances in which we now find ourselves.

2. HOW DO THESE OBSERVATIONS AFFECT THE ANSWERS TO THE QUESTIONS POSED BY THE COMMITTEE ?

The preamble suggests:

“The need to address long-term weaknesses in the Welsh economy, while also reducing our contribution to climate change, means that investment in rail infrastructure has a key role to play in the post-Covid recovery.”

“While daily travel patterns may change permanently as a result of the pandemic, the need to upgrade Welsh rail infrastructure will remain a priority both in terms of ‘levelling up’ and working towards a Net Zero economy.”

Transport is regarded as a support for the economy. Good transport is a **necessary** condition for a successful economy, but is not necessarily **sufficient**. In the light of the

figures presented in the introduction, it is by no means obvious that the railway in Wales is able to address long-term weaknesses in the economy, or contribute significantly to carbon reduction or indeed that past funding has been less than generous.

The questions posed are:

- *Where does responsibility lie for rail infrastructure in Wales?*
Historically it has been with Network Rail
- *How effectively do the UK and Welsh Governments cooperate with one another in the management, and funding, of rail infrastructure in Wales?*
As far as one can judge, reasonably well, but what is meant by effectively?
- *Should responsibility for railway infrastructure in Wales be fully devolved?*
The Welsh government has taken over ownership of the franchise of train operations in Wales, primarily as “operator of last resort” as ridership figures are now about 10 to 12 % those of pre-Covid levels.
Rail professionals generally favour vertical integration as the preferred way of running a rail system. The fragmentation caused by privatisation in the UK is slowly being mended, a trend that will likely continue. In principle, I would favour full devolution of both operations and infrastructure, together, in the longer term, with finance, but how a financial settlement would be established is problematic. Given that there is a benefit in scale, then for the foreseeable future remaining with Network Rail, utilising their specialised equipment and expertise is probably the preferred option. But Network Rail needs to significantly improve its performance to reduce costs and timeliness of delivery.
- *What share of investment has Wales secured in its rail infrastructure since privatisation came into effect in 1994, and how sufficient is that level of investment?*
Sufficient for what? Has it had a fair share? What is fair? See the introduction. It could be argued that the share has been generous when measured against use.
- *How is funding allocated to rail infrastructure projects across the UK and how are the different infrastructure needs of the regions and nations of the UK assessed?*

Broadly speaking at the highest level by inadequately strategically informed Government decision, moderated by the Treasury. Currently rail is given over 50% of public expenditure on transport, a much higher figure than its mode share. At a lower level, by capable and considered planning by Network Rail, taking into account as far as possible both local public opinion and financial constraints.

- *What will be the impact of the Covid-19 pandemic for the railway network in Wales (including the sustainability of services and potential impact on investment in the railway infrastructure)?*

Who knows? The effect on the confidence of people to use public transport will take a significant time to overcome. It will be difficult to prise people out of the cocoon of

safety of their car. Commuting to work may well be lessened and home working may become more significant. What is sure is that the railways are now in a very difficult and unsustainable financial position, the recovery from which will require painful political decisions about ownership and financing. The effect on air travel, internationally and nationally, may have impacts in rail planning, bus and coach usage may decline further. The situation will develop over the next few years: speculation now is little better than guesswork.

- *What opportunities are there for Wales as a result of the recently launched Union Connectivity Review?*

The most obvious ones are strengthening the North Wales, South Wales East-West corridors, improved connections between Chester/Wexham/Crewe/HS2 and some possible improvements in mid-Wales to Birmingham. Major speed up improvement to the existing rail infrastructure will prove to be extremely expensive.

3 WHAT ARE THE FUTURE NEEDS FOR RAILWAYS IN WALES

The first priority is to strengthen resilience of the existing infrastructure against the effects of climate change, particularly flooding, embankment collapse and bridge foundations. Recent years have demonstrated on many occasions the fragility of the existing infrastructure. Improvements and monitoring will be expensive, but will have little visibility to passengers.

It should be recognised that future possibilities may be limited by both the public response to and the financial burden of the Covid pandemic.

The east-West links in the north and south of the country can be improved by improving frequencies and modest improvements in journey times.

Significant improvements in service levels are possible in the Cardiff metro system, and along the M4 corridor to alleviate congestion on the motorway and to improve connection with Bristol.

Although improvements to the North-South link might be desirable, major changes are likely to be extremely expensive and not justified by the ridership.

Overall changes in carbon emissions are not likely to be improved significantly by changes in traction power, although low cost electrification for minor lines could play a role. Increased mode share would be the most effective path.

There is no shortage of reports on potential rail developments. Hendy reported on Network's Rails Investment Programme in 2015, Network Rail's Welsh Route Study (2016), Welsh Assembly Rail Priorities of the same year, the Burns report of the SE Wales Transport Commission (2020) and the recent A Railway for Wales document, New Opportunities for Wales, all contain interesting and useful aspirations. In addition the Hendy report on Union Connectivity and the William's report on the structural organisation of rail in the UK report are due soon.

The role of the Severn Tunnel on access to and from south Wales is paramount. Longer term is an alternative needed?

Any future plans should be better justified by increased attention to operational statistics, particularly with regard to ridership. The ways in which improvements in interconnectivity will enhance employment prospects need to be well justified and thought through.

Much can be learned from International practice. Examples are, the so-called third-sector community railways, stations as “pearls in the necklace of the line” and the diversification of small railway operations to include real-estate and retail opportunities. There are examples of how stored value card ticketing and truly integrated train/bus/taxi operations can be introduced to make the use of the railway more attractive to passengers.

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