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The rail freight sector in Great Britain: how and why is it changing?

Future of Mobility: Evidence Review

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The rail freight sector in Great Britain: how and why is it changing?

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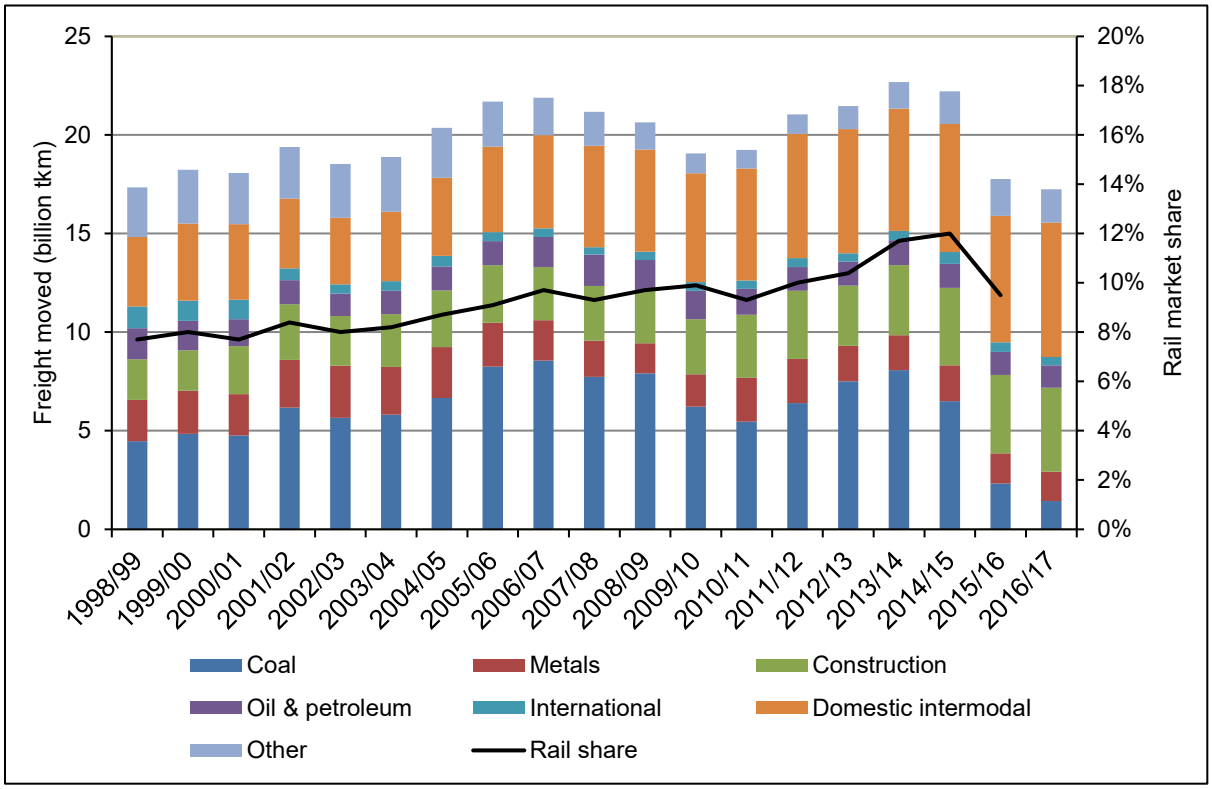
Contents

1. How is the rail freight transport system changing?

The long-term post-war decline in rail's share of the British freight transport market was reversed in the mid-1990s (Department for Transport (DfT), 2016a). As Figure 1 shows, there was a broadly upward trend through to 2013/14, followed by a sharp decline in both the amount of rail freight moved and in rail's share of the British freight market. This recent decline has been caused primarily by rapid reductions in the use of coal for electricity generation (Office for Rail and Road (ORR), 2017a): in 2013, just before the dramatic reduction in coal traffic, rail carried nine times more coal than was transported by road (DfT, 2016a). The total non-coal rail freight moved was at the highest recorded in 2016/17, so the decline caused by coal is not indicative of a wider problem for rail.

Figure 1. Rail freight moved (by commodity) and rail share of the land freight market



Source: based on ORR (2017b); market share data in calendar years (e.g. 1998 rather than 1998/99)

Wider changes in the demand for freight transport present both challenges and opportunities for rail freight, but in general, the characteristics of freight flows are

becoming more of a challenge for rail. Rail works best for large, regular flows, ideally over long distances (Harris & Schmid, 2003). The changing nature of industry and retailing is leading to smaller volume, more dispersed flows. This has been identified at the European level with structural changes to the economy, including 'changes in the industrial production process and the fragmentation of logistics' having led to negative effects on rail freight (Directorate General for Internal Policies (DGIP), 2015, p.3). The proportion of Britain's GDP attributed to production (which includes manufacturing) declined from 25% in 1990 to 14% in 2013 (Office for National Statistics (ONS), 2014). Amidst these challenges, new forms of intermodal transport potentially represent a high-growth market segment, and rail freight may be able to exploit this opportunity (DGIP, 2015).

Despite these changes, it is estimated that rail carries goods worth more than £30 billion a year, and generates more than £1.6 billion in annual economic benefits to the UK economy (Rail Delivery Group (RDG), 2015). The fastest area of growth in rail freight has been domestic intermodal transport,[1] which almost doubled in volume between 1998/99 and 2016/17 and increased its share of the rail freight market from 20% to 39% (see Figure 1). Based on the number of trains operated (see Annex A), an estimated 85% of domestic intermodal activity is maritime-related (i.e. containers moving to and from ports). Rail has an extremely small share of the genuine domestic market for flows that are unitised or have the potential to be unitised.

Constraints on the capacity of the rail network and increasing competition for network access have resulted from the growth in both passenger and freight rail activity (Network Rail, 2017a). The existence of a defined Strategic Freight Network (DfT, 2009) and dedicated funding for network enhancements to improve capacity and support growth in rail freight (Network Rail, 2014) aim to ensure that freight is taken into account in network development and operations. A Freight Network Study published in 2017 set out a range of schemes that would develop key rail freight corridors in the long term (Network Rail, 2017b). Building on this study, the Network Rail Freight and National Passenger Operator Strategic Business Plan looks beyond

[1] Intermodal is defined as 'the movement of goods in one and the same loading unit or road vehicle, which uses successively two or more modes of transport without handling the goods themselves in changing modes' (United Nations Economic Commission for Europe (UNECE), 2001).

2024. (Network Rail, 2018). Between 2019 and 2024, the government has stated its intention to continue funding further rail freight enhancements (DfT, 2017).

One potential opportunity area identified is to use spare capacity on the passenger rail network at certain times of the day to transport goods. Particularly, this could have impact on shipments into, out of and across urban areas where the challenges of last mile logistics are greatest (Arup, 2015).

2. How is the user engaging with the rail freight transport system?

The issues relating to user engagement depend on the definition of the user: rail freight operators or their customers. The latter can be divided into shippers (e.g. manufacturers, retailers) and logistics service providers.

From the operators' perspective, high fixed costs and long-life assets make it challenging to change operating practices in the short term (DfT, 2016b). Some decisions made now will most likely have long-term effects until 2040 or beyond (locomotives typically have a 25–30-year operating life). Political uncertainty adds risk to the rail freight operators. The five-yearly Network Rail funding settlement, and associated track access charging regime, provide some medium-term certainty for operators, but this does not overcome uncertainty and risk in the longer term. The DfT Rail Freight Strategy (DfT, 2016b) gives a clearer policy framework that will help the industry plan ahead and provides greater certainty to investors and customers. Industry organisations (e.g. ORR, 2012b; Rail Freight Group (RFG), 2014) argue that, for long-term investment (including in new technologies), there needs to be certainty over the strategic policy direction. This affects rail freight operators and their customers alike, given the considerable cost and associated payback period for many types of investment.

Freight customers are not a homogenous group, and they have differing requirements and expectations of transport modes. Non-users of rail freight perceive bigger obstacles to using rail than users do, and non-bulk rail users are more price sensitive than bulk users (ORR, 2012a). In general, though, service-quality attributes such as 'information/responsiveness to customer needs' and 'track and trace' are not

seen as critical issues. However, service attributes ranked more highly by customers (e.g. cost, flexibility, service recovery) can be influenced by technology.

Rail freight operators prefer to operate complete trainloads, but individual customers do not always have sufficient volume. In some cases, logistics service providers act as intermediaries, aggregating volume from a number of different customers (Network Rail, 2010).

3. How is technology changing the freight transport system?

When compared with road, access to and use of the rail network is tightly controlled, with systems in place to promote safe and efficient train movements. Technology is critical in achieving this, with applications already determining the position of trains on the network, recording which assets (e.g. locomotives, wagons) and consignments are on a particular train, and documenting the condition and maintenance requirements of locomotives and wagons (Woodburn, 2016).

There are many areas where technology has the potential to help rail freight play to its strengths, including the following:

- **Network performance:** through the Digital Railway initiative, signalling and train-control technology can increase network capacity and improve train performance (Network Rail, 2017b). More efficient techniques can improve asset management and reduce the amount of time that routes are unavailable because of planned and unplanned maintenance (Rail Safety and Standards Board (RSSB), 2012).

- **Train operational performance:** this relates, for example, to the use of longer and heavier trains with remote control locomotives within the train (SNCF, 2014), or the use of more ‘intelligent’ technologies to increase train loadings.

- **Transhipment techniques:** intermodal freight transport requires seamless transfer between modes to be cost- and time-competitive compared with road haulage (Monios & Bergqvist, 2016).

- **Customer service:** there are opportunities for improved supply-chain visibility and transparency using information technology (e.g. for consignment tracking and

tracing), building on internal rail industry systems (see, for example, DB Cargo, 2017).

- **Decarbonisation:** there is potential to decarbonise rail freight activity through use of proven technology, notably electrification if the means of electricity generation is not based on fossil fuels (Sims et al., 2014). Other new technologies such as bi-mode, hydrogen fuel cells, or batteries can also reduce CO_2 emissions. Lesser environmental benefits may result from technologies to improve diesel fuel consumption (European Commission, 2011), to help improve driving techniques, and to implement regenerative train braking for electric trains (RSSB, 2011).

The success of some of these areas (e.g. network performance, decarbonisation) is closely related to government policy and funding towards railways and, specifically, Network Rail. Some recent deferrals or cancellations of rail network enhancement projects[2] may limit the likelihood of change. Government involvement in other freight transport modes, notably road freight, will also influence rail's role in meeting Britain's freight transport requirements. Rail freight could form a vital part of a more efficient and sustainable end-to-end freight system by making use of new technologies and business models to integrate, for example, rail for the long haul and electric road vehicles for the 'last mile' urban distribution (DfT, 2016b). Initiatives such as 'Flexible Freight' are considering innovative ways in which technology can be used to enable rail to better cater for small volume, time-sensitive freight flows (RDG & RSG, 2017), given the decline in traditional bulk freight flows.

[2] See, for example, cancelled electrification schemes (Hansard, 2017).

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5. Annex A

Table A1: Data table for Figure 1. Freight moved by rail (billion tonne kilometres), by commodity grouping (1998/99 to 2016/17) and rail market share (1998 to 2015)

Financial year	Coal	Metals	Construction	Oil & petroleum	International	Domestic intermodal	Other	Total	Rail market share (%) (calendar year)
1998/99	4.47	2.10	2.06	1.57	1.10	3.53	2.51	17.34	7.7
1999/00	4.85	2.19	2.04	1.50	1.01	3.92	2.73	18.23	8.0
2000/01	4.77	2.09	2.43	1.36	0.99	3.84	2.60	18.09	7.7
2001/02	6.17	2.43	2.81	1.22	0.60	3.54	2.62	19.39	8.4
2002/03	5.66	2.64	2.51	1.15	0.46	3.38	2.72	18.52	8.0
2003/04	5.82	2.41	2.68	1.19	0.48	3.53	2.77	18.87	8.2
2004/05	6.66	2.59	2.86	1.22	0.54	3.96	2.53	20.35	8.7
2005/06	8.26	2.22	2.91	1.22	0.46	4.33	2.29	21.70	9.1
2006/07	8.56	2.04	2.70	1.53	0.44	4.72	1.89	21.88	9.7
2007/08	7.73	1.83	2.79	1.58	0.37	5.15	1.73	21.18	9.3
2008/09	7.91	1.53	2.70	1.52	0.42	5.17	1.38	20.63	9.7
2009/10	6.23	1.64	2.78	1.45	0.44	5.51	1.01	19.06	9.9
2010/11	5.46	2.23	3.19	1.32	0.42	5.68	0.94	19.23	9.3
2011/12	6.41	2.24	3.45	1.20	0.45	6.31	0.99	21.06	10.0

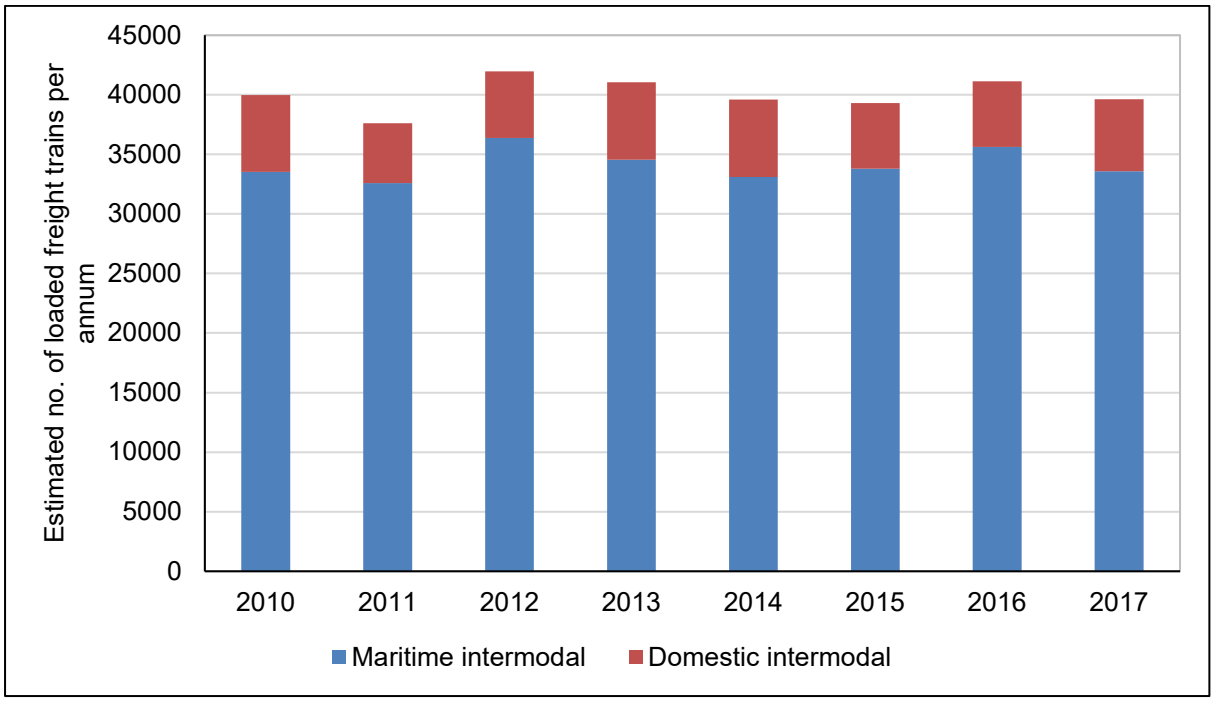
2012/13	7.50	1.81	3.05	1.21	0.43	6.30	1.16	21.46	10.4
2013/14	8.07	1.77	3.56	1.27	0.47	6.19	1.36	22.71	11.7
2014/15	6.50	1.82	3.93	1.21	0.60	6.49	1.67	22.21	12.0
2015/16	2.32	1.53	3.98	1.17	0.48	6.42	1.86	17.76	9.5
2016/17	1.43	1.50	4.25	1.13	0.43	6.81	1.70	17.25	n.a.

Source: based on ORR, 2017b

Composition of domestic intermodal commodity grouping used in ORR statistics

This commodity grouping, accounting for 39% of all rail freight moved in Britain, covers all dedicated intermodal service provision apart from those services travelling through the Channel Tunnel. It is perhaps confusingly named, since the majority of activity is to and from ports as part of international transport activity (i.e. maritime intermodal), with just a small part being genuinely domestic intermodal traffic. Official statistics do not break down the total into its two key components, but an original database of rail freight service provision compiled by the author each January allows analysis of the rail freight market at a far higher level of disaggregation than is possible from the official statistics. Figure A1 (and the accompanying data in Table A2) show the annualised estimate of the number of trains in each year since 2010 overall and for the two components.

Figure A1: Estimated number of loaded maritime intermodal and domestic intermodal trains per annum (2010 to 2017)



Source: author's annual rail freight database

Table A2: Estimated number of loaded maritime intermodal and domestic intermodal trains per annum (2010 to 2017)

	2010	2011	2012	2013	2014	2015	2016	2017
Maritime intermodal	33,525	32,600	36,375	34,550	33,100	33,800	35,625	33,575
Domestic intermodal	6,450	5,000	5,600	6,500	6,500	5,500	5,500	6,050
Total	**39,975**	**37,600**	**41,975**	**41,050**	**39,600**	**39,300**	**41,125**	**39,625**

Source: author's annual rail freight database

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