

# Managing Unprofitable Passenger Rail Operations in Japan - Lessons from the Experience in Sweden -

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## **ABSTRACT**

Japan was the first country to implement a ground-breaking reform in the railway sector in 1987 when it broke up the Japanese National Railways (JNR) into six vertically integrated railway companies. Mainly because of the recent population decrease in local areas, many local rail lines face severe declines in passenger numbers. JR Hokkaido, where railway management has been particularly difficult, announced in November 2016 that about 1200 km of lines cannot be sustained only through the revenues from the businesses and the interest of the Management Stabilization Funds. When it comes to upholding unprofitable public transport, Sweden implemented a radical reform in 1988 by means of vertical separation and decentralisation and then gradually introduced competitive tendering to procure unprofitable passenger rail services. In order to tackle current challenges in the Japanese railway sector, it could be beneficial to draw lessons from the experience in Sweden. As the railways provide several different benefits to the society, it seems rational that those beneficiaries provide certain finances accordingly to sustain the unprofitable railway operations. Also, in order to introduce a system to provide the subsidy, it seems necessary to make each account of the railway company transparent.

## **1. Background to the Study and Aim of Research**

In April 1987, the Japanese National Railways (JNR) underwent a major reform. JNR was divided into six vertically integrated companies, and a single vertically separated freight railway company. This case is considered to be a successful reform of a public enterprise in Japan as transport volume and productivity of railways have increased largely. However, mainly because of the recent population decrease in some parts of Japan, many local rail lines now face severe declines in passenger numbers. For JR Hokkaido, where the average

passenger traffic density is lower than other JR companies, the management has been particularly difficult. In November 2016 it announced that 1237 km of lines cannot be sustained only through the revenues from the businesses and the interest of the Management Stabilization Funds. Consequently, it has become necessary to take certain measures if these unprofitable lines should be kept in the future.

As the above status shows, despite the overall success of the 1987 JNR reform, the current railway management in Japan requires some measures in order to uphold operation of local lines. In comparison, in Sweden, both the national government and regional governments allocate finances to the railway sector, and the passenger railway services have been operated where population density is much less than that in Japan. Thus, based on a study about the financial schemes to allocate public spending on unprofitable railways in Sweden, the paper seeks to address the key issues necessary to allocate public finances for sustaining unprofitable rail lines in Japan.

## **2. Research Design and Outline of Paper**

The paper is structured as follows, reflecting the design of the research. The next section studies and investigates the current status of unprofitable passenger railways in Japan. As the status vary depending on the size of the passenger railways, this study focuses on JR Hokkaido that has a large network and requires public financial support for continuing its unprofitable railway lines. Section 4 then explores the operation and management of passenger railways in Sweden, in order to find some implications for solving the current financial issues that Japanese railways are now facing. The study is based upon not only already available papers but also interviews with representatives from affected entities in Sweden such as the Ministry of Enterprise and Innovation, the national operator SJ AB, and the County Public Transport Authorities (CPTAs) in the counties of Stockholm, Uppsala and Jönköping. Section 5 compares the financial schemes to operate passenger railways in Japan and Sweden in order to draw some conclusions on how to sustain unprofitable lines. Section 6 then discusses some key issues related to the allocation of public finances to the railway sector in Japan based on the lessons gained through this study. Finally, Section 7 concludes the study by summarizing the implications gained.

## **3. Railway Reform and Current Status of Japanese Railways**

Owing to lack of competitiveness against other modes of transport and failure of the management of JNR, JNR lost transport market share for many years. JNR ran a deficit in 1964, and the annual deficit continued for the latter subsequent years. JNR accumulated long-term debt each year, and at the time of the JNR reform in 1987 it amounted to 25 trillion yen (Aoki, *et al.*, 2000, p.183).

Besides financial difficulties, JNR also faced severe criticism of its ineffective management. Then, prior to other countries, the JNR reform was finally implemented in April 1987. Through the reform, JNR was divided into six vertically integrated regional passenger companies, and a single vertically separated nation-wide freight company, JR Freight (Figure 1).

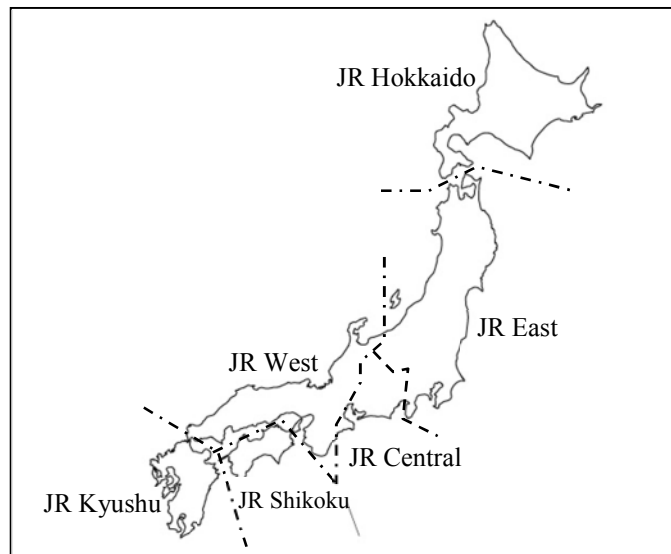


Figure 1 JNR Reform in 1987

For the three passenger railway companies (JR East, JR Central and JR West) on the main island of Honshu, which has metropolitan areas and several large cities, the rail business has been profitable, even though they bear the cost of infrastructure and the burden of the allocated JNR liabilities. In contrast, the other three passenger railway companies (JR Hokkaido, JR Shikoku and JR Kyushu) provide their rail services on Japan's smaller islands, and it was predicted that the operations of these companies would become unprofitable. Thus, the government allocated Management Stabilization Funds (MSF) to these companies at the time of the JNR reform.

#### 4. Railway Operation in Sweden

##### 4.1 Railway Reform in Sweden

Sweden was the first country in Europe to introduce vertical separation into state-owned railways. Until 1988 the Swedish State Railways (SJ) was a state-owned business administration with a monopoly position upheld partly by means of laws and regulations. The majority of passenger services were unprofitable but were considered important to keep for socio-economic and political reasons. The railway network was under-capitalised and infrastructure reinvestments typically came to a halt once a line started to make losses. This kind of vicious circle made the conditions worse. State-subsidies covering the operating deficits of loss-making lines had been introduced already in 1958. Even though these subsidies increased in the following decades, several lines were closed and the financial situation of SJ deteriorated further during the 1970s and 1980s. It was also difficult for the state to grant more money to SJ, partly because it could be regarded as unfair from the viewpoint of other transportation firms, and partly because it was difficult to monitor how the money was spent inside the large conglomerate that SJ constituted at the time (Alexandersson and Hultén, 2005).

Following a severe crisis in 1986, it was decided to restructure the industry drastically. The outcome was the 1988 Transport Policy Act. The major element of the Act was to introduce vertical separation of infrastructure from train operations, with an aim to make the conditions for rail more equal to those for road. Following the aims of the Act, Banverket (BV) was set up as a national rail infrastructure authority in 1988, and the state thereby started to take full responsibility for track infrastructure investments and maintenance.

Another essential element of the 1988 Transport Policy Act was a decentralisation (regionalisation) of responsibility for the unprofitable local and regional lines. For local and regional public transport in Sweden, the Transport Policy Act of 1979 had created the County Public Transport Authorities (CPTAs) as a new institutional structure for regional public transportation. The 1988 Transport Policy Act extended the responsibility of the CPTAs into the unprofitable regional railway services. Then, in return for continuing the services (which was not obligatory)<sup>1</sup>, a temporary state subsidy was provided, covering the annual operating deficits, and the relevant rolling stock was also transferred to the CPTAs (Alexandersson, 2015).

The reformed SJ was to concentrate on becoming a profitable (still state-owned) train operator. During the 1990s other lines of business were divested, such as bus operations, forwarding services and hotels. In 2001 a new reform split SJ's remaining divisions into separate companies. Thus, SJ today is only a passenger rail company, while freight services, railway real estate, and vehicle maintenance are to be found in the companies Green Cargo, Jernhusen and Euromaint, respectively.

## **4.2 Financing of Railways**

As noted above, the 1988 Transport Policy Act largely changed the means to subsidize the railway sector. This section outlines how the government and CPTAs provide their finances to the railway sector in Sweden.

Since the introduction of vertical separation in 1988, the government took the responsibility of the management of infrastructure through its authority, BV (today Trafikverket, TrV). This reform improved the transparency of the usage of the state grant since it was channeled to a national authority rather than to a specific operator. As one could now be certain that the subsidy went directly to the infrastructure, it became much more difficult to argue that state grants form a source of unfair competition and favour SJ. Accordingly, the government and Parliament started to support the railway sector actively by means of increased spending on infrastructure, and now spend 2 to 3 times more in real terms on railway infrastructure than in the late 1980s (Alexandersson, 2015) – see Figure 1.

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<sup>1</sup> The CPTAs could choose to uphold the services by rail or replacing them with bus services.

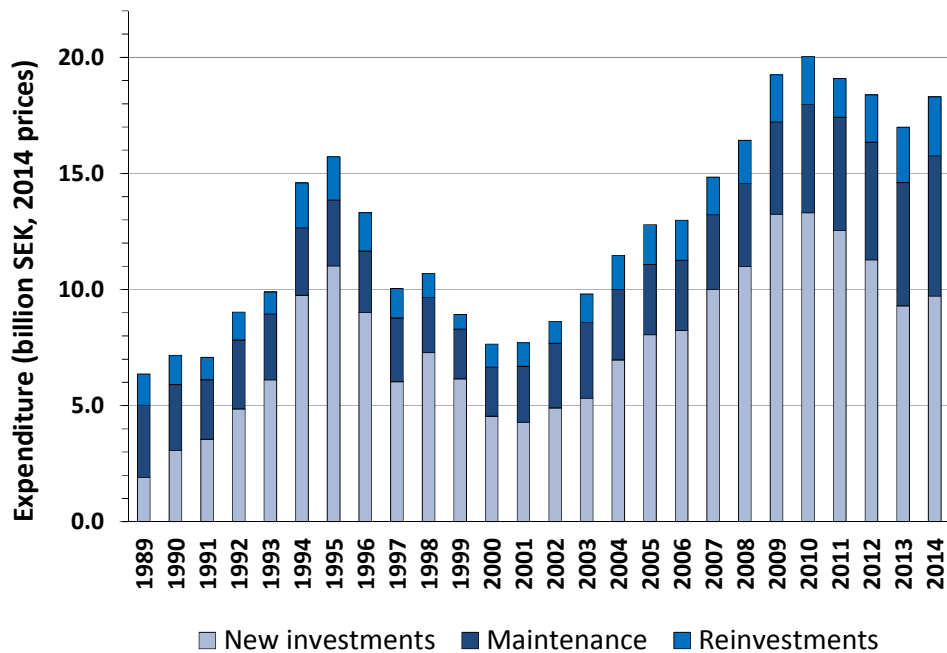


Figure 1. Development of expenditure on railway infrastructure in Sweden 1989-2014  
Source: SOU (2015:42)

A portion of the money spent on rail infrastructure comes from the track access charges that train operators pay to TrV. In 1989, when these charges were first introduced, they amounted to about 1.2 billion SEK (in 2014 prices). In 1999 they were reduced and roughly amounted to 0.5 billion annually for the period 2000-2008. Since 2009 these charges have increased step-wise, again reaching 1.2 billion SEK in 2014 and 1.6 billion SEK in 2016 (Trafikverket, 2017). The increase is a combined effect of actual changes in fees and an increased supply of railway services. The charges are not yet covering the direct costs of infrastructure and are still low by international standards. Thus, to invest and maintain the railway infrastructure, the government allocates public funds raised from outside of the railway sector.

As noted in the section above, CPTAs started to finance the railway sector to operate non-profitable regional railway services once the 1988 Transport Policy Act had been enacted. These services have been procured by competitive tendering since 1990. According to interviews with representatives from three CPTAs in the counties of Stockholm, Uppsala, and Jönköping, each CPTA established a standard that about 50 % of the costs would be covered by the passenger revenues and the rest would be covered by public subsidies, raised from the taxpayers in each county. This corresponds well to overall national figures, where ticket revenues amounted to a total of 4.4 billion SEK in 2016, while total traffic costs amounted to 8.5 billion SEK (Trafikanalys, 2017), equalling a 48 % subsidisation.

For the non-profitable *inter-regional* railway passenger transport, SJ held a monopoly and received subsidies. The government started to procure these services through competitive tendering in 1993. Different government authorities have had this task over the years; today the responsibility lies at TrV. The amount of money spent by the state on passenger train services has decreased a lot since 1989, reflecting the changed focus of the state to support

infrastructure rather than train operations and the corresponding increased spending of the CPTAs.

Due to the structural changes and the many different financing sources, it is very difficult to calculate the overall development of total public subsidies directed to the Swedish railway sector. However, it is safe to say that, especially when infrastructure spending is taken into account, there has been a very substantial increase in the level of subsidisation.

The company SJ has been profitable since 2004, reporting an operating profit of 837 million SEK in 2016, and pays taxes as well as dividends to the state. It has also been able to meet its owner's financial target of a minimum return on operating capital of 7 percent in four out of the latest five years (SJ AB, 2017).

## **5. Comparison Between Japan and Sweden**

### **- With a Focus on the Case of JR Hokkaido -**

As has been shown in the sections above, railway reform in Japan was implemented by a model largely different from the one in Sweden. As long as the revenue to the railway company covers its costs, although urban trains on some lines are very crowded and the number of trains is limited in rural areas, so far these Japanese railways have not faced serious problems regarding their management. Instead, these profitable companies, such as JR East, JR Central and JR West, not only improved the transport services but also improved the revenue from the affiliated businesses. For example, the revenue of the JR East Group was 1,955 billion JPY in FY 1989, and it had increased to 2,881 billion JPY in 2016. While the business scope was limited to railway transport and the necessary subsidiary businesses during the JNR's era, the revenue from the affiliated business of the JR East Group has increased to 32% (JR East, 2017)

The status of the railway companies which operate unprofitable railway networks is largely different. As for JR Hokkaido, among 1237 km of lines that the company announced that they cannot be sustained only through the revenues and the interest of the MSF, 3 lines covering 179.4 km transport less than 200 persons in average passenger transport density. JR Hokkaido wishes to change the transport mode of these lines to bus services. And, it has 8 lines covering 926 km with the passenger transport density between 200 and 2000 persons, and the company wishes to start negotiation with local governments about the future direction of the lines (JR Hokkaido, 2017).

Because of the above-noted conditions, annual financial results of JR Hokkaido are negative, and the outline of the P/L statement in FY2016 of JR Hokkaido is shown in Table 1.

Table 1 The Outline of the P/L Statement of JR Hokkaido in FY2016

Unit: billion JPY

| <b>Account</b>                | <b>Amount</b> |
|-------------------------------|---------------|
| Railway transport             | -53.4         |
| Operating income              | 83.2          |
| Operating expenses            | 136.6         |
| Affiliated businesses         | 3.6           |
| Operating income              | 6.2           |
| Operating expenses            | 2.6           |
| Operating Profit              | -49.8         |
| Non-operating profit and loss | 30.9          |
| Profit from MSF               | 23.6          |
| Other Income                  | 7.3           |
| Ordinary Profit               | -18.9         |

Source: JR Hokkaido (2017)

At the time of the JNR Reform in 1987, it was planned that annual interest from MSF would cover the operating loss, but the amount of the interests has become lower than the expectation because of the low-interest rate in Japanese economy. Thus, it covers only about 47 % of the operating loss in FY2016. Partly because of this, the ordinary profit of JR Hokkaido has been negative these years.

Because of this negative cash flow, it has been difficult for JR Hokkaido to invest for the improvement of the services, and the president, Mr. Shimada, recently said that “If we do nothing (to improve financial conditions) our company would be unable to secure funds for safety measures at the end of fiscal 2019” (Japan Times, 2016).

As his comment shows, the current management of JR Hokkaido is facing extremely serious financial conditions under the current Japanese railway policy. The operating income of the railway transport covers only 61 % of its operating costs. However, if the railways were operated under the similar scheme as that in Sweden, where the government covers infrastructure expenses and CPTA covers almost 50 % of the operating costs of regional rail transport, the possibilities to manage the conditions currently facing JR Hokkaido could be improved to a large extent.

## 6. Current Schemes to Sustain Unprofitable Railways in Japan

This section provides an overview of recent legal efforts that have been taken to sustain unprofitable railways in Japan.

### 6.1 Act on Revitalization and Rehabilitation of Local Public Transport Systems

In Japan the number of unprofitable railways has increased in recent years. To manage the financial difficulties of those unprofitable passenger railway services and other public transport, the government has enacted or revised Acts regarding public transport as follows:

- October 2007: The “Act on Revitalization and Rehabilitation of Local Public Transport Systems” was enacted. This made it possible to support unprofitable public transport by regional governments.
- October 2008: The Act mentioned above was revised. This revision made it possible to support unprofitable passenger railways through vertical separation.
- May 2014: The Act mentioned above and the “Act on Special Measures Concerning Urban Renaissance” were revised. The revision means that the policies for transport and urban planning have been integrated to establish better and sustainable public transport and urban systems.

As a background to the establishment of these Acts, several issues, such as urban sprawl, motorization, a decrease of the passengers of public transport, and management difficulties in public transport companies, have been worsening the situation in a vicious circle, a bit similar to what took place decades earlier in Sweden. Thus, integrated measures are required to solve these issues, and the Japanese government has an aim to establish compact cities by integrating both transport and urban policies (Figure 2).

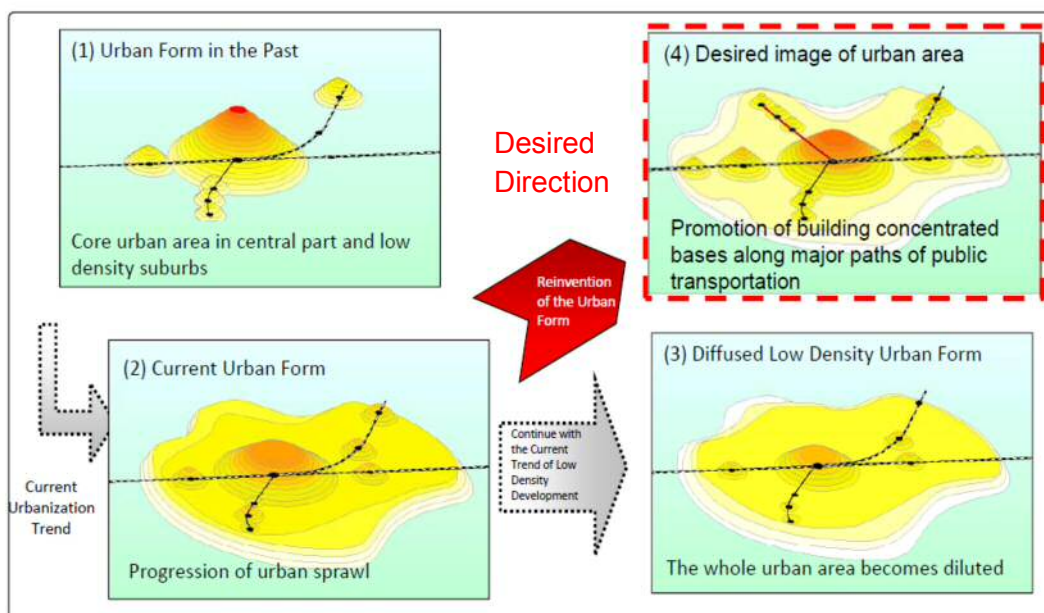


Figure 2. Integration of transport and urban policies to establish compact cities  
Source: MLIT (2015)

When a regional government utilizes the “Act on Revitalization and Rehabilitation of Local Public Transport Systems” to sustain unprofitable railways, the regional government will generally transfer the infrastructure from a railway company and become the new owner. Thus, the railway will be vertically separated. Since vertical separation is introduced, the regional government will pay the cost of the infrastructure, both for investment and maintenance. When the proposed plan is admitted based on the Act, the national government provides a third of the investment to upgrade/replace the railway facilities but does not pay subsidy to cover a part of annual expenses.



## 6.2 Regulation to Sustain Conventional Intercity Lines Separated from JR Passenger Companies

While the above-mentioned Act is mainly for sustaining local railways for regional governments, there is a regulation to sustain intercity railways where the lines are separated from JR passenger companies and JR Freight has access.

In Japan, Shinkansen infrastructure has been constructed as public works since the reform of JNR. Since operation of new Shinkansen lines should not deteriorate the JR Passenger Companies' financial results, the agreement of local communities is required with respect to the management separation from the JR Passenger Company of conventional lines parallel to new Shinkansen line segments (JR East, 2004). Thus, the sections of conventional lines parallel to new Shinkansen line segments have been transferred to local governments. However, since express trains would not be operated on these conventional lines, the number of trains would be much fewer than before. As a result, it has become more difficult to sustain these lines only by means of the revenue from local passenger trains and access charges paid by JR Freight. Regarding JR Freight's access charges, the amount is stipulated as avoidable costs, and it is designed so that the rest of the necessary infrastructure costs should be covered by the passenger companies.

Because of the outline mentioned above, the passenger sector's financial bearing for rail infrastructure has been relatively large, and local governments started to bear large amounts of financial bearing, once the management of this section was separated from JR Passenger Companies. In 2002, in order to mitigate the local governments' financial bearing, a stipulation was established with the implication that JRJT, a public entity, provides the payment that makes it possible to sustain the separated conventional lines.

Although this stipulation is effective only for the separated conventional lines parallel to new Shinkansen line segments, it is worth noting this case as a measure to sustain certain part of conventional inter-city lines in Japan.

## 7. Discussion

### - Lessons and Implication for Sustaining Unprofitable Passenger Rail Services in Japan -

Passenger local railways in Japan have been facing tough conditions in recent years due to severe competition from cars and the challenges stemming from a decreasing population. Also, several railways seem to be at risk getting stuck in a vicious circle. However, as the railway sector in Sweden has been successfully reformed and revitalized since 1988, it seems necessary to establish certain schemes to sustain unprofitable passenger railways in Japan as well. This necessity is not only for JR Hokkaido but also for other passenger railway companies, since most of the unprofitable railway passenger services have so far been sustained by cross-subsidisation. There is a high risk that excess cross-subsidisation damages the market share of rail, since it utilizes the profits on certain parts of the rail

network, and inter-modal competition could make it increasingly difficult to earn profits on those parts of the network (Nash, 2007).

This section discusses several key issues to prepare the ground for the introduction of public subsidies in the Japanese railway sector and to uphold a stable management of the railways based on the present market conditions in Japan.

### **1) Coordination with other modes of transport**

In 1996, the government of Japan devised a plan to abolish supply-demand adjustment regulations in principle (MLIT, 1999). Based on this decision, transport services have been deregulated already. Thus, in general, the local governments do not interfere with the transportation market. On the other hand, they make a plan of public transport service network when they seek subsidies based on the Act on Revitalization and Rehabilitation of Local Public Transport Systems, which was enacted in October 2007.

When the local governments try to develop public transport especially under unprofitable market conditions, it is essential to coordinate among different modes of transport. In this stage, it is essential to attain equal footing among them regarding the bearing of infrastructure costs of each mode and the external costs caused by the operation of transport services.

### **2) Coordination with urban planning**

Transport planning and urban planning should be closely coordinated. In Japan, the “Act on Revitalization and Rehabilitation of Local Public Transport Systems” and the “Act on Special Measures Concerning Urban Renaissance” were revised in May 2014. These policies also aim to integrate transport planning and regional planning. Since the two issues are closely related, the policies will be effective when they are closely coordinated.

### **3) Improvement of transparency of the expenses**

In the case of Sweden, the government has been responsible for the national railway network since the reform in 1988, and CPTAs have been responsible for regional transport. In this case, vertical separation has worked as an effective way to make the both infrastructure and operation accounts clear and transparent.

When the concerned entities, such as national government and regional governments, try to provide subsidies to the railway sector, transparency of the expenses must be secured. It seems practically difficult for them to provide subsidies without clear financial statements of each division where they take financial responsibilities. As the Swedish case shows, vertical separation is effective for this aim not only for infrastructure but also for operating divisions as they pay infrastructure charges and this can make the cost of the divisions clear and transparent.

### **4) Financial bearing based on the benefit**

There are various kinds of unprofitable passenger railways in Japan. Some lines are utilized mainly for regional passenger transport, and other lines are also utilized for intercity transport of both passenger and freight. The benefits of the lines vary depending on the type of lines. For example, the former regional lines deliver benefits mainly within a

certain region. On the other hand, the latter intercity lines deliver benefits outside of the segment of the lines since people and goods can be transported long distances. Provided that people who receive benefits should bear the cost of the lines, the way for bearing the costs should also be varied. It seems reasonable that people in a wider area should bear the cost of the intercity lines since people outside of the concerned segment of the line also receive benefits from the line.

The discussion to sustain the railway network in Hokkaido is in progress at present, and it is argued that the necessity of a line should be judged not by the profitability under the current status. On the other hand, as the local governments think that it is difficult to provide sufficient subsidies, the concerned people reached the consensus that it would be practically difficult to sustain the entire network in the future (Hokkaido, 2017).

As section 6 showed, the “Act on Revitalization and Rehabilitation of Local Public Transport Systems” proposes to introduce vertical separation provided that the regional governments wish to sustain the segment in question. But, as some segments, especially intercity lines, deliver benefits to wider areas, it seems reasonable that people outside of the segments would bear financial costs for them. For example, regarding the segments that freight trains are operating, even people in the Tokyo metropolitan area receive a certain benefit. Thus, there might be the case that the similar policies discussed in Section 6.2 can be introduced to sustain such intercity lines.

When it comes to the segments that many sightseers travel, Hokkaido receives a benefit since the concerned line contributes to improve the attractiveness of Hokkaido and increases the number of passengers. Thus, along with regional governments, there seems to be a reason for Hokkaido to play an important role in sustaining these lines.

As such, since Japan has various kinds of railway lines in the country, it seems difficult for the government to provide financial support to sustain the entire railway network. Thus, it has become necessary to consider who receive the benefits of the segment of the line and to introduce measures making them bear a financial responsibility to sustain the segment.

##### **5) Retaining technical abilities to retain infrastructure effectively**

Japan already has several cases where regional governments took over the ownership of infrastructure to sustain unprofitable railway lines, based on the “Act on Revitalization and Rehabilitation of Local Public Transport Systems”. In these cases, in contrast to vertical separation in European countries, the railway company not only operates the trains but also manages the infrastructure as part of its daily operation processes.

Nevertheless, since the regional governments retain the ownership of the infrastructure, they take the responsibility as an infrastructure owner. Also, although daily maintenance works are carried out by a railway company, they have to promote engineering works to upgrade and replace the infrastructure. Thus, as infrastructure owners, the regional governments also require sufficient engineering capabilities to take appropriate measures in certain stages. Otherwise, they would simply follow what the contractor insists on doing, and the contract would tend to be expensive. However, compared with engineers in a

railway company, it is not easy for regional governments to acquire engineering capabilities since their staff would work on various tasks as civil servants.

The required engineering skills largely differ depending on the type of railways. For example, in order to maintain and manage the infrastructure, the electrified lines on which express intercity trains and freight trains run require more sophisticated engineering capabilities than non-electrified lines where only regional trains run. Thus, it is essential that a certain entity with professional engineering capabilities retains the former type of infrastructure. It is worth noting that European railway infrastructure managers are large-scale entities with a number of well-trained engineers.

## 8. Conclusions

This study has explored the Swedish railway reform of 1988 and current railway operations, trying to draw lessons in order to establish certain schemes for sustaining unprofitable passenger railways in Japan. Despite support from the MSF, section 5 showed that the interest beared by MSF covers only 17 % of the operating expenses of railway transport in JR Hokkaido. Thus, it appears that the passenger railway services in Hokkaido receive fewer subsidies than corresponding services in Sweden, where the government takes responsibility of infrastructure and CPTAs cover almost 50 per cent of the operating costs of regional railways.

Despite this and the severe management difficulties of many Japanese local railways, including JR Hokkaido, it is neither rational nor practical to reform all the Japanese railways in accordance to the Swedish railway reform model. This is because other profitable integrated railways keep independent management without receiving subsidy. Also, there are many private railways in Japan, and many of them have succeeded in internalizing the external economy of passenger railway operation. Thus, it does not seem reasonable to reform these profitable integrated railways to a large extent.

On the other hand, it is also apparent that the railway sector in Japan should establish a more clear and robust scheme to sustain unprofitable passenger railway operations, since such operations are likely to become more common in the future. Otherwise, the future outcome might be one of the following: 1) some lines would not be possible to sustain even though they are beneficial from the viewpoint of Japanese economy; 2) some profitable lines would lose competitiveness to other transport modes because of excess cross-subsidisation.

As noted above, the railway sector in Japan retains both operations that can keep the current status and those that should be changed. Thus, based on careful examination of the sector both in Japan and abroad, it is necessary to consider rational and practical options to develop the current schemes to sustain unprofitable railway lines in Japan. This study has tried to highlight some of the key issues based on a study of the railway sector in Sweden, but there could certainly be other interesting cases to examine as well.

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