

## **A Study of Recent Management Modifications after Railway Reform in Japan and the UK**

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**Abstract:** Both Japan and the UK have passenger-dominated railways. Nevertheless, these two countries have experienced completely different types of railway reform. The Japanese National Railways (JNR) were reformed by the model of horizontal separation, in which the passenger sector is vertically integrated and the freight sector accesses the passenger company's infrastructure. On the other hand, the UK adopted the model of complete separation, where the operator and infrastructure manager are completely independent. Nevertheless, both railways have been facing certain difficulties after the reform. Japanese passenger integrated railways have concerns about financial difficulties of unprofitable lines, and the passenger railways in the UK suffer from coordination problems between infrastructure and operation. Recently, these two railways introduced some cases which modified the original management model to solve the problems. The modified management model has large similarities in its organizational structure.

*Keywords:* Vertical Separation, Railway Reform, Management Model, Vertical Integration, Coordination Problems, Unprofitable Lines

### **1. INTRODUCTION**

Over the last few decades, the market share of railways declined severely in many countries largely because of competition with other transportation modes such as road and air (UNESCAP, 2003). This condition has been the same in both Japan and the UK. Accordingly, the management of the railways in Japan and the UK has been worsened.

Figure 1 shows the transition of passenger transport in Japan since 1950. Fortunately, Japan already constructed the fundamental trunk railway lines across the country before the age of motorization started. Nevertheless, as road traffic has increased rapidly since the 1960's and the market share of railways has declined accordingly, JNR has become in deficit since 1964. Thereafter, debts were accumulated to approximately 25 trillion yen by the time of JNR Reform in 1987 (Aoki, E. et al., 2000).

In addition to the changes in the transport market, JR East (2000) notes other reasons for the poor performance of JNR:

- 1) misguided intervention from a government;
- 2) excessive operating costs;
- 3) insufficient management incentives; and
- 4) lack of management dynamism.

Many other state-owned railways could not improve their management, and the above-mentioned reasons are quite similar to those for the failure of these railways overseas.

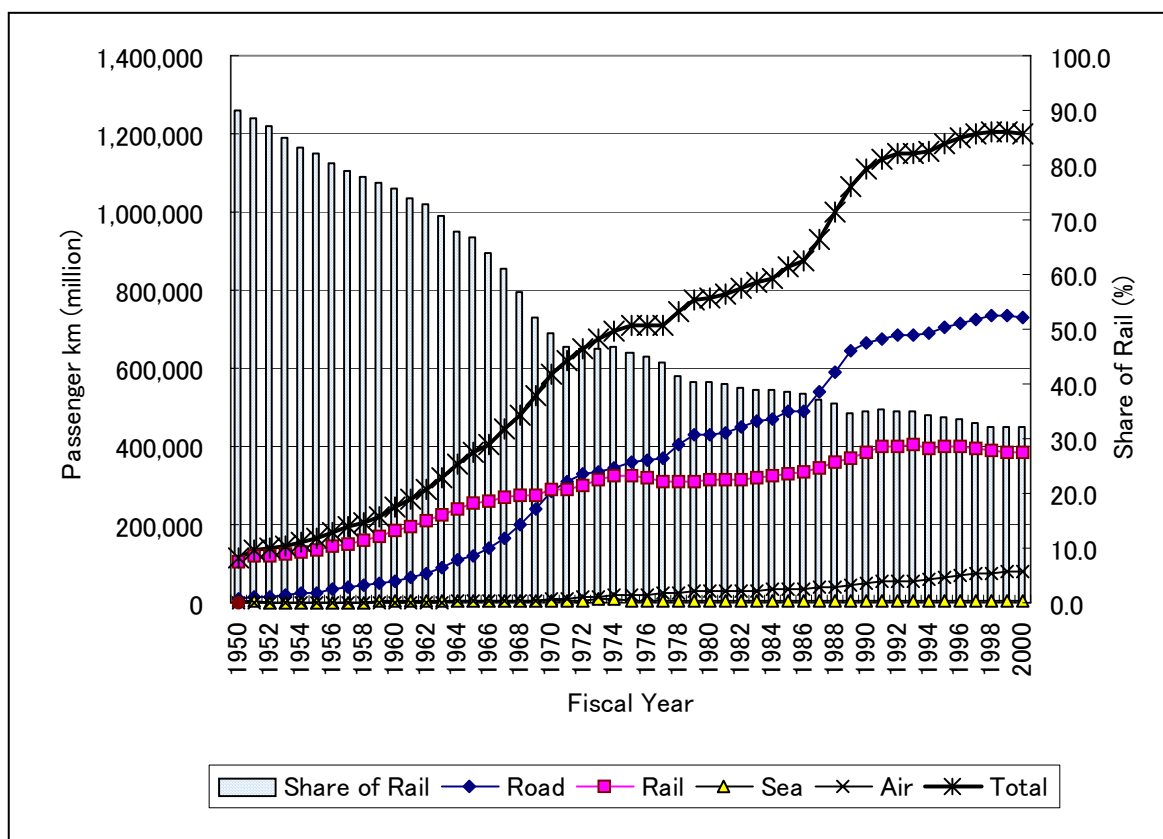


Figure 1 Transition of the Passenger Transport in Japan since 1950

Source: Ministry of Land and Transport (2012)

Although British Railways (BR) was reformed since 1994 adopting vertical separation, which is different from JNR Reform, Japan and the UK interestingly have the similar characteristics in the transport market. Table 1 shows that, different from many other overseas railways, both railways are passenger-dominated.

Table 1 Units of Traffic by Market Sector in Japan and the UK (Year 2011)

Country	Passenger-km (million) (A)	Freight tonne-km (million) (B)	Passenger-km / Traffic Units (A)/(A+B)
Japan	244,600	20,228	92.4%
UK	54,500	19,000	74.1%

Source: [Japan] Ministry of Land and Transport (2012)

[UK] Department of Transport Statistics (2012)

In addition to the above-mentioned similarities in their railway market shares, Japan and the UK also have similar geographical characteristics that they are island countries surrounded by the sea, and Table 2 shows the population, area and population density of the two countries.

Table 2 Geographical Area and Population in Japan and the UK

Country	Population (million)	Area (thousand km <sup>2</sup> )	Population Density (persons/ km <sup>2</sup> )
Japan	127.8	378	338
UK	61.8	243	254

Source: [Japan] Statistic Bureau (2012)

[UK] Ministry of Foreign Affairs of Japan (2012)

Considering the fact that the transport market conditions in the two countries have a close similarity, although many state-owned railways have adopted different structures through their railway reform, it could be assumed that the appropriate model of railway management would have common characteristics in Japan and the UK.

In order to prospect the appropriate model of railway in the two countries, this paper firstly investigates the following issues:

- 1) An outline of railway reforms in Japan and the UK;
- 2) Problems the railway sector in these countries faced after their railway reforms;
- 3) Recent cases in which each railway modified the original management structure to solve the problems.

Based on the above investigation, at the end of this paper, this study tries to discuss the appropriate model of railway management in these countries, both of which have passenger dominated railways.

In order to implement the above-mentioned research, as a methodology of this study, the study performs investigation based on a variety of reliable materials and interviews/questionnaires to the concerned persons and specialists in Japan and the UK.

## 2. OUTLINE OF THE RAILWAY REFORM IN JAPAN AND THE UK

### 2.1 Railway Reform in Japan

As railways in Japan are passenger-dominated, the freight revenue has been less than the passenger revenue for many years, and JNR had accumulated heavy debts especially in the freight sector and it threatened JNR's financial viability as a whole (Aoki, E. et al., 2000).

In April 1987, JNR was reformed and split into six passenger companies and a single freight company (JR-Freight). In this model of railway reform, the unprofitable freight division was separated from the profitable passenger division and the cross-subsidy between the two divisions was terminated.

Since the reform, each of the six passenger railway companies owns the infrastructure and operates the railways paying infrastructure costs through the model of vertical integration. JR-Freight accesses the trunk line section of the passenger railway companies and performs

the businesses nation-wide. At the time of railway reform, the government owned all stocks of the six passenger companies and JR-Freight. Then, the stocks of the three passenger railway companies in the main island of Japan, JR-East, JR-Central and JR-West, were gradually listed on the market and all the stocks of these three railways were listed during the period 2002 - 2006. Currently, the stocks of JR-Freight and the other three passenger railway companies in the three islands of Japan, JR-Hokkaido, JR-Shikoku and JR-Kyushu, are still owned by the government.

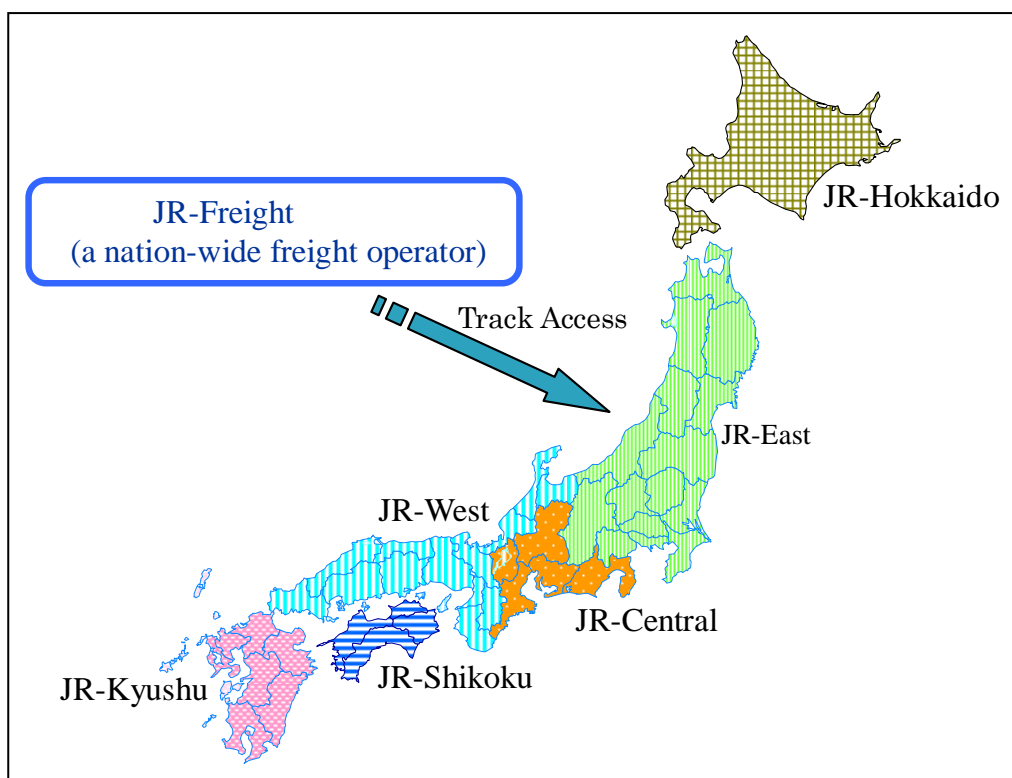


Figure 2 Outline of the Reform of the Japanese National Railways (JNR)  
Source: Authors

## 2.2 Railway Reform in the UK

In the UK, British Railways (BR) was radically reformed during the period 1994-1997. It was still owned by the government in 1994, but was divided into a number of entities by 1997. The process is outlined as follows (Kain, P., 1998):

- Railtrack became the sole owner and manager for the entire railway infrastructure, and was sold in 1996 to the private sector through flotation on the stock market;
- The right to run the ex-BR passenger trains was franchised to 25 private sector train operating companies (TOCs), through the newly created (passenger) Franchising Director;
- BR's freight train operations (including rolling stock) were split into six companies, and two companies bought them;
- BR's passenger rolling stock was sold to three rolling stock leasing companies (ROSCOs), and these companies lease vehicles to train operators;
- Many subcontracting companies were created, mainly to maintain and improve infrastructure.

The author's interview to the former manager in BR found additional characteristics of the reform of BR, including that:

- The government had a strong intention to perform privatization of BR through the railway reform;
- The reform was aimed to promote competitions within the railway sector;
- It was intended that new operators were able to enter the railway market with low amount of initial costs (sunk costs) by designing so that the operators do not need to buy neither infrastructure nor rolling stock;
- It was designed in order that the private sector can enter the passenger market through competitive bidding and it can enter the freight market through open access.

Thus, the reform in the UK was designed so that the new entrants need to pay only running costs of the railway operations practically. In order to achieve the above-mentioned aims, the restructuring of BR was fragmented as shown in Figure 3.

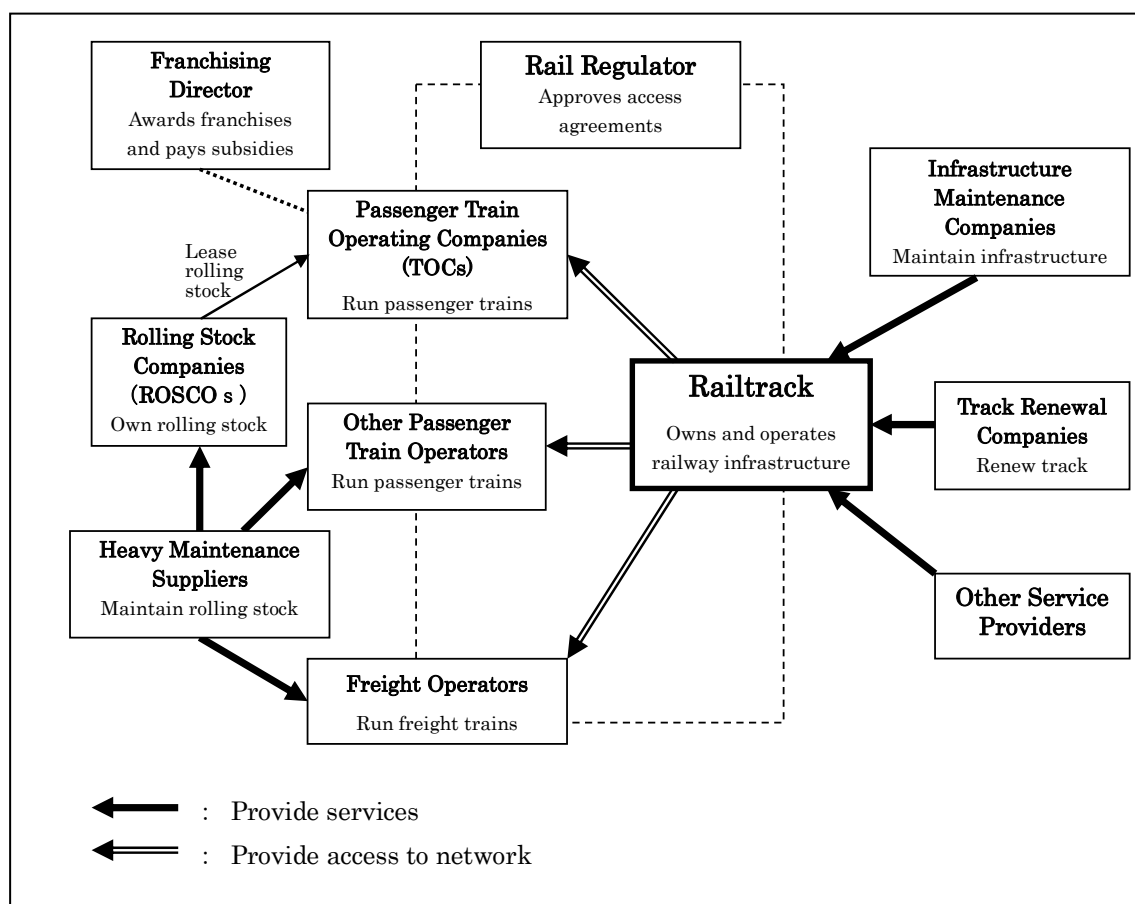


Figure 3 The British Rail Industry in 1996-7

Source: Kain, P. (1998)

The infrastructure was transferred to a separate company, Railtrack, which was then privatized. However, the worsening maintenance condition of the network was highlighted by the Hatfield accident, and the government placed it into administration in 2001. Then, Railtrack was replaced by Network Rail, a new 'not-for dividend' organization limited by guarantee (Rail Freight Group, 2007).

### 3. DIFFICULTIES IN THE ORIGINAL MODEL AFTER THE REFORM

This section investigates the difficulties that each railway management in Japan and the UK faced after the reform described in the above section.

#### 3.1 Financial Difficulties in Japanese Railways

Different from overseas vertically separated railways, Japanese passenger railways pay the expenses for the maintenance and upgrade of the infrastructure. As most of the other private urban passenger railways also operate railways by the model of vertical integration, this kind of financially independent management has been commonly accepted by the people in Japan so far. Behind this kind of distinct characteristics in Japanese passenger railway management, there are several advantageous conditions in Japanese passenger railway market:

- 1) Japan has many large and medium size cities on the coastal line, which provides advantageous market conditions for railway operation;
- 2) Fundamental railway lines in Japan had been already constructed before the age of motorization, and the urban and residential area has been developed around stations;
- 3) Japanese passenger railways provide competitive services against other transport modes.

Figure 4 shows the passenger density of the six passenger railways and that in the UK.

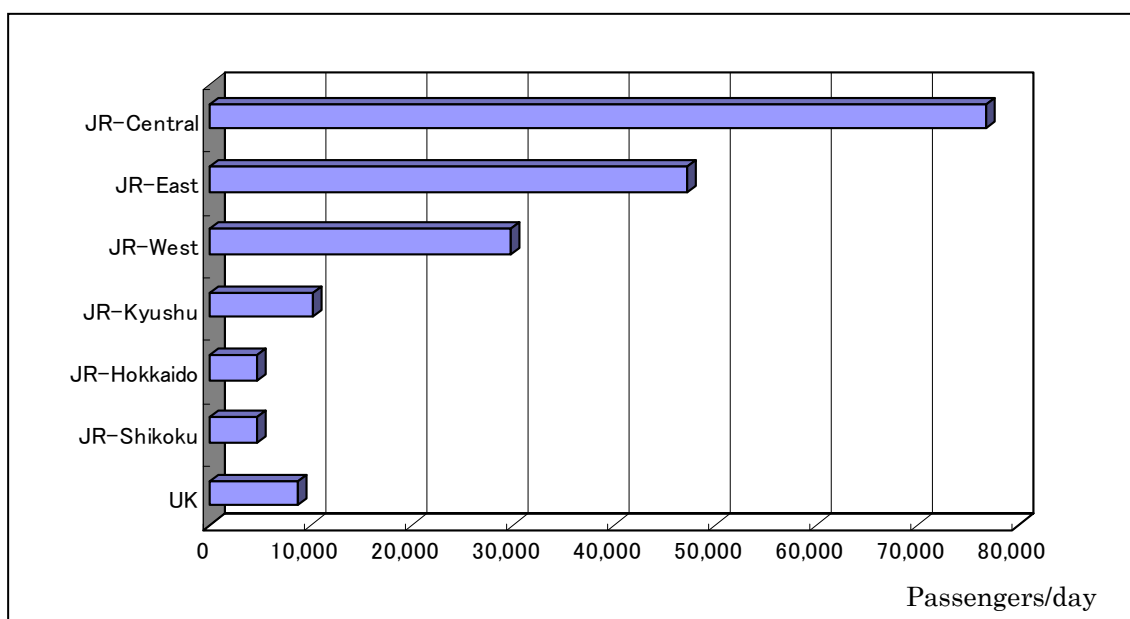


Figure 4 Comparison of Passenger Density among Railways in Japan and the UK  
Source: UIC (2011)

As this figure shows, the privatized three passenger railways have much larger passenger density than the railways in the UK based on the above-mentioned advantageous conditions. The passenger density of JR-Kyushu is slightly higher than that of railways in the UK, and the other two railways, JR-Shikoku and JR-Hokkaido, have lower passenger density than the railways in the UK.

The Japanese railway management model, which the railway company pays the expenses of infrastructure investments and maintenance, seemed practically difficult for the latter three railways. Thus they received a certain amount of finance, namely a Management Stabilization Fund, from the government at the time of JNR Reform, and their management has been balanced by including the interests of the Fund.

Regarding the former three privatized railways, they did not receive such finance from the government at the time of JNR Reform, and have not received annual subsidies from the public sector since then. Although the management status of each line is not open to public, the three privatized railways practically own a large number of loss-making lines within their network, and they are operated by cross-subsidy from the profit-making lines such as urban commuting lines around metropolitan area and Shinkansen lines connecting large cities. Nevertheless, relying on cross-subsidy as the sole means of funding such unprofitable services is not recommendable for management of the railway company. Nash (2007a) notes that it tends to damage the rail market share in the long term because of the severe intermodal competition.

Certainly, Japanese railways have a very advantageous market for railway operation. However, after the rapid increase following JNR Reform in 1987, the total passenger volume has not changed significantly since 1990 in Japan. On the other hand, the following figure shows that the results are contrasting since the railway transport volume has been increasing largely in the UK especially in the period after its railway reform in 1994. Specifically, during the period between 1994 and 2010, the transport volume in the UK increased by 89.9%, whereas that in Japan has increased only by 0.1%.

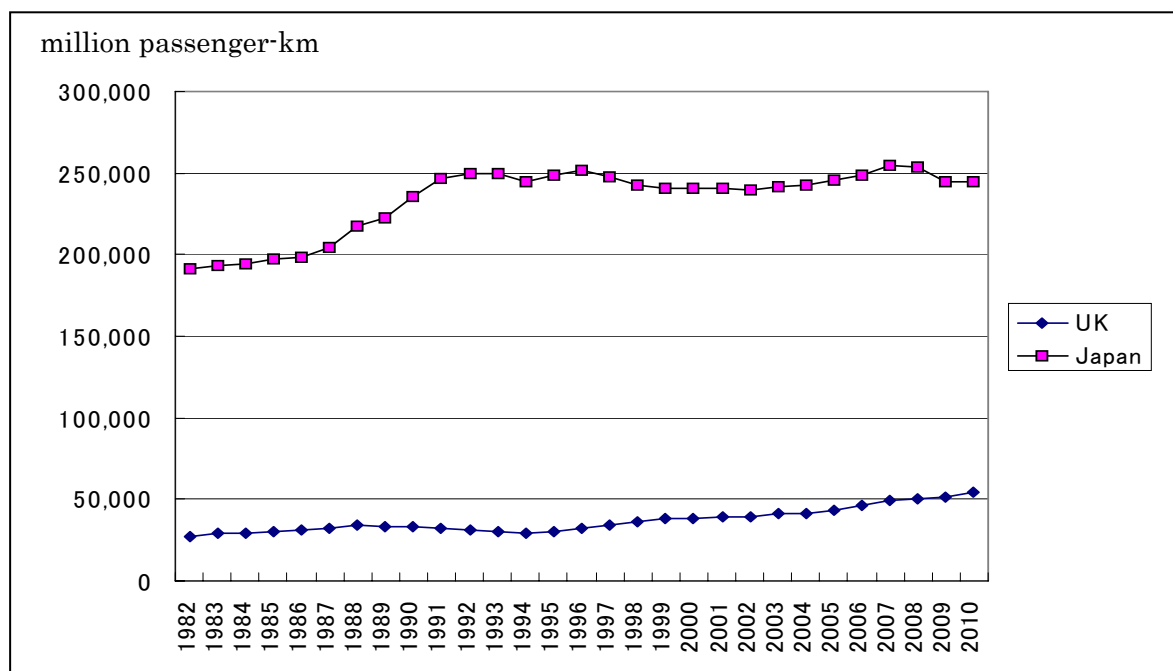


Figure 5 Transition of Railway Passenger Transport in Japan and the UK  
 Source: [Japan] Ministry of Land and Transport (2012)  
 [UK] Department of Transport Statistics (2012)

The above comparative result seems to show that the present railway policy in Japan, which the railways are operated independently by cross-subsidy from profitable lines to unprofitable lines, is not effective to improve the market share of railways. Since it is forecasted that the population in Japan would decrease in the future, there is strong possibility that the transport volumes in the railway sector would also decrease accordingly, provided that the current railway policy continues in the future as well. To say the least, it can be expected that the present cross-subsidy within the railway company would be a burden to the management of the railway company financially in the future rather than the current situation.

### 3.2 Coordination Problems of UK Railways

In vertically separated railways in the UK, the independent infrastructure manager has become responsible for infrastructure works such as:

- 1) maintenance works of infrastructure and tracks;
- 2) signaling and train controlling; and
- 3) timetabling.

This means that the infrastructure manager plans and orders the track maintenance works, and implements signaling and train controlling in daily railway operation. Regarding timetabling, it is implemented as following steps;

Step 1) each operator applies for time-slots;

Step 2) the infrastructure manager allocates infrastructure capacity fairly and without discrimination (this responsibility is stipulated by the EC Directive);

Step 3) the infrastructure manager adjusts the infrastructure capacity and makes timetable by communicating with plural operators.

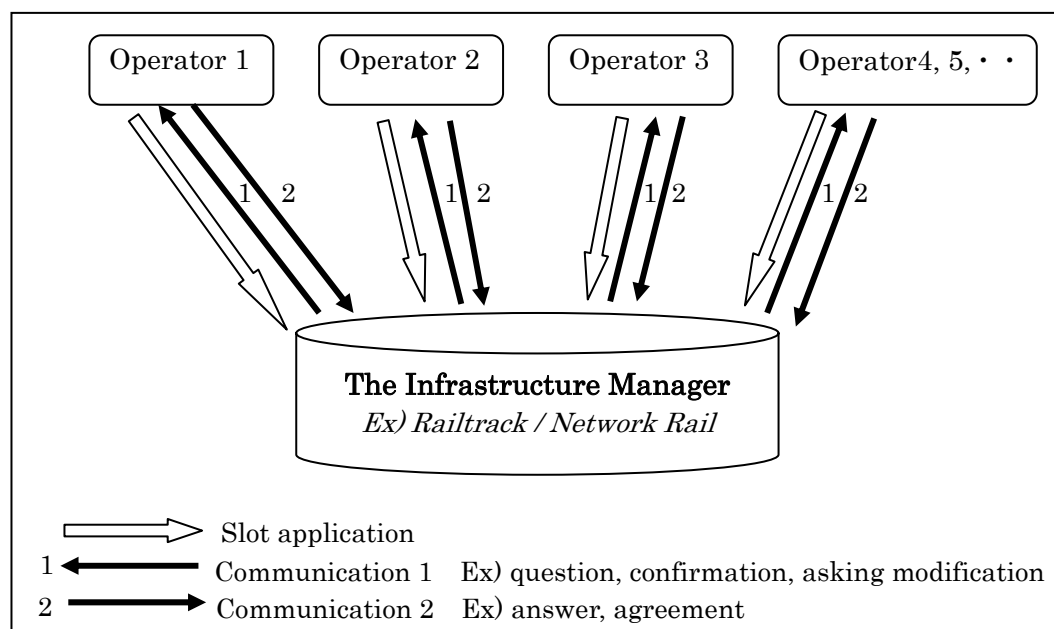


Figure 6 Procedure for Making a Timetable in the UK after the Reform  
 Source: Author based on the interview to a former manager in BR

Open access policy in the freight sector made it possible for multiple operators to access the same track. In addition, in some cases such as lapping franchising networks, more than one



operator accesses the same track in the passenger sector as well. Therefore, it has become usual for the infrastructure manager to negotiate with plural operators to promote above-mentioned steps.

This status is shown in Figure 6. As this figure shows, the information must be exchanged between the infrastructure manager and plural independent operators several times. This timetabling procedure has become more complicated since the reform because the former integrated railway could implement timetabling within a sole organization flexibly.

The author's investigation through the interview to the former manager in BR found that, in the stage of timetabling, the infrastructure manager faces difficulties to coordinate the operators' application especially in the following cases:

- 1) in the case where infrastructure capacity is limited;
- 2) in the case that several operators apply for the same time-slots;
- 3) in the case where there is not sufficient time for maintenance works.

When several operators are on the same track, sometimes disputes are raised among them in the stage of railway operation as well. The author's interview found that the disputes are raised especially in the following cases:

- 1) in the case where an operator meets with an accident or traffic delay because of other operator's responsibility;
- 2) in the case of differing interpretations of the infrastructure manager's decision rules for train priority;
- 3) in the case of sudden planning of engineering works, which requires cutting a scheduled train.

Therefore, vertical separation tends to have coordination problems in the stage of both timetabling and railway operation. When a conflict is not settled among concerned entities through the coordination by the infrastructure manager, they ask settlements to the independent regulator and sometimes they take legal action. Thus these kind of disputes should be counted as a cost of coordination problems as well.

The author's interviews found that vertical separation has some problems in terms of investment planning as well. Although an integrated railway can adjust their traffic capacity more easily and appropriately according to the change of the transport demand, this kind of appropriate investment planning would be more difficult for vertically separated railways.

For example, when the demand of railway transport increases, broadly the following three options of solutions can be planned for adjusting the transport capacity;

- Option 1) Introduction of a different type of rolling stock which has bigger capacity such as double deck trains. This solution requires an investment by a train operator;
- Option 2) Increase of infrastructure capacity such as constructing relief tracks and improving the signaling system. This solution requires an investment by an infrastructure manager;
- Option 3) Extension of both trains and platforms by adding more coaches and construction works. This solution requires an investment from both a train operator and an infrastructure manager.

Certainly, various investment options should be compared deliberately in order to make an appropriate investment planning. Nevertheless, in practice, each entity of separated structure

hesitates to invest its own resources. Thus it would be more difficult for vertically separated railways to plan and invest appropriately.

In addition to the above-mentioned author's findings about the reasons of coordination problems between infrastructure and operation, the new econometric evidence provided by CER (2012) showed that vertical separation increases costs at higher traffic densities.

The model of railway reform in the UK separated the railway operation into train operating companies and an infrastructure manager as completely independent entities. Certainly, since the sunk costs for the operators were relieved, it has become easier for train operating companies to enter into the railway market. But the separated entities have been worrying about coordination problems between infrastructure and operations in terms of daily railway operations such as investment planning, slot allocation and timetabling, infrastructure maintenance works and so on.

## **4. RECENT MODIFICATION TO SOLVE THE PROBLEMS**

### **4.1 Contract with the Public Sector (Japan)**

Some unprofitable lines are still beneficial for the region in terms of a social point of view and Nash (2007a) indicated some reasons why it may actually be economically desirable to subsidize railways. Nevertheless, sufficient rules and regulations have not been established to subsidize the unprofitable railway lines in Japan. As mentioned above, although unprofitable passenger services within JR passenger companies are provided by cross-subsidy within a railway company, it tends to lessen financial ability of the company to invest into competitive transport services. Thus excess cross-subsidy has a disadvantageous aspect for the railway management, and has a risk to decrease the modal share of the railways in the long-term. On the other hand, when the railway passenger services are not at a satisfactory level, passengers tend to prefer other modes of transport, especially private cars. Many local cities in Japan suffer from the disadvantageous effects of excess motorization such as urban sprawling and stagnation of the city center district. As the population of these cities is decreasing in many cases, infrastructure maintenance costs per capita tend to increase according as urban sprawling develops. In addition, in order to develop a city where people can receive urban services without relying on excessive car use, some of the local cities started to build a compact city and to revitalize public transport services.

Behind the above-mentioned background, there are some cases in which the local government makes a contract with a railway company to improve the passenger transport services. This section introduces the case of Takayama Line, which Toyama City made a contract with JR-West to improve the transport services of an unprofitable line.

The section of Takayama Line between Toyama Sta. and Inotani Sta. was succeeded to JR-West from JNR and it has been unprofitable since the JNR era. Before making a contract between Toyama City and JR-West, the service level of this section was stipulated by JR-West. Similar to other unprofitable local lines in large railway companies, Takayama Line was operated based on cross-subsidy within the railway company, and the service level of the line declined accordingly as the number of passengers decreased.

On the other hand, Toyama City made a long-term vision to establish a compact city in order to solve the problems raised by reliance on excessive car use. In order to fulfill this long-term vision, the city also decided to revitalize public transport, and Takayama Line was designated to be one of the railway lines which should improve its service levels.

The project, which aimed to revitalize the areas around the line and to improve the railway services of Takayama Line, started in October 2006. Although Toyama City utilized a subsidy from the government as a part of the necessary finance until March 2011, the city has been continuing the measures to improve the service levels of Takayama Line utilizing its own finance since then.

In order to improve the railway services of the line, Toyama City and JR-West made a contract which contains the following fundamental schemes:

- 1) the necessary costs for improving the services would be paid by Toyama City; and
- 2) the increased revenue earned by the improved services would be returned from JR-West to Toyama City.

Based on the above-mentioned contract, the project was started and the following table shows how the number of trains has increased.

Table 3 Outline of the Project to Improve the Transport Services of Takayama Line

Stage (Period)	Section that the train services were improved	Number of trains (Toyama-Etchuuyatsuo)	Increased trains from the original stage
Before the Project	—	34 trains/day	
1st Stage (Oct.2006-Mar. 2008)	Toyama - Inotani	50 trains/day	16 trains/day
2ed Stage (Mar.2008-Mar.2011)	Toyama-Etchuuyatsuo	59 trains/day	25 trains/day
Present Stage (Mar.2011-)	Toyama-Etchuuyatsuo	41 trains/day	7 trains/day

Source: Kurosaki and Kawata (2012)

The section where Toyama City improved the train services was decided based on the results of the increased passengers in each stage. As the number of passengers between Etchuuyatsuo Sta. and Inotani Sta. did not increase significantly, the section has been limited between Toyama Sta. and Etchuuyatsuo Sta. since the 2nd Stage.

Takayama Line had the trend of decreasing number of passengers until the commencement of the project, but this trend was changed by the project. Although the number of passengers decreased on other local railway lines in Toyama prefecture, the number of passengers in the stations between Toyama and Etchuuyatsuo in Takayama Line increased by 13.5 % during the period 2005-2010.

Though the investment cost to the project is more expensive than the increased revenue to the railway company, the original aim of the project was to establish a compact city. While the population in Toyama City decreased by 0.9% in the Toyama district as a whole, the population increased by 8.1% in the districts around the stations between Toyama and Etchuuyatsuo in Takayama Line. Thus it can be regarded that the project had some effects on

people to live around stations and to establish a compact city.

In the case of Takayama Line, different from other unprofitable local lines which are operated by cross-subsidy within the railway company, JR-West made a contract with Toyama City and received the necessary finance to increase the number of trains. Thus, the way of operation to improve the railway transport services is completely different from other cases. This kind of contract between the public sector and a railway company also appears to be effective to improve public transport so as to solve the problems raised by excessive motorization.

Though railway operation has been provided based on the franchising contract in the UK since its reform, this kind of service contract has not been common in Japan yet and the case of Takayama line is one of the unique cases in Japan.

#### 4.2 Alliance between Infrastructure and Operations (the UK)

In 2011, inefficiency of the railways in the UK was indicated in the “McNulty Report”. By comparing with other countries, the report noted that the railways in the UK are less efficient than other railways in Europe, and explained that it is partly due to its fragmented structure. The Department for Transport responded to the report and recommended an alliance between the passenger franchisee and infrastructure to cooperate in daily operation.

The report categorizes the level of integration into three levels as shown in the following table.

Table 4 McNulty levels of Integration

Level of Integration	Arrangements between Network Rail and Train Operators
Minimum	Cost and revenue sharing; joint targets
Intermediate	Joint venture / alliances
Maximum	Full vertical integration through a combined concession of infrastructure services and train operations

Source: Department for Transport (2012)

Following the recommendation of the report, the alliance between infrastructure and operation was executed and a passenger franchisee, South West Trains (SWT), made an alliance with an infrastructure manager, Network Rail, in April 2012. The two organizations made a ‘single senior joint management team’ and the team has been responsible for infrastructure and train operation on the Wessex Route, which has busy commuter train services in the suburb of London.

This alliance is planned to run until February 2017, the end of the current SWT’s franchise, and the alliance aims to improve management efficiency through more collaborative working and faster decision-making. The alliance between SWT and Network Rail is named a “deep alliance” and the level of integration between infrastructure and management is firm. Although the level of integration is weaker, there are other examples of alliances between infrastructure and operation in other parts of the country (RGI, 2012).

The above-mentioned alliance is different from the original model, in which all the train operators are completely independent from the infrastructure manager. Certainly, different from the case in Japan, the ownership of infrastructure is retained by the public sector in the case of the UK. However, the alliance in the passenger sector changes the original railway management model in the UK into the type which is similar to the case in Japan in that the dominant passenger sector plays an important role to operate railways including infrastructure management.

## **5. CONCLUSIONS: DISCUSSIONS AND FUTURE PROSPECTS**

Since the reform of JNR in 1987, many railways over the world have introduced various management models through railway reform. Kurosaki (2008) clarified the characteristics of each type of management model, and found that the appropriate management models of railways are different based on certain factors. Examples of the essential factors include:

- 1) financial abilities of the government;
- 2) the government's intention to introduce within-rail competition;
- 3) technical abilities of the incumbent operator;
- 4) the market condition of railway transport.

In particular, he showed that the market condition, whether it is passenger-dominated or freight-dominated, is one of the most important factors for determining the appropriate management model of railway operation.

Different from many other overseas railways, both Japan and the UK have passenger-dominated railways, and this is a distinct common characteristic. Nevertheless, despite their similarities, the two countries introduced different management models through the original reform of the state-owned railways.

There are several key factors why these countries introduced different types of railway reform. The first was the government's intention to introduce within-rail competition. Japan did not have an intention to introduce within-rail competition whereas the UK had a strong intention to introduce within-rail competition. A second factor is the number of passengers. In the case of Japan, based on the background that the railways have a large number of passengers, the railway company has been responsible for the infrastructure costs as well. In the case of the UK, though the private firm, Railtrack, was responsible for the infrastructure costs after the reform, the government actually succeeded them later since it was practically difficult for the private sector to bear the full financial responsibilities of the infrastructure in the UK railway market.

The investigation in this study found that each management model introduced in Japan and the UK has certain problems.

In Japan, the unprofitable lines within the company have been sustained by cross-subsidy from the profitable lines, but it is prospected that relying on cross-subsidy to sustain unprofitable lines is not advantageous for developing/sustaining the railways in the future. In addition, without attracting people to public transport, the regional government cannot solve its social problems occurred by excessive car use.

On the other hand, the railway sector in the UK, which has been operated under complete separation, has concerns about coordination problems between infrastructure and operation. Despite the advantage to introduce competition within the railway sector, the investigation in this study found that the railway operation in a fragmented structure faces difficulties in railway operation such as investment, timetabling, maintenance of the infrastructure, and also found that the coordination problems would be enlarged in a case the infrastructure capacity is limited. The recent studies such as McNulty Report and CER (2012) also note that vertically separated structure is one of the main factors of inefficiency of railway operation especially where the network has dense traffic.

This study also investigated recent cases which have modified the original respective models in order to solve the above-mentioned problems.

As a case in Japan, this study investigated the case of Takayama Line, which Toyama City has improved the railway services which are provided by JR-West. In the case of Takayama Line, Toyama City was obliged to make a contract with JR-West as it owns the infrastructure of the line and operates the trains. Thus instead of a competitive bidding, which is common in the passenger railway services in the UK, Toyama City negotiated with the incumbent operator, JR-West, to make a contract. Though the procedure to make a contract is different from the one in the UK, the management model has a similarity in that the passenger train services are provided based on the contract between the public sector and the railway operator.

In the case of the UK, this study investigated the recent alliance between infrastructure and operation. For example, a passenger franchisee, SWT, and an infrastructure manager, Network Rail, made an alliance and have become responsible for infrastructure and train operation jointly. Different from the original fragmented model, the modified model made infrastructure and operation integrated in order to improve management efficiency through more collaborative working. As this kind of model has started recently, it has not yet been clarified as to whether the alliance in the passenger sector promotes the efficiency of the railways in the UK or not. But as the vertically integrated passenger sector has been operated smoothly since the railway reform in Japan, it is expected that alliance between infrastructure and operation can solve coordination problems in the passenger sector in the UK.

Figure 7 shows the transition of the railway organization from the state-owned railways to recent cases of the management modification.

As the figure shows, after the two railways modified their railway management to solve their problems, their management structure has had large similarities and advantages in that:

- 1) the dominant passenger sector keeps an integrated structure or allied with the infrastructure management. This kind of integration / alliance between infrastructure and operation is expected to reduce coordination problems;
- 2) the passenger sector makes a contract with the public sector to receive financial support. The service contract between the public sector and a railway operator makes it possible to operate unprofitable lines keeping appropriate service levels without relying on excess cross-subsidies;
- 3) the minor freight sector continues to access to the infrastructure paying track access charges. The separation between the passenger and the freight sectors could terminate cross-subsidies between the two sectors.

Since the modified management model solved the problems which the respective original models faced after the railway reform in Japan and the UK, there are possibilities that the modified model has better aspects rather than the original model in these countries.

If the number of modified management structure increase in both Japan and the UK in the future to solve their problems, their management models would become very similar. Considering the fact that their market structure has large similarities, it is possible that the appropriate railway management model for these countries has large similarities as well.

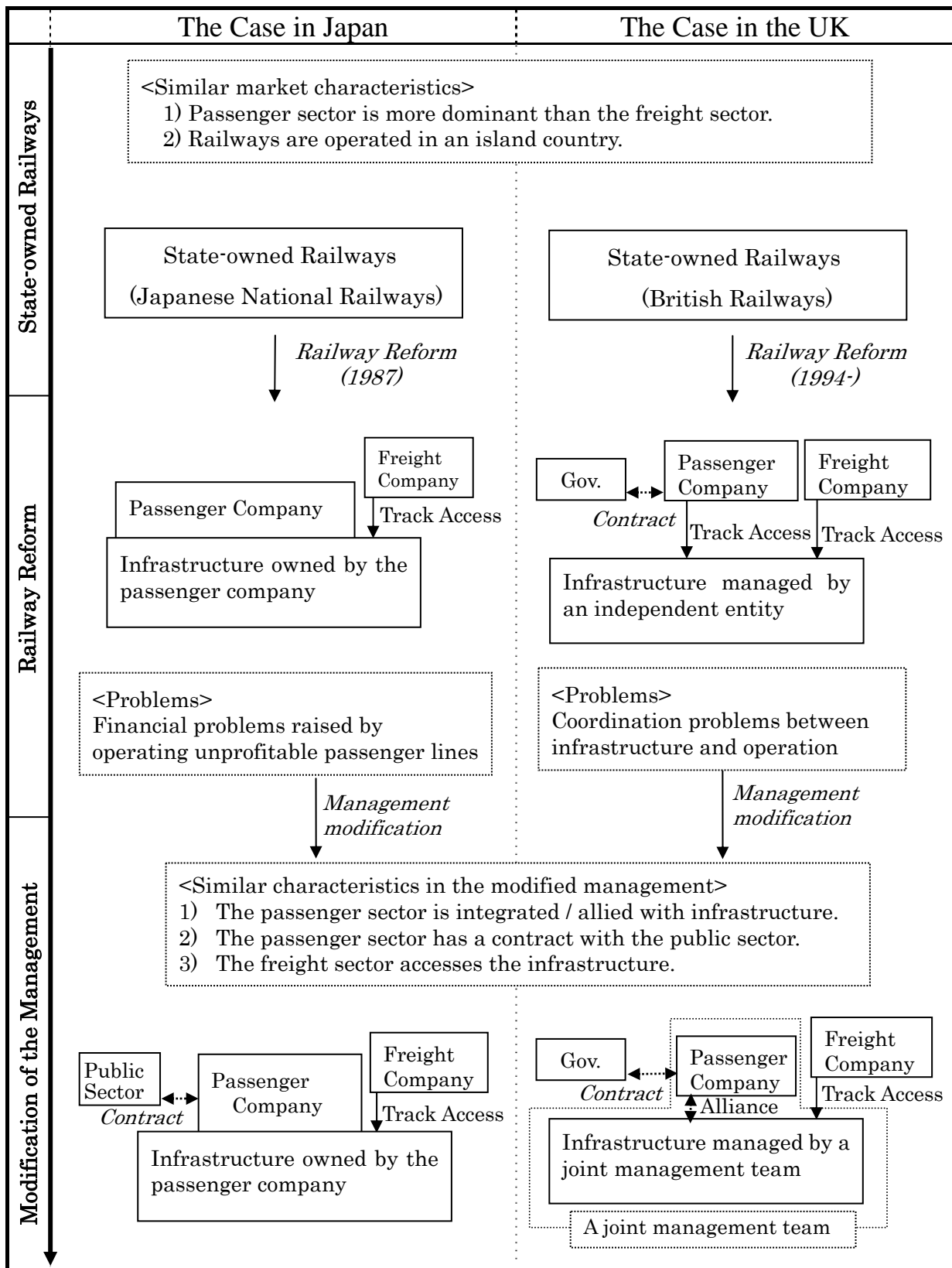


Figure 7 Railway Reform and Management Modification in Japan and the UK  
 Source: Author



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