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CONSTRUCTION OF LRT LINE WITH VERTICAL SEPARATION UNDER NEW JAPANESE ACT FOR PUBLIC TRANSPORT

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CONSTRUCTION OF LRT LINE WITH VERTICAL SEPARATION UNDER NEW JAPANESE ACT FOR PUBLIC TRANSPORT

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ABSTRACT

For many years, public transportation in Japan has been operated in surplus, and railway companies have been able to afford the infrastructure costs in many cases. However, due to recent conditions, such as rapid motorization, the situation has been changing rapidly, especially in local areas. Many local railways have been facing management difficulties because of the burden of their infrastructure costs, and it has become practically impossible to open rail systems with integrated structure financially.

Nevertheless, in 2009 a LRT line opened in Toyama city, which is one of the major local cities in Japan. The line was constructed based on the newly established Act, namely “Act on Revitalization and Rehabilitation of Local Public Transportation Systems”. This research investigates the outline of this newly established Act, and examines the procedure to construct/revitalize public transportation system based on the Act.

Keywords: vertical separation, LRT, railways, regional planning

1. INTRODUCTION

1.1 RECENT SITUATION OF PUBLIC TRANSPORTATION IN JAPAN

In Japan, public transportation has been facing management difficulty in recent years. This is not only because of decreasing birth rate and aging population (Figure 1), but also because of rapid motorization (Figure 2).

These tendencies are notable especially in local area, and the number of railway operators which discontinued their operation has increased. The railway operation has been abandoned on the total track length of 634.6km in 33 lines since 2000.

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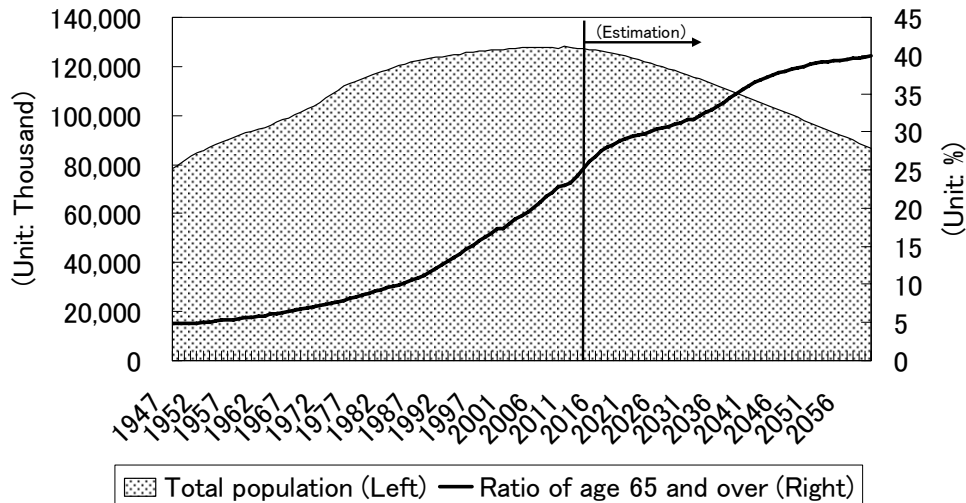


Figure 1: Population in Japan

Source: Ministry of Internal Affairs and Communications (2012) : Actual results
National Institute of Population and Social Security Research (IPSS) (2012): Estimation

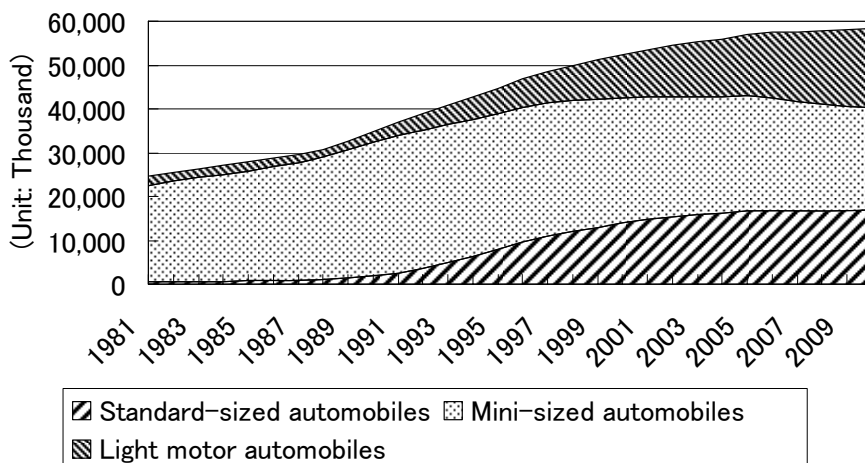


Figure 2: Number of private cars in Japan

Source: Ministry of Land, Infrastructure, Transport and Tourism (MLIT) (2012)

According to the latest estimation by National Institute of Population and Social Security Research (IPSS), the number of population in Japan has already turned into decline, and population will be three quarters in 2060 compared with that of 2010. Thus, this situation will have a significant impact on the management of local railways.

1.2 PROSPECTS OF PUBLIC TRANSPORTATION IN JAPAN

The recent changes of transportation market seem to affect the management of local railways in Japan in terms of the following:

- 1) The number of passengers especially that of students will decrease in accordance with a low birth rate;

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- 2) It is estimated that the labor population will be half in 2050. Thus, the decrease of the labor population will result in the decrease of the company's income.
- 3) As the aged people tend to hesitate to go out, the number of aged passengers will decrease as well.

On the other hand, the aged people who cannot drive cars will increase. Thus, the role of public transportation would be more important to secure mobility for those people. Based on these circumstances, to maintain local transportation network, the new Act named "Act on Revitalization and Rehabilitation of Local Public Transportation Systems" was established in 2007.

2. RESEARCH DESIGN AND METHODOLOGY

In order to understand the background to the enactment of the new Act, firstly the authors will closely investigate the concept of the Act through the available literature.

Secondly, this paper discusses two different LRT systems as they are operated under different management schemes. The former case of LRT is Toyama Light Rail. In this case, the management structure retains vertical integration as it was implemented before the new Act was enacted. The latter case is Toyama Local Railway Circle Line, to which the new Act was firstly applied. This case adopted a vertically separated structure, because the invested assets have been retained by the local government even after its opening.

This paper investigates the above-mentioned two different schemes and compares the management of LRT lines. In addition to the investigation into the literature about the new Act and two LRT projects in Toyama city, the authors would hold interviews for the concerned persons in Toyama city, and examine their operation in terms of both operational and financial viewpoints. This interview would be beneficial for understanding the concept of the Act and the practical conditions of the LRT projects.

Based on the examination into the Act and practical application into two LRT lines, this paper also investigates how the other local railways in Japan have been changed before and after the enactment of the new Act, and tries to learn lessons and implications which are also applicable to other LRT and railway projects in Japan and overseas.

3. ACT ON REVITALIZATION AND REHABILITATION OF LOCAL PUBLIC TRANSPORTATION SYSTEMS

3.1 BACKGROUND OF ESTABLISHMENT OF THE ACT

As the background of establishment of the Act, it should be noted that Japanese railway companies own the infrastructure with vertically integrated structure in most cases. This vertically integrated structure is different from other transportation modes such as air and

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roads, and this structure is not common in overseas passenger railways nowadays. As the background of this status, there have been Japanese favourable markets, where most train companies can maintain their infrastructure within their operating income.

Nevertheless, according to the survey to 90 local railway companies by MLIT (2008), as of FY 2005, 46% of their expenditures are related to infrastructure costs such as maintenance cost and depreciation. This amount is as much as operating cost, which amounts to 45% of their expenditures. Recently, it has become difficult to own and maintain the infrastructure for many railway companies due to its high amount of costs and decrease of the income. The survey also shows that:

- 1) if local railway companies can release their infrastructure, 90% of local railway companies would be able to gain operating profit;
- 2) only 30% of the railway companies are in surplus at present.

Thus, vertical separation improves the management of many railways to a large extent, and seems to be essential in the railway sector in Japan. Nevertheless, before the enactment of the Act, the railway policy in Japan practically required a balanced management in the railway sector including its infrastructure.

3.2 CHARACTERISTICS OF THE NEW ACT

This new Act was enforced in Oct 2007. In this Act, a railway company which faced management difficulty for sustainable operation can receive subsidy and practical support by the local government and would be recommended to change its management structure under the revitalization plan which should be authorized by the Minister of Land, Infrastructure and Transport (MLIT).

Before the introduction of the Act, an infrastructure owner was obliged to cover the infrastructure maintenance costs through track access charges even if vertical separation was introduced. But the new Act made it possible to allow an exception of this situation. Based on the agreement among the concerned entities as noted below, a local government has become able to own railway infrastructure and rent it to a railway company with less track charges than its maintenance costs. The difference between the infrastructure maintenance costs and track access charges can be covered by public subsidies.

Although there were some financial support schemes for railway companies which faced management difficulties, the scope of financial support was expanded through the Act (Table 1).

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Table 1: Change of the scope of financial support for railway companies

	Before enactment of the Act	After enactment of the Act
Basic method	Investment for modernization of infrastructure	Encouraging the region and the railway company to make efforts for efficient management
Subsidy for upgrade	20% of its cost	33% of its cost
Target	Loss-making railway companies	Railway companies in general
Condition of use	-	Agreement among concerned entities and an approval by MLIT
Other measures	-	A local government can take some measures, such as a tax exemption, coordination with regional planning.
Subsidy for revitalization and rehabilitation	Not available	Setting on a plan: fixed amount Experimental services: 50% Other services: 50% (Ordinance-designated city: 33%)
Subsidy for safety	Depending on the case	33% (Unified safety related subsidy before the Act enforced of its cost)

Author's revision of MLIT (2008)

One of the essential points of this Act is that it requires the authorized specific transportation plan in the region. This authorized specific plan must be made by a local council with concerned entities. The council normally consists of local governments, a railway company, bus operators, representatives of communities, a road administrator, a public safety commission, and so on.

Within the local council, the participants discuss how to improve public transportation services, enforce public comments and create transportation systems reflecting passengers' suggestion. The local council is obliged to make up plans which contain the way to optimize public transportation in the region. The plan must contain specific schemes which stipulate how to improve administrative problems of the railway company, and how to support the railway operator by subsidy adopting a target figure based on the schemes. By means of these procedures, all related entities take responsibilities for sustainable operation of the local public transportation.

In comparison with European countries, such as France and Germany, there is a large difference in terms of the institutional scheme which supports railway operation in Japan. In European countries, based on the regionalization, the local government is often responsible for the procurement of the regional transportation. In these European countries, in cooperation with a transportation association, the local government usually makes a transportation plan, procures transportation services and makes a service contract with transportation operators.

By contrast, in the case of Japan, it is the national government who has been responsible for providing subsidies to the regional transportation. This situation remains the same in the new

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Act, and it is the government who gives the authorization to the transportation plan made by a local council with concerned entities.

The above comparison between Japan and Germany, is shown in Figure 3.

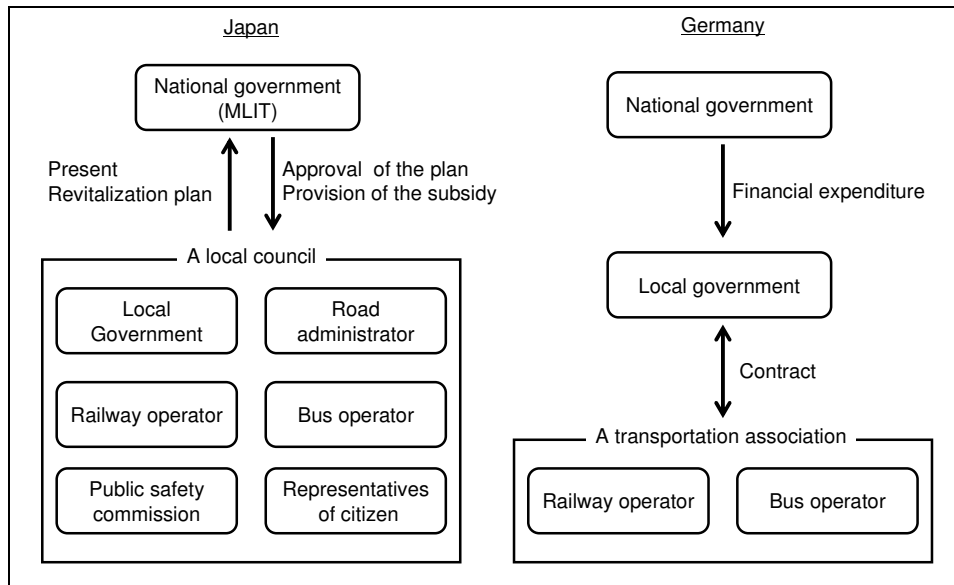


Figure 3: Planning and procuring the local public transportation in Japan and Germany

Source: Author

4. TWO LRTS UNDER DIFFERENT MANAGEMENT SCHEME

This chapter explains the background to the introduction of LRT systems, and investigates the practical two examples in Toyama city in order to compare how the status has been changed through an enactment of the Act.

4.1 BACKGROUND TO THE INTRODUCTION OF LRT SYSTEMS

Toyama city is located in the northern part of Japan, about 200km away from Tokyo. The city has a population about 420 thousand (as of end of Aug. 2012) and is the capital of Toyama prefecture. Owing to motorization and an urban sprawl of the city, although the number of population is decreasing, the financial burden of the city's infrastructure has increased according as the length of roads and sewage drains are extended. Especially, the expenditure of snow removal amounts to severe financial burden for the city as the roads are covered with snow in winter season. It costs 1.4 billion yen in 2012 and accounts for approximately 1% of the total city budget. This means that the infrastructure costs per citizen have largely increased because of the motorization and the urban sprawl of the city.

In Toyama city, there are several modes of public transportation and many of them are operated by private operators. Regarding the heavy-rail, JR-West operates two lines and

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Toyama Local Railway Co. operates four lines. As for light-rail lines, Toyama Light Rail Co. operates one line and Toyama Local Railway Co. operates three lines. Buses are also available throughout the city and operated by Toyama Local Railway Co.

Similar to the cases in many other local cities in Japan, the number of passengers on public transportation has declined for many years. On the other hand, the number of cars has increased. During 20 years between 1990 and 2010, the number of private cars has almost doubled, and its share has become 72.2% (Toyama prefecture, 2005). As a result, the number of passengers on public transportation has decreased drastically during the period between 1989 and 2010: JR line has decreased 29%; private railway has decreased 43%; light rail has decreased 38%; bus has decreased 70%; the number of bus routes has decreased by 40% (Toyama city, 2012).

The progress of motorization and declining of public transportation resulted in the loss of vividness of the city center and decreased tax income to the city. This is because, although the area of city center takes only 0.4% of the whole city, the city center makes for as much as 22.5% of real estate tax and city planning tax (Toyama prefecture, 2013).

Based on the above-mentioned problems, the mayor decided to change the situation and established a long-term plan, which aimed to form “compact city” in order to transform the city into sustainable one. This decision is the reason why the city started to take actions to revitalize public transportation.

In Toyama city’s plan, the city recommends citizens to inhabit near the railway/LRT stations or bus stops. Public transportation is regarded as a very important means to carry passengers to the city center. By these measures, Toyama city aims to establish a compact and sustainable city, and to create wealthy lifestyle, which people can spend their lives without relying on private cars excessively. For attaining the above-mentioned aim, one of the most important projects is laying LRT lines.

Toyama city has two LRT lines. One is Toyama Light Rail, and the other is Toyama Local Railway Circle Line. Toyama Light Rail has its route from JR Toyama Station to the northern part of the city. On the other hand, Circle Line provides its services in southern area of the city, where business and commercial districts dominate. Both lines are completely independent in terms of their routes, fare systems, entities of operators and the management structure. The characteristics of each line would be examined in the following section respectively.

4.2 FIRST CASE: TOYAMA LIGHT RAIL

Toyama Light Rail opened in 2006 and is widely known as the first modern LRT system in Japan. Construction works were financed by Toyama city. However, in order to operate and maintain the LRT system, a new company was established namely “Toyama Light Rail Company”. Originally, most of this line was operated as Toyamakou Line by JR-West. However, facing vicious circle of declining the number of passengers and trains, Toyamakou Line could not cover its expenses by its revenue for many years. In addition, the extension

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plan of Hokuriku Shinkansen was decided by the government. Accordingly, it has become inevitable that Toyamakou Line ought to be removed from the city center area. After serious arguments and planning, Toyama city finally decided to convert the former heavy-rail line to a new LRT line and settled the difficult circumstances.

According to the survey by Toyama city, the number of passengers has increased more than double on weekdays and 4 times on weekends compared with the times of Toyamakou Line. Nowadays, the numbers are 4,815/day and 3,717/day respectively. Nevertheless, the fare income cannot cover the operating cost. The cost of operation is estimated as approximately 0.3 billion yen each year although the fare revenue of the company is estimated around 0.2 billion yen. Thus, the operating loss, approximately 0.1 billion yen per year, is covered by subsidies from the city.

Regarding the construction costs of Toyama Light Rail, the total investment amounted to 5.8 billion yen. Because of the abolition of Toyamakou Line, Toyama city could receive the subsidy from the government, and almost half of the construction costs were covered by this subsidy.

Concerning the progress to form a compact city, as it was intended, people started to inhabit the districts where the city recommends people to live. These districts are specified around the stations of LRTs and bus stops on some essential routes. As for the opinions of the people, more than 80% of the citizens who do not inhabit along the LRT routes also support this kind of transportation policy of the city. Thus, it is expected that the public financial support has been generally accepted by the citizens owing to the sufficient explanations to them and the city assembly.

4.3 SECOND CASE: TOYAMA LOCAL RAILWAY CIRCLE LINE

Following Toyama Light Rail, Toyama city decided to construct LRT Circle Line. Unlike Toyama Light Rail, the purpose of this LRT is to carry passengers within the area of city center. The newly constructed section consists of 0.9km-long line with three stations and is connected with existing Toyama Local Railway's LRT line at the both ends. Based on the contract between Toyama city and Toyama Local Railway Co., passengers are not required to pay extra fare when they transfer to/from existing Toyama Local Railway's network, and this arrangement largely contributes to improve public transportation services.

Toyama city (2012) shows that the number of passengers on Circle Line is 1139 per day on weekdays and 995 per day on weekends in 2011. Including existing LRT system of Toyama Local Railway, passengers increased 28% on weekdays and 16% on weekends in comparison with 2009 when Circle Line was not opened yet.

Different from Toyama Light Rail system, this line introduced vertical separation as a management structure. Specifically, infrastructure and LRV are owned by Toyama city, and operations are performed by Toyama Local Railway Company.

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The total construction cost of 3.0 billion yen was fully covered by public subsidies, part of which is reimbursed by the national government. This financial scheme is similar to the construction of Toyama Light Rail. As Toyama Local Railway Co. does not receive any subsidies for operational cost from the government and the city, the company ought to cover their operational cost through the fare income. Based on the introduction of vertical separation, the railway company does not need to pay the investment and maintenance cost for the infrastructure, but pays track access charges.

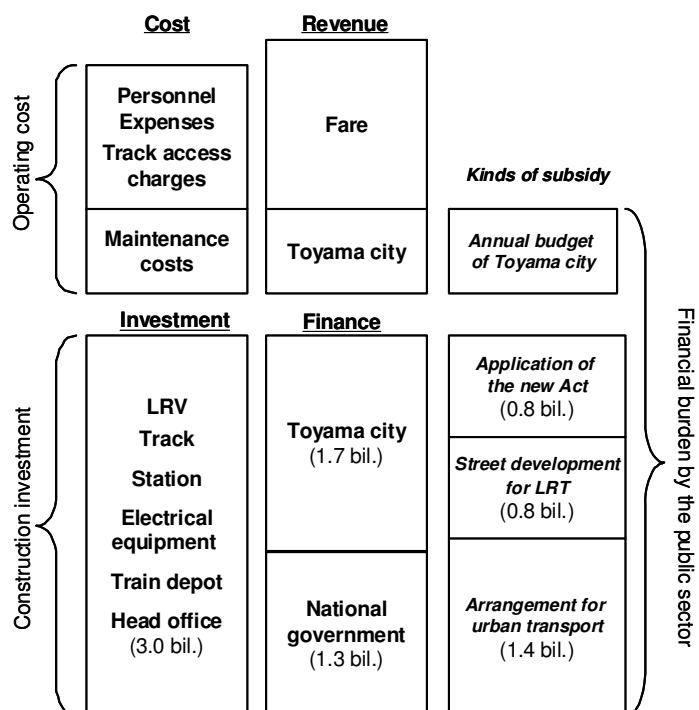


Figure 4: Financial framework of Circle Line

Source: Toyama city (2012)

Table 2: Outline of the two LRT lines in Toyama city

	Toyama Light Rail	Circle Line
Date of opening	29 th Apr., 2006	24 th Dec., 2009
Route length	7.6 km	3.4 km
Number of stations	13	11
Number of LRVs	7	3
Vertical structure	Vertical integration	Vertical separation
Operator	Toyama Light Rail Co.	Toyama Local Railway Co.
Owner of infrastructure	Toyama Light Rail Co.	Toyama city
Cost of construction	5.8 billion Yen	3 billion Yen
Public subsidies for operating losses	None	None

Source: Toyama city (2012)

4.4 VERTICAL STRUCTURE OF THE TWO LRT LINES

Comparing management models of Toyama Light Rail and Circle Line, the most significant difference is the vertical structure. Regarding Toyama Light Rail, Toyama city constructed the infrastructure but it was transferred to the operating company, Toyama Light Rail Co., a joint-venture between the private sector and Toyama city. Thus, it is operated with vertically integrated structure. On the other hand, regarding Circle Line, infrastructure is retained by Toyama city, which had invested the infrastructure, and operation is performed by Toyama Local Railway Company. Thus, vertical separation was adopted as a management structure.

Our interview to Toyama city found that adoption of the different vertical structure in the same city was introduced because of the enactment of the Act on Revitalization and Rehabilitation of Local Public Transportation Systems. At the time when Toyama Light Rail was opened, vertical separation in the railway sector was not common in Japan, and the above-mentioned Act had not been enacted yet. At that time, though there were some examples of vertical separation in the rail sector such as construction of Shinkansen, the scheme of Japanese Railway Law was not sufficient in terms of construction and sustaining local railways. Especially, as for local railways and LRTs which cannot repay their investment, Japan did not have a sufficient law scheme to promote those projects under vertically separated structure.

Due to the lack of the law scheme, Toyama city promoted the project of Toyama Light Rail as a vertically integrated structure. Though Toyama city had constructed infrastructure of Toyama Light Rail with its finance, the city was obliged to transfer all the related assets to Toyama Light Rail Co. after the construction stage. In addition, even at the operation stage, Toyama city annually grants the maintenance cost of the infrastructure, which was already transferred from Toyama city to Toyama Light Rail Co.

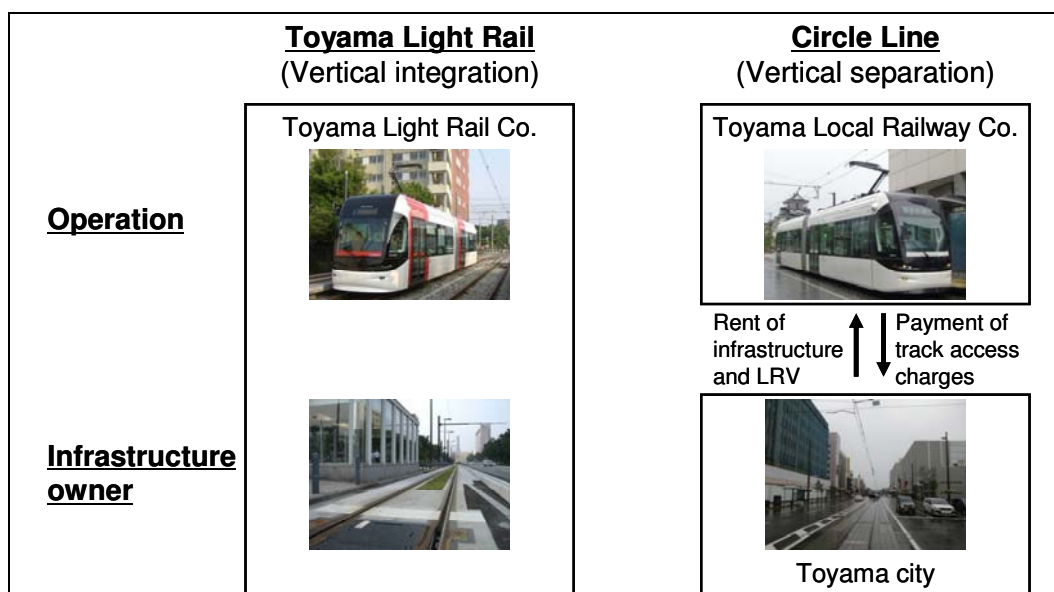


Figure 5: Framework of two LRTs in Toyama city

Source: Author

4.5 The types of vertical separation in Japan and the effect of the Act

According to Hara (2011), the models of vertical separation in Japan can be categorized into 5 types shown in below.

Type A) Complete asset separation

Type B) An operator possesses rolling stock

Type C) An operator possesses rolling stock and operation related facilities

Type D) An operator rents land from a local government

Type E) An operator possesses all facilities but a local government pays the costs

Type B, Type C and Type D have similarities, and these three types are combined into “an operator possesses operation related facilities” in this study. The detail of each type is shown in below.

Type A) Complete asset separation

In terms of the asset ownership, this type is regarded as the most extreme separation between infrastructure and the railway operator since the operator possesses neither rolling stock nor other facilities. The operator utilizes all facilities which are owned by the infrastructure owner and pays access charges. By adopting this structure, the operator would be free from the investment costs to railway facilities including rolling stock. Usually, the public sector would be an infrastructure owner. Thus, it would be necessary for the public sector to take financial burden of these railway facilities though it can receive access charges after the open of the system. The case of Toyama Local Railway Circle Line is defined as this type.

Type B, C and D) An operator possesses operation related facilities

In this group, an operator owns some operation related facilities. This group can be divided into three types based on the railway facilities which an operator owns.

In Type B, an operator owns rolling stock. Since rolling stock are essential facilities for operation, it is reasonable for the operator to own them when it is financially affordable.

In Type C, an operator owns electricity, mechanics and station facilities in addition to rolling stock. As these facilities are also closely related with railway operation, an operator can invest and promote maintenance works flexibly when it owns them. But an operator would be responsible for its investment and maintenance costs as well.

In Type D, almost all equipments except the land belong to an operator. In many cases, a local government owns the land, and an operator does not pay the usage fee as the local government has an intention to sustain railway operation.

In the case the railway facilities are owned by another entity, a railway operator has to report and negotiate with the owner whenever it invests and maintains the facilities. Thus, when it


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owns more railway facilities the operator is able to promote operation and maintenance works with less coordination with the asset owner. This often makes it possible to promote smooth and independent operation. On the other hand, a railway operator has to bear the costs of investment and maintenance for the facilities financially when it owns them. Thus, the kinds of railway facilities which an operator can own depend on the amount of revenue to the railway operator.

Type E) Operator possesses all facilities but the local government pays the costs

In this type, the ownership of railway facilities is not divided into a railway operator and the public sector and they still belong to a railway operator. Thus, in terms of general definition, it is not designated as vertical separation. But, instead of covering the deficit of the railway company as a subsidy, this model was defined so that the local government bears financial responsibilities for the infrastructure covering both investment and maintenance. This type is called “Gunma style” as the model was introduced in Gunma prefecture for the first time in 1999. This kind of framework has been applied to some local railways before enforcement of the Act. Toyama Light Rail is one of the examples.

Table 3: Types of vertical separation in Japan and their characteristics

Vertical structure	An operator's financial burden for the infrastructure	Type	Real estate	Operation related facilities				
				Track	Station facilities	Electricity & Mechanics	Rolling stock	
Separated	Light  Heavy	TypeA	I	I	I	I	I	
		TypeB	I	I	I	I	O	
		TypeC	I	I	O	O	O	
		TypeD	I	O	O	O	O	
Integrated		TypeE	O	O	O	O	O	

I: An infrastructure owner owns the asset.

O: An operator owns the asset.

Source: Author

In terms of above-mentioned categorization, Table 4 classifies railway companies which adopted vertical separation by time series. The trend shows that the applied types have been shifted from Type E to Type A. Especially, there has been no case which adopted type E since the enforcement the Act. By contrast, based on the utilization of the Act, the number of railways which adopted type A has increased. Therefore, Table 4 clearly shows that the enforcement of the Act brought a structural change of local railways in Japan and that vertical separation has become common among them.

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Table 4: Chronological table of vertical separation in Japan

FY	The Act	Type A	Type B & C	Type D	Type E
1991			•Noto Tetudou		
1998					•Jomo Electric Railway
1999					•Joshin Dentetsu
2002			•Aomori Railway		•Manyosen
2003				•Sangi Rail Hokusei line	•Echizen Railway •Ibara Railway
2006			•Chiba Urban Monorail	•Wakayama Electric Railway	•Ichibata Railway • <u>Toyama Light Rail</u>
2007	The original Act was enforced	• Yoro Railway • Iga Tetsudo			
2008	The revised Act was enforced				
2009		• <u>Toyama Local Railway Circle Line</u>	•Wakasa Railway	•Fukui Railway •Sanriku Railway	
2013		•Shigaraki Kogen Railway			

Source: Author

4.6 ISSUES BEFORE THE NEW ACT

As mentioned above the former status in Japan had some issues to be rationalized. It seems that they are mainly derived from the integrated management structure of unprofitable railways.

Firstly, although the railway assets were constructed by the public sector, it was transferred to an independent company by much cheaper price than the actual construction costs. Since there was not a sufficient law scheme to promote vertical separation in the railway sector at that time, this procedure was necessary for LRT operation despite the fact that the operating company is partly invested by the private sector.

Secondly, the city covers the maintenance cost of the infrastructure although the asset belongs to the independent company. This situation is different from the expenditure on the maintenance of roads as the infrastructure of roads is owned by the public sector. As the operator is an independent company, this expenditure is noted as “subsidy”. When the operating company is in surplus, the city might take large efforts for the explanation about providing public subsidy for independent profitable company.

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In order to fulfil the accountability for those issues, vertical separation appears to be more appropriate as a management structure for local unprofitable railways.

4.7 VERTICAL SEPARATION UNDER THE NEW ACT

Different from the above-mentioned status, since the new Act was revised in 2008, it has become possible for the infrastructure owner to rent its asset to operating company without covering its maintenance costs. In other words, the revised Act made it possible to introduce vertical separation to unprofitable railways. As this concept in the revised Act is also applicable to LRT systems, Toyama city introduced it to Circle Line for the first time in Japan.

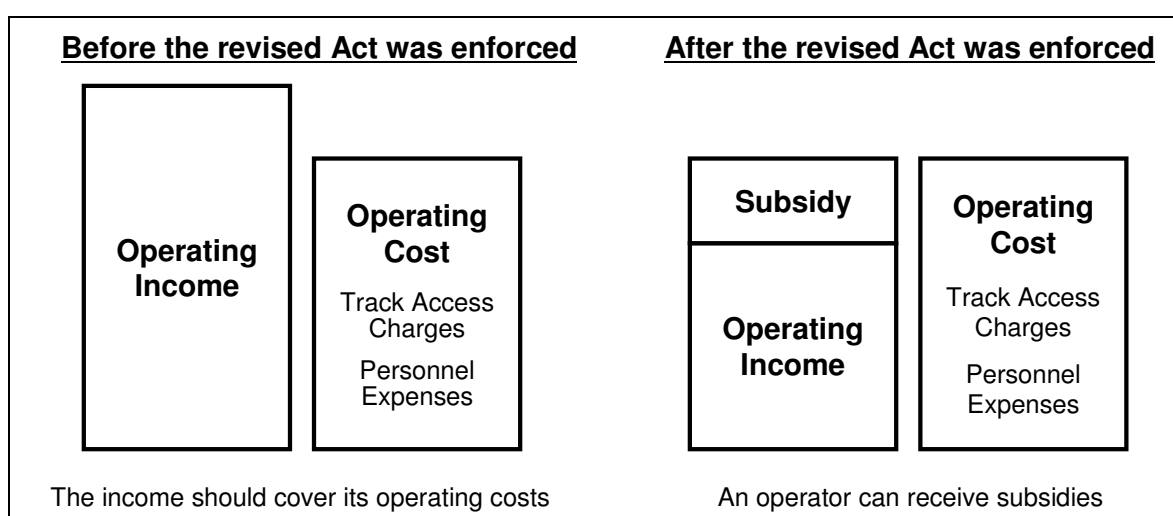


Figure 6: Possible financial flow for an operator with vertical separation

Source: Author

In the case of Circle Line, Toyama city owns infrastructure and is responsible for the maintenance costs financially. Different from the vertical separation in European countries, in order to minimize coordination problems between infrastructure and operation, the infrastructure owner, Toyama city, contracts out the practical maintenance works to the operator, Toyama Local Railway Company. Thus, with vertical separation under the new Act, it is usual that all operational responsibilities including track maintenance works are retained by an operator.

4.8 RATIONALIZED ISSUES AND ADVANTAGES OF VERTICAL SEPARATION

Vertical separation, which was introduced based on the new Act, rationalized some problems which the former integrated model used to have. In addition, vertically separated structure of Circle Line has some advantages. The rationalized issues and advantages are as follows.

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Realization of equal footing among different transportation modes

As infrastructure of the LRT system is retained by the public sector, it has become possible to support the LRT for social objectives and ensure competitive balance with other transportation modes. Similar to the roads, the public sector can undertake full responsibility for maintenance and upgrading of the rail infrastructure under vertically separated structure. Introducing vertical separation is effective for realizing “equal footing” among different modes of transportation.

Promoting accountability for public expenditures

Under vertically integrated railways, it is practically inevitable to pay subsidy to sustain unprofitable railway companies. Nevertheless, it would be difficult for the public sector to grant money to the independent company especially in the case the railway company is in surplus as a whole business because it might be seen as unfair from the view of other (loss-making) companies. Vertical separation can contribute to clarify the fairness of public expenditures since they can be spent on the infrastructure rather than covering the deficit of the operator’s management as payment of subsidies. Vertical separation can improve the transparency of the public expenditures and contribute to the accountability for the taxpayers.

Operation by an independent company

Vertical separation can make it possible to operate railways by an independent railway company even if the railway management is loss-making as a whole. A part of the financial burden of the railway can be alleviated by way of transferring the infrastructure and its costs. As a result, the finance of the operating sector can be balanced, and it would be possible for a (private) independent company to operate the railways even if the railways are loss-making as a whole. Without vertical separation, it appears difficult for the operating company to implement a large investment into infrastructure and promote balanced management in many cases.

Development of the transportation system based on the public policy

Under vertically separated structure, infrastructure of the transportation system can be defined as the asset of the public sector. Thus, it has become a responsibility of the public sector to develop the transportation system based on its long-term policy. In the case of Toyama city, this structure is expected to be appropriate to establish “a compact city”, which is designed in its long-term plan.

4.9 AN OPERATOR OF THE VERTICALLY SEPARATED RAILWAY UNDER THE NEW ACT

The process to decide an operator in the new Act in Japan is worth noting. In European and other countries, it has become common to decide an operator by competitive bidding. In

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other words, the competitive bidding plays an important role to attain accountability to the taxpayers as the public sector pays subsidies to the (private) company utilizing tax from the citizens.

On the other hand, in Circle Line's case, an operator was decided by negotiation based on the Act, and the city could make a contract with the private railway company, which operates the existing LRT line connected with the newly constructed section. In addition, this contract does not pre-suppose changing the operator some years later by competitive bidding. Instead, the contract supposes that the designated operator will provide transportation services continuously if there would not be certain reasons. From the technical and managerial point of views, it is rational that Toyama Local Railway Co. would provide services since the section constructed by the public funds is connected with its other lines.

As mentioned in the former sections, as a background of the above-mentioned procedures, there exists the concept of the new Act. The Act stipulates that public subsidies would be provided once the government approves the authorized specific plan made by a local council with concerned entities. This stipulation can be applied to the selection process of the operator as well. It is also possible for the public sector to make a contract with a private company by negotiation based on the authorized specific plan.

In other words, it is obvious that vertical separation in Japan does not aim to promote competition among operators as recent European railway regulations try to promote. Certainly, it is possible to implement competitive bidding for making a service contract if a local council wishes and agrees. Nevertheless, competitive bidding has not been implemented under the new Act in the railway sector so far in Japan.

5. DISCUSSIONS AND CONCLUSION

This chapter summarizes the discussion regarding the characteristics of the Act and the management of the two LRTs, and concludes this study.

5.1 DISCUSSIONS

Through the interview in the study and investigation into the available literature, it was indicated that the following issues are essential for utilizing the new Act to promote railway construction and revitalize railway management with efficiency.

Clear responsibilities of each infrastructure owner and operator

Once the railway operation is divided into two sectors, the infrastructure owner and the operator, it is essential to separate the responsibilities of each entity clearly because certain conflicts tend to occur between them. For example, the responsibility might be a problem once an accident happens on the line. Without a clearly stipulated contract between them, it

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would be difficult to define each responsibility. To avoid conflicts between infrastructure and operation, a clearly stipulated contract should be made in advance.

For example, as it is noted, the infrastructure maintenance works are contracted out from Toyama city to the operator. In this case, not only the contract about the infrastructure works, but also the responsibilities for supervising the infrastructure conditions and securing safety are also transferred from the city to the operator based on the contract.

Minimizing coordination problems between infrastructure and operation

Under vertically separated railways, coordination problems tend to occur between infrastructure and operation. Especially, they tend to occur once railway operation is implemented by plural entities such as an operator and an infrastructure manager. For example, in European countries, the railway sector has been worrying about this kind of coordination problems since a part of railway operation is implemented by an infrastructure manager.

In the case of Circle Line, infrastructure maintenance works are financially born by Toyama city, and the works are contracted out to Toyama Local Railway Company. Thus, Toyama Local Railway Co. performs not only LRT operation but also the infrastructure maintenance works. As a result, although vertical separation is adopted, coordination problems between operation and infrastructure are minimized as the railway operator implements all the maintenance and operation works of the line in practice.

It is essential for the concerned entities to implement some measures to minimize coordination problems between infrastructure and operation. In the case of LRT operation in Circle Line, contracting the maintenance works from the city to the operator has been effective for smooth coordination between infrastructure and operation.

Understanding by the citizens

Even though vertical separation is effective for promoting accountabilities to the taxpayers, it is essential to make efforts to gain understanding from the citizens. According to the interview, Toyama city held explanatory meetings for the citizens many times. In these meetings the city explained the plan of establishing a compact city and the importance of the public transportation for realizing the long-term plan.

In the explanation, the city emphasizes on explaining how important the city center area is. Though, the city center has a narrow area, the regional tax from the area reaches to a large amount and it is an important financial income to the city. Thus, introduction of LRTs not only contributes to the passengers but also to all citizens through the increase of the regional tax in the area.

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As the case of Toyama city implicates, it is essential to explain about the importance of the project and gain the understanding of citizens. In these procedures, it is crucial to evaluate the benefit of the project appropriately.

Regarding a railway project, not only the benefits for passengers but also those for local society should be considered. For example, as a result of railway projects, there are several beneficial effects such as revitalizing the city center, easing traffic congestion, ensuring mobility for students and elder ages, promoting tourism and so on.

Since many operators for the public transportation have been profitable in Japan so far, some people still do not understand the reason for providing subsidy for unprofitable public transportation. Moreover, some taxpayers think that subsidy for a private company should not be allowed. The project evaluation is effective in order to get an understanding by the citizens.

In terms of this point of views, the concept of the new Act is also effective for promoting understanding among the taxpayers since the concerned entities including citizens should negotiate to establish the transportation plan in the council. Thus, it can be expected that the new Act would deepen the understanding among the citizens.

Coordination among the concerned entities

As it is noted, the Act stipulates that the government's approval for the council's specific transportation plan is required to provide/receive public subsidies. Although the plan should be made by a local council with concerned entities, this process often faces large difficulties. It is because some issues in the plan would be disadvantageous for a certain transportation operator. Nevertheless, as the public transportation plan in a region should be made in a coordinated manner, this kind of negotiation process has advantageous aspects as well.

Different from overseas cases such as the ones in European countries, competitive bidding for transportation services has not been in common in Japan. Certainly, competitive bidding appears to have some advantageous effects such as minimizing the amount of subsidies and promoting the accountability for taxpayers. Nevertheless, if the concerned entities agree with the transportation planning in the region, continuous operation might have more advantageous aspects:

- 1) long-term investments and management by an operator;
- 2) accumulation of technical abilities in the incumbent operator;
- 3) avoidance of administrative works for competitive bidding;
- 4) avoiding a risk of the management by the inferior operator which is selected by competitive bidding;
- 5) others

Of course, transparency about the service contract must be secured especially when the contract is made based on the negotiation with the existing operator in the region. In addition, competitive bidding can be implemented once the local council makes the plan to promote

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the bidding. But the concept of the new Act in Japan puts more emphasis on the agreement among the concerned entities in the region. In practice there has been no case that the competitive bidding was implemented based on the new Act so far.

As discussed above, coordination among the concerned entities can be regarded as one of the most distinct characteristics of the new Act. In addition, different from overseas cases, the new Act puts a ground for providing public subsidies on the approval for the agreement about the specific transportation plan in the region.

5.2 CONCLUSION

The new Act promoted some measures to sustain operation of local railways in Japan. Vertical separation is recommended to sustain unprofitable railways, and some railways, including Circle Line in Toyama city, adopted vertically separated structure based on the new Act. Through dividing the railway system into operation and infrastructure, infrastructure can be regarded as public goods.

In comparison with European countries, the process and management model under the new Act retain some different aspects, such as the decision process of the operator, the measures for ensuring transparency, and so on. It seems that the Act in Japan emphasises on how to sustain the existing railway companies. On the other hand, the European railway policy emphasises on promoting competition among operators. Although both policies have advantageous and disadvantageous aspects, it seems that the new Act in Japan has a characteristic to sustain the unprofitable railway operation with coordination and agreement among the concerned entities. This paper has discussed its unique characteristics, which appear to be beneficial for promoting railway management in other cases as well.

As a case study, this paper discussed the Toyama city's two cases comparing the original case and the case which the new Act was applied. The study also found that Japanese local railways started to adopt vertically separated structure to sustain its management since the enactment of the Act. Then, it was investigated how the issues of the integrated structure were solved in the separated structure.

Facing rapid progress of motorization and development of other transportation modes, the circumstances around railway management are getting to be difficult not only in Japan but also in overseas countries these years. Despite the difficult circumstances, it is essential to sustain and improve railway transportation services for realizing environmental regions in many cases. Therefore, the new Act in Japan and the experiences in Toyama city appear to have several issues which can be shared with other cases as well. From this point of views, the studies and investigations implemented in this paper are beneficial for promoting railway operation and management in other cases both in Japan and overseas.

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