How rail systems work around the world

A comparative review of international approaches by Rail Delivery Group

Atocha Station (Madrid, Spain)

The purpose of the report is to review different rail organisation and management models in select countries (France, Germany, Spain, Sweden and Japan) and provide a comparative analysis in contrast to the UK's rail regime. The key findings have been summarised for this factsheet, accompanied by selected comparative metrics which help contextualise the respective rail systems, their size and relative performance.

Overview

In Europe, the organisation of rail networks is primarily determined by EU regulations, including the requirements for the separation between the Infrastructure Manager and Railway Undertakings (train operator).

The application of these regulations however varies considerably by country; reflecting interpretation, characteristics of the respective networks, and political organisations and priorities. Therefore, there is not a single model, and each country has developed its own approach.

The model in Japan differs significantly, both in structural organisation and as a consequence of the network characteristics and usage.

Any view on overall effectiveness needs to consider the respective models overall, rather than necessarily taking an individual component in isolation, however we can draw some high-level conclusions and comparisons.

Key findings

- **There is separation between the Infrastructure Manager and Railway Undertaking across all observed European countries.** However, it is observed that in France and Germany the main Railway Undertaking and the Infrastructure Manager come under the same holding group, whereas in Spain and Sweden the two organisations are completely separate.
- **There is a legacy Railway Undertaking in each of the European countries.** The dominance of the legacy Railway Undertaking varies, but generally they have managed to maintain a dominant position.
- **There is a very clear distinction between the definition of commercial and Public Service Obligation (PSO) passenger services in all the other European countries.** Commercial services are delivered through an open access model, even where the long-distance network has remained an effective national monopoly.
- **The concession model is the norm for PSO services.** PSO services are clearly defined, and relate primarily to regional and urban services. The GB model of specifying and tendering long-distance services is not the norm elsewhere.
- **There is generally a higher level of devolution to regions within a country for the specification, procurement and management of PSO services.** This reflects the popularity of decentralised government models in other countries compared to the UK. There are even regional variations in the contracting models, and therefore not a single, standardised contract model within each country.
- **There is a clear focus on the responsibility for the specifying authority to determine the services which are to be provided, and which also have associated quality standards.** Bidders for PSO services deliver to these specifications. This establishes clearer responsibility between the specifying authority and the Railway Undertaking which delivers the service.
- **The Japanese model has a very limited role for government, with no role in specifying services.**
- **There are different approaches observed for rolling stock and service facilities**, but fair and equal access is a critical factor in market opening and competition.
- **There is generally greater multi-modal integrated ticketing at a regional or city level than is seen in the UK**, with the exception of London. Regional authorities are generally responsible for revenue risk in PSO concession.
- **Long-distance ticket pricing tends to be market-led**, reflecting the commercial nature of the services. Comparably, ticketing for long-distance services does not appear to as regulated in the UK.

The contents of the report and factsheet (including all values) were sourced in March 2024. For information on the references used for this factsheet, refer to the full report or please contact Rail Delivery Group.

Rail Delivery Group

National Rail

Comparative metrics

of the countries reviewed and the UK

	UK	France	Germany	Spain	Sweden	Japan
Population (million)	67.35 m	67.9 m	83.2 m	47.4 m	10.45 m	125.7 m
GDP (GBP billion)	£2,488 b	£2,138 b	£3,078 b	£1,031 b	£462 b	£3,570 b
GDP per capita (GBP ,000s)	£36.9 k	£31.5 k	£36.9 k	£21.8 k	£44.0 k	£28.4 k
Rail route length (route miles)	10,140	17,218	24,474	9,704	6,781	16,780
Route length by country size (route miles per 100 km^2)	11.05	3.14	6.84	5.02	1.67	-
Route length by population density (route miles per 10,000 inhabitants)	1.51	2.55	2.94	2.05	6.49	-
Percentage of electrified network (route miles)	38%	60%	54%	65%	75%	74%
Length of High-Speed rail network (miles)	70	1,699	976	2,254	534	1,741
Network density train per day per route/km	77	36	61	23	30	-
Passenger train km (million t/km pa)	558 m	375 m	852 m	168 m	127 m	-
Passenger km (million km pa)	69,148 m	95,950 m	102,900 m	27,272 m	14,617 m	435,063 m
Rail passenger transport modal share (% passenger-km by land)	4.9%	9.4%	6.4%	5.2%	7.4%	33.8%
Freight tonnage pa	33,141 m	33,771 m	128,700 m	10,459 m	22,717 m	18,042 m
Rail freight transport modal share (% tonne-km by land)	8.7%	10.3%	18.6%	4.1%	28.8%	5%
Infrastructure expenditure – maintenance and renewal (GBP billion)	4.35 b	£4.44 b	£5.64 b	£0.59 b	£0.68 b	-
Maintenance and renewals as percentage of all infrastructure expenditure	58%	82%	63%	27%	35%	-
Punctuality of long distance and high-speed passenger services (RMMS)	67%	76%	71%	89%	72%	-
Punctuality of regional and local passenger services (RMMS)	86%	90%	88%	92%	89%	-
Punctuality of domestic freight services (RMMS)	93%	71%	65%	90%	77%	-
Passenger revenue (GBP million)	£11,214 m	£12,299 m	£13,402 m	£2,905 m	£1,068 m	£353,382 m
Percentage of PSO services (train/km)	99%	72%	83%	70%	58%	-
Percentage of non-PSO services [commercial / open access] (train/km)	1%	28%	17%	30%	42%	100%
Safety: Railway passenger fatality rates (2010-2020) per billion train/km	0.01	0.03	0.025	0.43	0.015	0
Safety: Level crossing accident rates per million train/km (2018-2020)	0.01	0.04	0.03	0.02	0.03	-

Comparative data for European countries sourced from several publications and datasets from the EU and pan-European agencies. By contrast, data for Japan is more limited and is consequently more difficult to provide, as it is either not published in an official form, or the basis of the dataset is not comparable to the European data sets. Accordingly, where comparable data is not available, data for Japan has not been included to avoid misleading comparisons.

About the Rail Delivery Group

If you have travelled by train or booked a journey for friends or family, you will have used one of Rail Delivery Group's (RDG's) services. We are integral to the running of the railway and play a crucial part at every stage of the customer journey.

We provide customers with information on their train service, we help them reserve their seat, we offer them discounted fares through Railcards, and we help arrange assistance for those customers that need additional support when travelling by train. We do all of this and much more.

Next year, we will be celebrating 200 years of Britain's railway. But, at RDG, we are not content with doing things as we've always done them. We're active in pushing forward change, driven by our purpose to create a simpler, better railway for everyone in Britain.

To access the full report or for more information, please email **policy@raildeliverygroup.com**

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