PUBLIC/PRIVATE PARTNERSHIPS IN PROVIDING RAIL INFRASTRUCTURE : THE JAPANESE CASE

by

Makoto Saito

B.E. Civil Engineering
Kyoto University, Kyoto, Japan (1991)

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Signature of Author .....
Department of Urban Studies and Planning
May 20, 1998

Certified by.....
Professor Joseph M. Sussman
JR East Professor
Department of Civil and Environmental Engineering
Thesis Supervisor

Accepted by.....
Professor Lawrence S. Bacow
Chair, MCP Committee
Department of Urban Studies and Planning

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ABSTRACT

Public/private partnerships in developing and operating infrastructure services have become a world-wide topic in public policy. There are many types of public/private partnerships which countries have introduced to promote private sector involvement in infrastructure developments. This thesis evaluates public/private partnerships in Japan which use a third-sector method, particularly those within urban/regional rail development projects. It also develops ideas for more effective public/private approaches which could accelerate these Japanese projects.

Through case studies of three rail development projects, this thesis examines the characteristics of current third-sector approaches. As its strong point, the third-sector method has a potential to collect the funds from various public and private beneficiaries as equity investments. This advantage could help translate projects in the planning phase into implementation and contribute to the project's financing. This risk-sharing scheme, however, does not always provide incentives for cost efficiency, and it also requires private railway companies to assume a large portion of risk at various stages. This risk-sharing scheme has, in some cases, prevented private railway companies from participating in such projects, especially if the project involves high-risk factors.

This thesis develops ideas for more effective public/private approaches to the provision and operation of rail systems and recommends some strategies, which could make better use of private sector skills and motivations in efficiency from planning to operation. These strategies are made for the respective role of the public, private and third-sector institutions within the projects. In keeping with these strategies, three types of project structures are proposed; these would be selected according to the public and private interests of future rail development projects This thesis also discusses some alterations required to make the proposed structures feasible.

Thesis Supervisor: Joseph M. Sussman
Title: JR East Professor, Professor of Civil and Environmental Engineering

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Makoto Saito

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Preface

The research for this thesis was done within the framework of an MIT research project called Res/SITE: Regional Strategies for the Sustainable Intermodal Transportation Enterprise. This project aspires to developing a new framework for regional strategic transportation planning. It has identified various shortcomings in that process through analysis of current planning efforts, and has worked to establish a new process to overcome those weakness. It builds broadly on the concepts of scenario and regional architectures as fundamental to this new generation of regional strategic transportation plans.

Public/private partnerships in transportation planning and project implementation are core issues in regional strategic transportation planning and are regarded as an useful means to accelerating the projects and improving the efficiency and inventiveness. This thesis focuses on public/private partnerships in Japan which use a third-sector method, and evaluates those partnerships, especially those related to urban/regional rail infrastructure development. It also develops ideas for more effective public/private partnerships in the delivery and operation of such infrastructure, and examines prospects of private sector involvement in regional rail planning.

Chapter 1 Introduction

This chapter describes the background, objectives and structure of this thesis.

1-1 Background

Public/private partnerships in developing and operating the infrastructure services have become a world-wide topic in public policy. There are many types of public/private partnerships which countries have introduced to promote private sector involvement in infrastructure development. This thesis focuses on Japanese public/private partnerships which use a third-sector method and evaluates those partnerships, especially those related to urban/regional rail infrastructure development. It also tries to develop ideas for more effective public/private approaches to the provision and operation of rail infrastructure from both regional and national viewpoints.

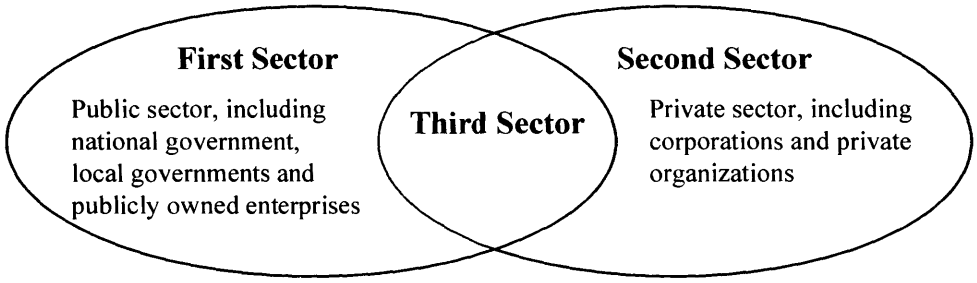
In Japan, the evolution of public/private partnerships for public infrastructure and services became a topic of much interest after the expression "private sector vitality (min-katsu) " was used by Prime Minister Nakasone in a policy speech to the Diet in 1982. In the 1970's, tax revenues had shrunk as a result of the economic depression and governments were suffering from annual deficits. The major goals of such partnerships were to supplement the shortage of public funds for infrastructure investment by using funds from the private sector and to promote greater efficiency in the construction of large-scale projects. Also, stimulating private sector investment in the domestic market was expected to reduce Japan's international trade surplus.

Since that time, public/private partnership projects in Japan have been used for many purposes such as highways, airports, railroads, and economic development. In many cases, the projects have been implemented by establishing a "third-sector" entity, a form of for-profit organization jointly funded by the public sector (the first sector) and the private sector (the second sector). (See Figure 1-1) Third-sector entities in Japan differ from those in Western countries; in the West, they are non-profit organizations independent of both the

public and private sectors. In Japan, a third-sector entity is treated as a corporation by commercial law, and must pay corporate taxes as the private (second) sector does.

Even though the third-sector entity has been expected to make good use of private sector know-how, it tends to do so in a limited way. "The government typically leads in the planning of "third-sector" projects, with the result that the private sector know-how is often ignored at the planning stage. Also, the management of the third-sector entity is subject to various political pressures from the public sector".[1] These undesirable characteristics of the third-sector entity are widely recognized in Japan from experience with various projects, and are regarded as the drawback to the third-sector method.

Figure 1-1 Third Sector in Japan



Source: Ishigami, Keitaro. "New Approaches to Public-Private Projects in Japan". NRI Quarterly, Nomura Research Institute, Winter/Spring 1995.

1-2 Objectives

There are major two objectives in this thesis. The first is to clarify and evaluate current third-sector methods used in Japanese urban/regional rail infrastructure development. The second is to develop ideas for more effective public/private approaches from planning to operation, with a view to accelerating the rail infrastructure development projects in Japan.

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[1] Ishigami, Keitaro. "New Approaches to Public-Private Projects in Japan". NRI Quarterly, Nomura Research Institute, Winter/Spring 1995.

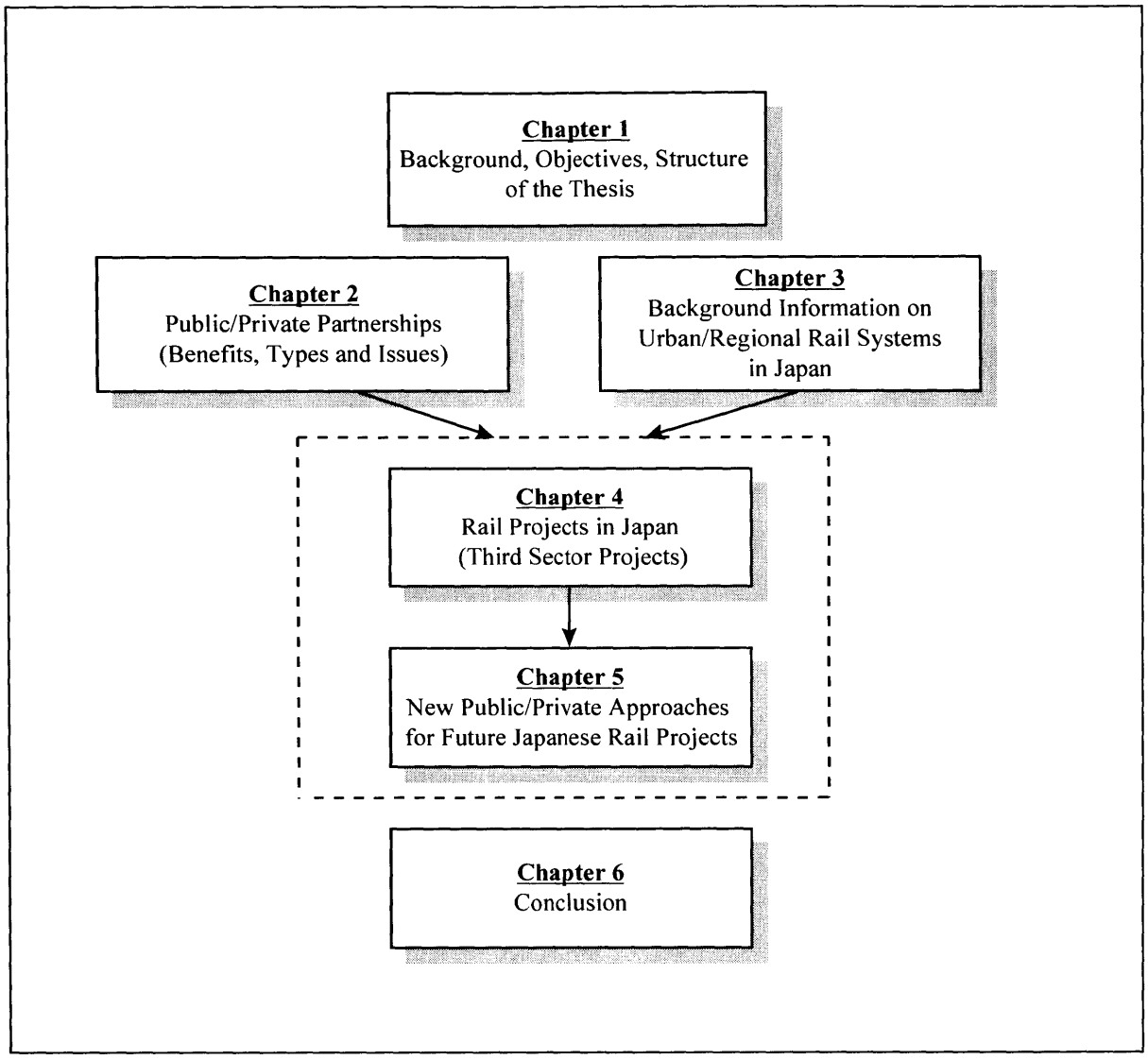
Ogawa Isao. Minkan-katuryoku ni yoru Shakai-shihon-seibi (Infrastructure Development by the Private Vitality). Kajima-shuppankai, 1991. (Japanese)

In order to evaluate current methods, this thesis has selected three Japanese rail development projects as case studies: the JR-Tozai Line Project in Osaka, the Joban Shinsen (New Joban Line) Project and the Narita Airport Access Line Project in the Tokyo Metropolitan region. These three projects were/are being developed by third-sector entities which were established specifically for them. They differ in terms of degree of their public and private involvements and in public and private capital contributions to third-sector entities.

1-3 Thesis Structure

Following this introduction in Chapter 1, Chapter 2 offers an overview of public/private partnerships, and the information given then is used and referred to in the following Chapters 4 and 5. Chapter 3 provides background information, explaining characteristics surrounding urban/regional rail systems in Japan. It also describes the financial support programs of the Japanese national government for urban/regional rail infrastructure development. Chapter 4 introduces the three Japanese third-sector rail development projects and clarifies the delivery methods used in the projects. In Chapter 5, new public/private approaches are proposed for future Japanese urban/regional rail infrastructure development. Finally, Chapter 6 is a conclusion to the thesis. Figure 1-2 shows the structure of this thesis.

Figure 1-2 Thesis Structure



Chapter 2 Public/Private Partnerships: Benefits, Types and Issues

2-1 Introduction

This chapter offers an overview of public/private partnerships in the provision and operation of infrastructure before we present the actual case studies of Japanese rail projects delivered by the third-sector method.

In the first section, the anticipated benefits of public/private partnerships are discussed in terms of private-sector participation. In the second section, different types of public/private partnerships are explained. Some transportation projects in Japan and the United States in which these methods have been applied are also described to show their practical uses. The final section examines the issues in public/private partnerships which should be taken into account to achieve the benefits described in the first section.

2-2 Benefits of Public/Private Partnerships

Since the 1980's, public finance experts around the world have been reassessing the arguments for the public provision of infrastructure services. Public/private partnerships or privatization to develop public infrastructures and operating services has become an important aspect of public policy. In this section, after the merits of the public sector are examined, the anticipated benefits of private participation in the provision and operation of infrastructures are examined.

2-2-1 Merits of Public-Sector

Low-cost financing is one of the most important features of the public sector. For instance, because the public sector can issue bonds which are guaranteed by the governments, the interest rate on the bonds can be lower than the private sector. This financial benefit can be a substantial asset to project financing. An additional benefit to the public sector

involvement is its familiarity with negotiations over issues such as environmental questions, right-of-way acquirement, etc. This skill can help to reduce the construction period, and thereby improve a project's cash flow.

2-2-2 Benefits of Private Participation

According to Dowall, private participation in or privatization of urban infrastructure services yields three important benefits to local and central governments: (1) it enhances the cost efficiency and quality of service; (2) it conserves scarce public sector resources; and (3) it provides additional sources of capital for financing infrastructure investment.[1]

It is generally thought that the private sector is more cost-effective than the public sector and can provide infrastructure and operate services for less money. A study in support of this opinion was conducted by Pryke, who compared public and private performance in four industries: airlines, ferry services, gas, and electrical utilities. He concluded that public enterprise performance was relatively poor, and that public enterprises used labor and capital inefficiently with reduced profitability.[2]

Enhancement of the quality of service is one of the expected benefits, because the private sector is usually more sensitive to customer satisfaction than the public sector. However, the quality of service can also become a problem: user fees, service frequency, and safety are all closely related to costs of construction and operation. If the private sector develops infrastructure and operates services with too great emphasis on profitability, the quality of service may be reduced. In this sense, the public sector often needs to monitor the service level to see whether or not it meets standards.

Reducing the use of or supplementing public funds is a major benefit when private funds can be used for public-purpose projects. In developing countries where economies have grown rapidly, public funds are not sufficient to make infrastructure improvements that

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[1] Dowall, David E. An Overview of Private Sector Financing of Urban Infrastructure Services, University of California at Berkeley, 1995.
[2] Pryke, R. Comparative Performance of Public and Private Enterprises. Fiscal Studies, 1982.

keep step with the economy. Also in developed countries, the governments often face very tight budgets, and regard debt financing as an undesirable solution. For instance, in Japan, 18.6 percent of the total budget expenditure went for repayment of the national debt in FY 1995.[3] Strict expenditure limitations have been required to improve the financial structure both at national and local level.

Risk distribution is also an expected benefit from public/private joint investment projects. Infrastructure development generally entails risk at various stages. Some portion of that risk can be shared between the public and private sector. Thus, the risk which the public sector will have to bear can be reduced to some degree.

2-3 Types of Public/Private Partnerships

There are many ways in which the private sector can provide infrastructure and operate services. The role of the private sector has varied widely, "ranging from full private-sector ownership and management of infrastructure to partial private-sector payment for infrastructure services."[4] This section describes methods which encourage the private sector to participate in a project's delivery and operation. Some transportation project cases to which these methods have been applied in Japan and the United States are also discussed to show their practical uses.

2-3-1 Transfer of Ownership (Privatization)

The transfer of ownership from the public sector to the private sector is the most extreme form of private sector participation and is usually referred to as privatization. The public sector sells or transfers infrastructure or existing public organizations to the private sector. The private sector then becomes substantially involved in the planning, financing,

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[3] Asahi Shimbun. Japan Almanac 1996, Asahi Shimbun, 1995.

[4] Delmar, Clare E. and Menendez, Aurelio. Infrastructure Financing in the United States - Issues and Mechanisms -. Massachusetts Institute of Technology, Department of Urban Studies and Planning,

construction, ownership and operation of public services, controlled to an extent by certain regulations.

In Japan, in 1987, due to huge long-term deficits derived from inefficient bureaucratic management and political intervention, the Japanese National Railways(JNR) was divided into six regional passenger railways, one nation-wide freight railway (JR-Railways) and five other related businesses. A portion of JR-railways stock was offered on the market by the national government to domestic and foreign private investors. Even though some parts of the stock are still owned by the national government, JR-railways have a much larger degree of autonomy than before. Because six JR passenger companies compete with one another, as well as other private railway companies, airlines, and long-distance bus services in service quality, speed, and punctuality, the performance of JR-Railways has greatly improved as a result of privatization.

Within a decade of privatization, a conflict between the national government and JR-railways has arisen over the share of expenses for the railway pension fund, which merged with the public pension fund in 1996.[5] In 1996, these expense shares were decided on, but the national government is now trying to impose an additional share for JR-Railways in 1998 using the force of the law. On the other hand, JR-railways are refusing to accept the imposition as private-sector firm with obligation to shareholders. Even though one of the goals of the privatization was to lessen political intervention, it comes to the surface again, ignoring the market economy.

2-3-2 Franchise

A franchise method usually gives monopoly privileges to a private sector with regulations on such things as price and quality of service. The most notable methods are the build-operate-transfer (BOT) and build-transfer-operate (BTO) methods which are

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1986.

[5] New York Times. "Saying No in the Land of Yes; Japanese Rail Executive Stands Up for Shareholders". March 12, 1998.

widely used in developing countries for infrastructure development with private funds. Through the BOT arrangement, the franchised private organization builds a facility and operates the service for a fixed period of time. After the contracted period ends, the facility is transferred to the public sector. The BTO is an alternative method. The government provides a franchise concession to a private organization, which constructs a facility. After completion of the facility, the private organization transfers it to the public sector, but the private organization operates the service for a fixed period of time under a lease agreement.

In the United States, one of the most notable examples of this kind of franchise can be seen in the California State Route 91 Express Lanes project. Assembly Bill No. 680 enacted by the State of California in 1989, allowed the California Department of Transportation (Caltrans) to use private funds to meet the increasing need for highway capacity.

The basic scheme was the BTO method: private companies were to build the road and make related improvements, after which they would transfer the road and the improvements to the public sector at no cost and receive up to 35 years to make a profit on their investment. Caltrans requested conceptual proposals in 1990, and eight proposals were received from private consortia. Eventually, four projects were selected based on evaluation criteria.

One of these was a 16 kilometer toll express lanes project on the State Road 91 (SR 91); this was undertaken by the California Private Transportation Company (CPTC) whose equity partners were construction conglomerate Peter Kiewit Sons' Inc., Confiroute Corp. a Los Angeles-based subsidiary of the large French toll road builder, and Granite Construction Inc., the largest transportation contractor in the United States.[6] The project involved the addition of four express lanes in the median along a consistently congested stretch of the SR 91 in Orange county; it introduced the world's first fully automated electric toll and traffic management system. "No federal or state funds or credit were involved in the financing,

[6] Schriener and Green. "100% Private Financing Wrap Ups". Engineering News Record, 9-10, McGraw-Hill Publishing Company, 1993.

and it relies entirely on tolls."[7] However, this project received nontoll support in that much of the right of way was provided without charge by state authorities (land in the median of the existing expressway).[8] The CPTC can set any toll price at any level depending on market conditions, but the base rate of return is set at 17 percent. The CPTC, however, can earn up to 6 percentage points (incentive return) above the ceiling rates of return if it meets certain public objectives, including increased average vehicle occupancy, reduced toll road operation costs, or reduced accident rates.[9] Since this expressway was built in order to relieve existing congestion, it was expected that the initial demand would be relatively high.

2-3-3 Lease

According to Clare E. Delmar and Aurelio Menendes, the leasing method is one of the earliest forms of privatization. It can work in two ways. "The public sector leases a public facility to a private entity, which then finances the operating and maintenance expenditures on that facility. Alternatively, the public sector sells the facility to the private entity, which then finances the capital cost for the facility, and the public sector leases the facility back from the private sector, assuming operating and maintenance expenditures."[10]

In Japan, this method is widely used for new rail projects. The public sector, or third-sector entity, owns facilities such as tracks, tunnels, and other rail equipment, and leases them to private railway companies. The private railway company then assumes the responsibility of operating services and pays the leasing fee. The Nagano Shinkansen, which began operation in 1997, is a recent example of a rail project in Japan to which this leasing method has been applied. East Japan Railway Company (JR-East) leases the

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[7] Public Works Financing. "SR91 Express Lanes Special Report". Public Works Financing, 1-24, McGraw-Hill Publishing Company, 1993.
[8] Gomez-Ibanez, Jose A and Meyer, John R. Going Private - The International Experience with Transport Privatization-. The Brookings Institution, 1993.
[9] Ibid.
[10] Delmar, Clare E. and Menendez, Aurelio. Infrastructure Financing in the United States - Issues and Mechanisms -. Massachusetts Institute of Technology, Department of Urban Studies and Planning, 1986.

Shinkansen facility from the national government at a fixed annual leasing fee of about 18 billion yen.(144 million dollar).[11] This fee was decided in negotiations between the national government and JR-East in such a way that it would not have a negative effect on the financing of JR-East.

In the United States, we can see cases of air-right leases above transit stations and highway/transit rights of way. South Station, which is the biggest downtown terminal station in Boston and is owed by the public transit agency of the Massachusetts Bay Transportation Authority (MBTA), is one example. It leases the air-rights above the station to a private developer, the Beacon Company Inc. The developer has constructed and operates office and retail space above and adjacent to the station. In exchange for the development air-rights, it pays 50 percent of the annual operating expenses of the transit station.[12] In this case, the MBTA has taken advantage of private know-how for its development and management, and it operates in the absence of maintenance costs.

2-3-4 Contract-out

The contracting-out method is a widely used technique for encouraging the private sector to participate in providing public service. This method consists of a shift of service operation or management from the public sector to the private sector by contract, but it does not include a change of ownership of the facility or the organization. In the United States, the contracting-out of public services has become popular in the last 25 years[13], and a wide variety of public services such as transit services, public works and parks have been

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[11] Nihon Keizai Shinbun (Japan Economic Newspaper). July 9,1997. (Japanese).
Exchange rate: 125 yen = 1 dollar. (According to the International Financial Statistics, average exchange rate in November, 1997 is 125.27 yen =1 dollar) Hereafter, this currency rate is used throughout this thesis.

[12] Cervero, Robert et al. Transit Joint Development in the United States. University of California at Berkeley, 1992.

[13] Lopez-de-Silanes, Florecio et al. Privatization in the United States. Working Paper No.5113, National Bureau of Economic Research, 1995.

contracted out to the private sector.[14]

For example, in the United States, the MBTA in Boston has, since 1987, contracted out all of its commuter rail services to the National Railroad Passenger Corporation (Amtrak). The primary goal of the MBTA is to provide the highest quality service at the lowest possible cost. At the time, there were two major bidders for the commuter rail services, Guiford, and Amtrak, but the MBTA felt that Guilford would not provide adequate service, and Amtrak was awarded the contract.[15] Amtrak provides the personnel to operate and maintain the commuter rail system and the MBTA owns all rights of way, rolling stock, and equipment. The contract is structured on a cost-plus basis with incentive and penalty provisions based on operating performance standards.[16] This is a regulated monopoly situation in which there is little possibility for competitors to appear. Nonetheless, a study shows that operating the entire commuter rail system "in-house" would not produce substantial savings and could even result in an increase of costs, as well as an increase in management problems.[17]

2-3-5 The Value-Capture Method: Benefit Assessment District / Tax Increment Financing

In these methods, a benefit assessment district is established where a benefit could be clearly expected from infrastructure improvements, such as in the areas around transit stations. Special fees are imposed on property owners in addition to regular property taxes. The proceeds from an assessment are often utilized to retire long-term bonds issued by the public sector for the purpose of constructing improvements. Tax increment financing does

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[14] Clarkson, Kenneth W. "Privatization at the State and Local Level", in Privatization and State-owned Enterprises, Kluwer Academic Publishers, 1989.
[15] Mantel, Nicole A. Alternative Strategies for Private Sector Participation in Urban Mass Transit. Thesis (MS), Massachusetts Institute of Technology, 1993.
[16] Ibid.
[17] Ibid. Mantel reefers to the conclusion derived from Halvorsen, Rick D. et al. Analysis Options for MBTA Commuter Rail Operations. Center for Transportation Studies, Massachusetts Institute of Technology, 1991.

not involve any special additional fees. The concept of the method is that construction costs will be financed through an increase in tax revenues generated by an increase in property values.

One of the most ambitious efforts of this type in the United States was the Los Angeles heavy rail transit line, known as the Metro Rail.[18] In 1983, the state legislature passed a bill that empowered the Southern California Rapid Transit District (RTD) to create assessment districts to fund the project. In accordance with the bill, RTD established benefit assessment districts around five stations on the initial 4.4 mile segments of the system to raise $130 million (about 10 % of the estimated $1.25 billion capital costs). The assessment fee was set at 30 cents per square foot, but could increase to as much as 42 cents, depending on the RTD Board's resolution. This fee was imposed on commercial properties within approximately one-half mile of any station, i.e. walking distance. After creating the benefit assessment districts, residential property owners were exempted by the Los Angeles City Council. Also, industrial and warehouse buildings, as well as parking, were defined by the plan as unassessable, i.e. they were not included in the calculation of square footage. "Commercial property owners investigated the possibility of forcing a referendum on the issue, but they could not collect the number of signatures required by the state law."[19]

2-3-6 Public-Private Bargaining: Impact Fee / Incentive Agreement

Both methods are techniques used to channel private developers' funds into capital expenditure. An impact fee is a method which imposes a fixed charge on private land developers. The theory behind the method is that new development increases the demand for public services or capitals and that the increased costs for new infrastructure improvements should be paid by the developers. Incentive agreements, on the other hand, utilize such incentives as zoning variances to leverage developer-funded capital

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[18] General Description comes from:
Cervero, Robert et al. Transit Joint Development in the United States. University of California at Berkeley, 1992.

improvements. Instead of providing a special or additional permit for private developers, which could increase the developers' revenue, the public sector requires that surrounding infrastructure improvements be made by the developers.

In the United States, from the end of the 70's to the end of 80's, the impact fee was popular among local governments as a means of financing capital improvements. The survey from 1985 shows the method in use: 36.6% for sewerage systems, 33.5% for water supply systems, 30.8% for roads, 30.8% for recreational parks, and 13.5% for school facilities. (Because the fee is sometimes used for multiple purposes, the total percentage is not equal to 100%).[20]

Even though this is not a recent case, one of the most remarkable uses of the incentive agreement method can be seen in New York City. In 1961, New York City first provided incentive-zoning in exchange for developers' provision of amenity facilities (open space and open passageways for public use). During the 60's and the 70's, zoning bonuses were sometimes awarded to other facilities, such as theaters and subways for improvements.[21] One example of an incentive agreement used for subway improvements in New York City was 885 Third Avenue, developed by a private developer.[22] It received an approximate 18 percent bonus for the construction of a 55-foot escalator in addition to a new stairway and stairwell from the sidewalk level to the station mezzanine.[23] As a further condition, the developer was and continues to be responsible for maintaining the escalator and stairwell for the life of the building. Even though the negotiation process was frustrating and long, the station improvement was completed and has been in use since November, 1986.

Since the Metropolitan Transportation Authority (MTA)'s jurisdiction over land use

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[19] Los Angeles Times. "Metro Red Line Tax Approved by High Court". January 31, 1992.
[20] Trust 60 Infrastructure Development Research Group. Infrastructure Development and its Funds (Shakaiseibi to Zaigen). Gihodou, 1992. (Japanese)
[21] Akimoto, Fukuo. Partnership ni yoru Machizukuri (Development by Partnerships). Gakugei-shupansha,1997. (Japanese)
[22] Stern, Jennifer. The Subway VS. The Sky: Awarding Private Developers Zoning Bonuses for Improvements to the New York City Subway System. A Report to the Permanent Citizens Advisory Committee to the MTA, 1989.
[23] Ibid.

covers only stations and rights-of-way, it has had to rely on the legal authority of the New York City Planning Commission to create an environment that induces cost-sharing. The successes of joints developments so far are due to the good working relationship between the MTA and the New York City Planning Commission. "Both agencies see joint projects as serving their respective missions: the MTA is interested in renovating old stations and the Planning Commission wants to stem Manhattan's ever-worsening traffic congestion."[24]

2-4 Issues in Public/Private Partnerships

This section examines issues in public/private partnerships which should be considered to achieve the anticipated benefits described in the first section of this chapter. There are several issues to be considered when we try to meet goals by using public/private partnerships.

2-4-1 Risk Distribution

Risk should be distributed so as not to impede the private sector's incentive to minimize project costs. For example, if the public sector takes the market risk of the actual ridership or traffic being lower than expected, the private sector has no incentive to operate the service efficiently. On the other hand, the risk should be allocated so as not to make the private sector hesitate to participate in the project.

2-4-2 Project Structure

First, the project structure needs to be considered from the point of view of effective project delivery and operation. As regards infrastructure delivering strategies, in terms of public/private partnerships, Professor John Miller of MIT presents a useful framework which

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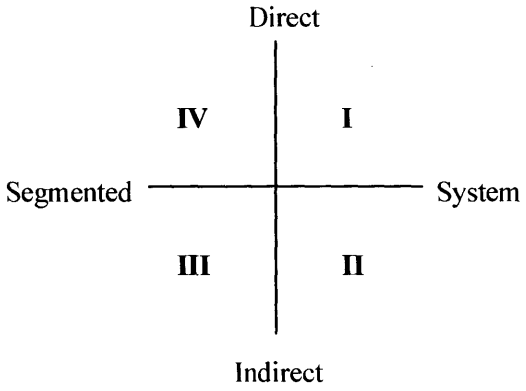
[24] Cervero, Robert et al. Transit Joint Development in the United States. University of California at Berkeley, 1992.

depicts fundamental public sector procurement strategies in two dimensions.[25] (See Figure 2-1)

The vertical axis describes the public sector's involvement in financing the project. The project is delivered using the public sector' s funds through " direct" financing or pulled into the private sector through "indirect" methods such as incentives, subsidies and mandates. The horizontal axis presents the range of possible delivery methods. The left side of the horizontal axis indicates that each step of the procurement process - planning, construction, operation, etc.- is "segmented", and the right side indicates that all these steps are combined into a single "system" procurement. A segmented task is completed in steps by firms that can provide the most effective work for a given part of the total job. In a single system, on the other hand, a entire process is controlled and completed by one firm.

Figure 2-1 Quadrant Framework



Miller argues that the United States has relied on a Quadrant IV approach for the last half century, but the segmented approach does not produce best value for the governments and is an aberrant method in the broader historical context of American infrastructure

[25] Miller, John B. Aligning Infrastructure Development Strategy To Meet Current Public Needs, Ph.D. Dissertation, Massachusetts Institute of Technology, 1995

development.[26] Miller recommends that the United States should move to recapture the advantages of Quadrants I and II, and increase systematic efficiency by reestablishing the governments' traditional role as a packager and facilitator for large infrastructure projects.[27]

Secondly, a competitive environment should be promoted and structured, since a monopoly situation might decreases the incentive to manage and operate a service efficiently regardless of whether it belongs to the public or private sector. An economic theory shows that the competitive process can achieve a situation in which the operating firms will earn a fair rate of return but no excess profit.[28] There are ways to promote competitiveness; the most commonly used techniques are bidding and proposal requests. These were used in the case of the franchise method for the California highway and the contract-out method for the commuter rail services of the MBTA.

Not every project, however, is suitable for a competitive environment. It is sometimes expected that there are obstacles to competitive situations with concerns such as economies of scale and system networks. Furthermore, a bidding or proposal process requires time and money, and may not be relevant for a project which has strict time constraints. In addition, even if the competitive process is used to select a private concessionaire, a long-term concession may create a non-competitive environment in which market forces can not achieve a desirable equilibrium. In such cases, proper regulations and monitoring systems are necessary to meet public requirements.

2-4-3 Regulations

In addition to the fundamental environmental and safety regulations, regulations for the private sector behavior are necessary, especially in a limited competitive situation.

These regulations should be made, however, so as not to reduce the private sector's

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[26] Ibid.
[27] Ibid.
[28] Train, Kenneth E. Optimal Regulation: The Economic Theory of Natural Monopoly. MIT Press, 1991.

incentives to operate the service efficiently and provide a higher quality of service. In the California highway case, a base rate of return has been used to regulate private sector behavior. Also, in order to oblige the private sector to provide efficient and high-quality service, an incentive return (bonus return) was introduced. In the case of the MBTA's commuter rail system, while the contract was structured on a cost-plus basis, incentive and penalty provisions included and were based on operating performance standards.

This chapter has examined public/private partnerships in provision and operation of infrastructure in terms of benefits, types, and issues. The information given in this chapter is used for evaluations of the case projects in Chapter 4 and recommendations for future Japanese urban/regional rail projects in Chapter 5.

Chapter 3 Background Information on Urban/Regional Rail Systems in Japan

3-1 Introduction

The primary objective of this chapter is to provide background information on urban/regional rail systems in Japan, for the following chapters. Throughout this thesis, regional rail system presents the system which starts and ends within a regional or metropolitan area (similar to a commuter rail system in the United States), and thus, excludes intercity rail system.

In the first section, Japanese urban/regional rail systems are examined in terms of ownership, market share, and trends. The second section clarifies the current Japanese national government systems that provide financial support for urban/regional rail development projects.

3-2 Urban/Regional Rail Systems in Japan

3-2-1 Ownership

Japanese rail history begins in 1872, when the first railroad began its run of 29 kilometers between Shinbashi, Tokyo and Yokohama. Since railroads then developed at a rapid pace after the completion of this one, almost all current rail networks in large metropolitan areas were constructed at the beginning of the Showa era.[1]

Originally, railroads were delivered by the public sector, but soon many were developed and operated by private companies due to the national government's insufficient resources. In 1906, the Railway Nationalization Law was enacted, and 17 private systems were taken over by the public sector. There were two reasons for this public takeover.

[1] The Showa era was from 1926 to 1989. Amano, Kozo ed. Toshi no KokyoKotsu (Urban Public Transportation). Gihodo, 1988. (Japanese)

"First, rail users were dissatisfied with the fare increases and poor services of private railway companies. Second, the local governments, which had no revenue source except taxes, wanted to increase revenue by owning profitable enterprises".[2] Before World War II, an economic recession brought about the reorganization of private railway companies, and the large ones took over the smaller ones.

After World War II, in 1949, the Japanese National Railways (JNR), a public organization, was established to promote effective nation-wide rail management. This was seen as an alternative to direct governmental control. The management was required on a self-paying basis under the control of the Ministry of Transport (MOT). The JNR developed a nation-wide rail network and operated urban, regional, and inter-city railroads including the Shinkansen (the Bullet Train). However, in 1987, budget deficits caused by inefficient bureaucratic management and excessive capital investment eventually led to the privatization of the JNR which was divided into six regional passenger companies and one nation-wide freight company (JR Railways). These are profit-seeking private companies, even though some of their stock is still owned by the national government. Thus, throughout this thesis, the term "private railway companies" also refers to JR Railways, unless otherwise specified. Currently, the JR-railways are major distributors for various types of rail services, such as urban, regional, and also inter-city services.

Other private railway companies have also played significant roles in urban transportation, especially for large metropolitan areas. Their lines are mainly commuter rail system connecting city centers and suburban residential areas. These have also conducted related businesses, such as hotels, shopping areas and residential development; these supplemental activities have, by and large, supported their railway businesses.

Although the national government is not directly involved in the ownership or operation of railroads, local prefectual and municipal governments do own and operate rail systems, either directly or through third-sector entities. Most subway systems in the cities, for example, are directly owned and operated by prefectures or municipalities. Furthermore,

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[2] Mizutani, Fumitoshi. Japanese Urban Railways. Ph.D. Dissertation, Harvard University 1993.

many recently-developed urban/regional railroads are owned by third-sector entities which are mainly or partly supported by prefectures and municipalities.

Current operating characteristics in terms of rail ownership are described in Table 3-1. Japanese rail systems, however, cannot be clearly separated in terms of rail modes, such as urban, regional, or inter-city, so the figures in Table 3-1 include all rail modes. (the figures for the JR Railways in Table 3-1 include a large portion of inter-city operations.)

Table 3-1 Operating Characteristics of Japanese Rail Systems

	Number of operators	Operation-km (km)	Passenger (million)	Passenger-km (million-km)
JR-railways	6	20,013.0	8,982	248,998
Large private railways	21	3,045.5	8,153	113,183
Small private railways	98	3,481.6	535	4,086
Public subways	10	628.0	4,857	32,467

Note: Data of FY1995. Large and small private railways include third-sector railways. Public subways include the Teito Rapid Transit Authority which operates subway systems in Tokyo and whose stock is owned by national and local governments.

Source: Japan Transport Economic Research Center. Suji de Miru Tetsudo '97 (Rail Fact Book '97) 1997. (Japanese)

3-2-2 Market Share

Mode Share in Japan

Rail transportation in Japan has played a significant role in passenger mobility. If we compare passenger mode share in Japan with that in the United States, its characteristics become much clearer. (See Table 3-2). Rail share in Japan on a passenger-kilometer basis remained at 35 percent in 1993, even though it had been on the decline. In contrast, rail transportation in the United States has accounted for only a small portion of the total passenger kilometers.

Table 3-2 Passenger Mode Share in Japan and the United States

	Mode	1970	1980	1990	1993
Japan	Rail	49.2	40.2	35.0	35.0
	Bus	17.5	14.1	13.5	8.9
	Automobile	30.9	41.0	49.8	50.6
	Ship	0.8	0.8	0.6	0.5
	Air	1.6	3.8	4.7	5.0
U.S.	Rail	0.9	0.7	0.7	0.7
	Bus	2.1	1.8	1.2	1.1
	Automobile	86.6	82.5	80.1	80.8
	Ship	0.3	0.0	0.0	0.0
	Air	10.0	14.9	18.0	17.4

Note: Numbers represent percentage in terms of passenger-km.
Source: Japan Transport Economic Research Center. Suji de Miru Tetsudo '97 (Rail Fact Book '97) 1997. (Japanese)

This difference in rail share between the two countries lies mainly in their different backgrounds:

First of all, the extremely high share of rail transportation in Japan is the result of higher population and employment density in several metropolitan regions. Table 3-3 shows a comparison of urban structure in selected cities of Japan and the United States. Tokyo and Osaka, two of the largest cities in Japan, have a higher population density in their central areas than does New York and about twice the employment density of New York.

Secondly, the difference in rail share in the two countries is caused by the different histories of national government policy toward transportation. The Japanese government took a leading role in the promotion of rail investment to develop rail networks along with private railways at the time when land is cheaper and more accessible. In comparison, the development of road infrastructure was relatively slow at that time. On the other hand, in the United States, after World War II , large-scale public investment was made mostly in highways, water, and air transportation, and in the maintenance of their infrastructures.

Moreover, financed by the proceeds of a national gasoline tax under the program of the Construction of the National System of Interstate and Defense Highways in 1956, the federal government began to assume 90 percent of the cost of new inter-city highways. This policy promoted the development of inter-city highways, while public transit systems were for the most part privately owned and in decline.[3]

Table 3-3 Comparison of Urban Structure in the Cities of Japan and the United States

	Japan			U.S.		
	Tokyo	Osaka	Nagoya	New York	Chicago	Philadelphia
Population density in central city [a]	13,067[c]	11,397[c]	6,428[c]	9,305[d]	5,097[d]	4,666[d]
Employment density in central city [b]	0.834[c]	0.928[c]	0.632[c]	0.412[e]	n.a.	0.368[e]

Note: a: person per square kilometer b: jobs/person c: based on population and number of employment in 1991 d: based on population in 1986 e: based on number of employment in 1985

Source: Mizutani, Fumitoshi and Shoji, Kenichi. A Comparative Analysis of US-Japanese Urban Railways: Why Are Japanese Railways More Successful?, School of Business Administration, Kobe University, 1995.

Mode Share in Urban Areas of Japan

In urban areas, rail is also an important mode of transportation. As an example, Table 3-4 shows the mode share in the two largest metropolitan areas: Tokyo and Osaka. The statistics in Table 2-4 are based on recent person-trip surveys and represent mode share for all trip purposes. Bicycling and walking are the most common modes; however, those average trips are much shorter than for other modes. If we consider only home-based work trips in the two metropolitan areas, rail transportation is the most prevalent commuting mode. (48.0% in Tokyo Metropolitan area and 37.7 % in Osaka Metropolitan area.)

[3] Wachs, Martin. "US Transit Subsidy Policy: In Need of Reform". Science. Vol.244, 1989.

Table 3-4 Mode Share in Tokyo and Osaka Metropolitan Areas

Metropolis	Survey year	Population (million)	Rail	Bus	Auto	Bicycle and Walk
Tokyo	1988	324	25.0%	2.8%	27.7%	44.4%
Osaka	1990	168	20.0%	3.3%	26.1%	50.5%

Note: Population is based on 1994 figures. Population in the Tokyo metropolitan is the total population of four prefectures (Tokyo, Kanagawa, Saitama and Chiba). Population in the Osaka metropolitan area is the total population of three prefectures (Osaka, Kyoto and Hyogo)

3-2-3 Trends

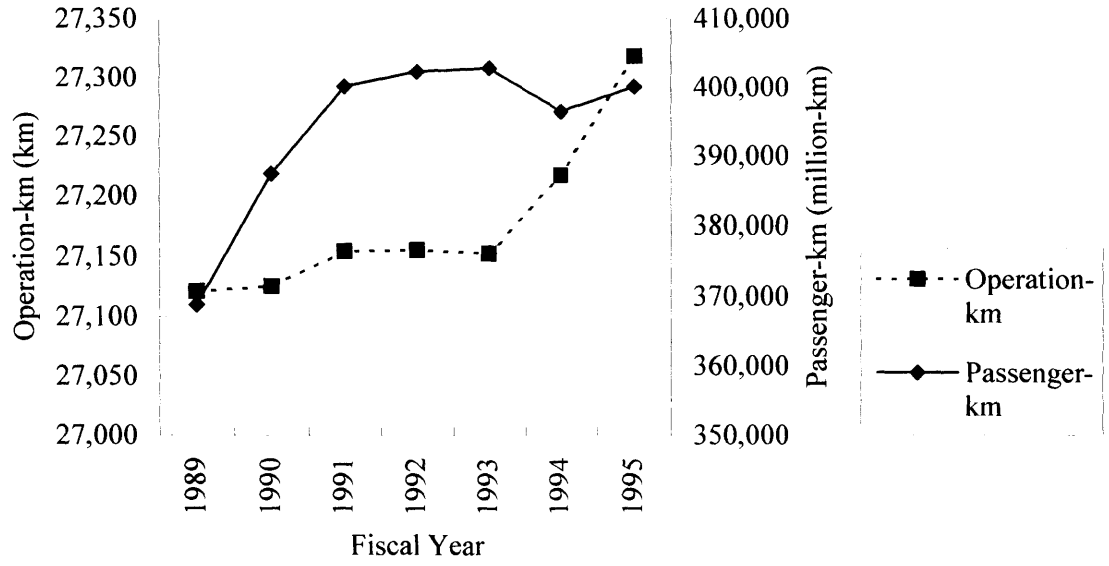
Passenger-kilometers for rail transportation steadily increased until the early 90's, but slowed down at the end of the era of rapid economic growth known as the "bubble" era[4]. (See Figure 3-1). Furthermore, future growth is not expected to rise so significantly because of decreasing Japanese population, but demand for new rail construction in urban areas has, nonetheless, been active due to traffic congestion and public recognition of the harmful environmental impacts of private automobiles. In addition to these factors, serious passenger overcrowding on urban/regional rails at commuting peak periods is creating a demand for further investment in the rail system.

The Transport White Paper of 1994 published by the MOT addressed the importance of improving public transportation modes, including rail transportation, as a way of reducing private automobile usage.[5] In its Transport White Paper of 1997, the MOT now emphasizes the importance of increased capacity for urban rail systems to relieve passenger overcrowding.[6] Figure 3-1 compares the average rush-hour overcrowding rate with designed capacity in the Tokyo metropolitan area. From 1975 to 1995, passenger capacity increased more than 150%, but the average rush hour overcrowding rate decreased only from 221% to 192% of capacity.[7] It still remains high in the Tokyo Metropolitan area.

[4] The "bubble" economic era was from 1986 to 1991.
[5] Ministry of Transport. Transport White Paper. Ministry of Transport, 1994. (Japanese)
[6] Ministry of Transport. Transport White Paper. Ministry of Transport, 1997. (Japanese)
[7] The Transport White Paper says that 200% of the overcrowding rate shows the situation of

In order to relieve such uncomfortable conditions at peak periods, new rail developments in the three largest metropolitan areas - Tokyo, Osaka and Nagoya- have been implemented on the basis of recommendations authorized by Council for Transport Policy under the control of the national government (MOT). Most major new line developments have been carried out through third-sector entities which are supported both by public and private sectors. (See Table 3-5) The purpose of these partnerships is to use private funds in projects to supplement the shortage of public funds, and to implement the project with greater efficiency. In reality, however, higher construction costs and protracted construction periods have created financial problems for the new lines. These conditions have been obstacles to private sector entry to the projects. As such, they have slowed down promotion of rail developments.[8] These unexpected developments have caused us to re-evaluate the current Japanese third-sector method and look for more effective public/private approaches to stimulate the development.

Figure 3-1 Trends of Operating Characteristics of Japanese Rail Systems

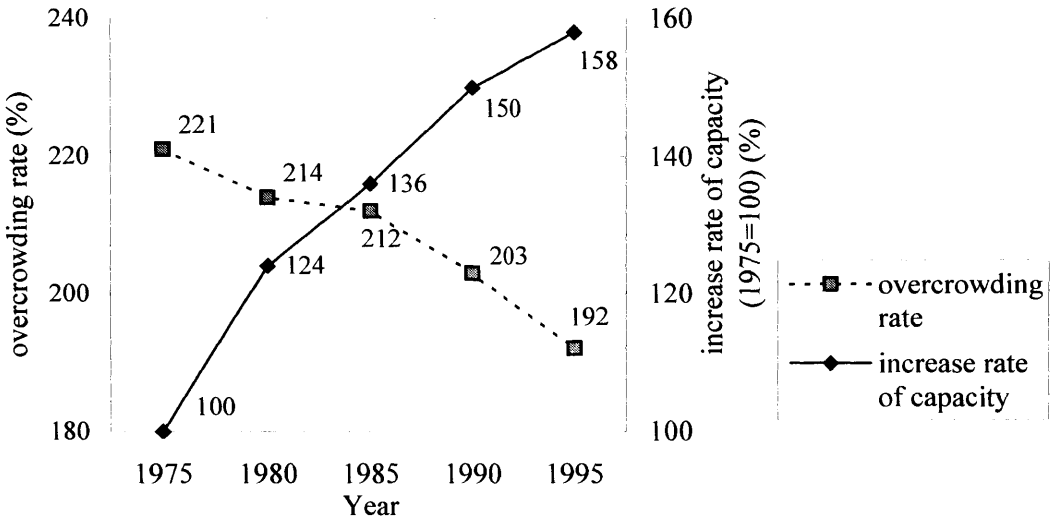


Source: Japan Transport Economic Research Center. Suji de Miru Tetsudo '97 (Rail Fact Book '97) 1997. (Japanese)

"bodies touching firmly, pressure being felt, and passengers possibly reading a magazine."

[8] Koutsu Shimbun (Transport Newspaper), "Tetsudo Zigyou he no Sannyuu Sokusin (Promotion of the Entry into Railway Business". May 9, 1997. (Japanese)

Figure 3-2 Average Rush Hour Overcrowding Rate against the Designed Capacity in Tokyo Metropolitan Area



Source: Ministry of Transport, Transport White Paper, Ministry of Transport, 1997 (Japanese)

Table 3-5 Major New Line Developments in Japan

Metropolitan area	Name of line	Construction period	Length (km)	Development entity
Tokyo	Tokyo Subway #12	1989-2000	28.8	Tokyo prefectual government and PPP
	Rinkai Fukutoshinsen	1991-1996	4.9	PPP
	Joban Shinsen	1992-2005	58.3	PPP
	Saitama Subway #7	1994-2000	14.5	PPP
	MM21 Line	1992-2001	4.3	PPP
	Toyo Express	1984-1996	16.2	PPP
Osaka	Kyoto Tozai Line (Subway)	1989-1997	12.9	Kyoto municipal government and PPP
	Osaka JR Tozai Line	1988-1997	12.3	PPP
	Osaka Sotokanjyo Line	1998-2005	20.4	PPP

Note: PPP shows "third-sector" entity. Original source is Fukui, Koichiro et al. Japanese National Railways Privatization Study II, The World Bank, December 1994. The author of this thesis modifies the original table.

3-3 Financial Support by the National Government in Japan

This section discusses the current Japanese government system for supporting urban/regional rail infrastructure development.

Financing is one of the most important elements in the success of the projects. In Japan, the financing of rail development is largely supported by the government, and it is useful to examine this support system.

Previously, Japanese urban/regional rail projects were financed by various types of loans and bonds to be repaid with fare revenues after the opening of the completed systems. However, due to the recent increase in construction costs, additional financial support programs have been created by the national government to stimulate development. These programs can be categorized as follows: subsidies, low- and interest-free loans, and deregulation.

3-3-1 Subsidies[9]

The following are four major subsidy programs for new rail construction projects in urban areas: subway construction subsidy, new town rail construction subsidy, interest payment subsidy (P-line subsidy), and subsidy for monorail and new transportation systems (See Table 3-6).

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[9] The author refers to the following publications;
Railway Development Funds. Tetsudo Jyosei Guidebook (Guidebook for Rail Assistance). October 1996. (Japanese)
Japan Transport Economic Research Center. Suji de Miru Tetsudo '97 (Rail Fact Book '97). 1997. (Japanese)
East Japan Railway Company. Tetsudo Seibi Seido Shiryo-shu (Railroad Development System). Internal Report, 1994. (Japanese)
Japan Society of Civil Engineers. Kotsu Seibi Seido (Transportation Development System). Japan Society of Civil Engineers,1991. (Japanese)
Hayashi, Yoshitsugu. "Issues in Financing Urban Rail Transit Projects and Value Captures". Transportation Research, Vol. 23A, 1989.

Table 3-6 Major Subsidy Programs for Urban/Regional Rail Infrastructure Developments

Subsidy Program	Application	Systems which can get subsidy	Amount/Share
Subway construction subsidy	subway construction, large-scale improvements	Public and third-sector systems*	70% of construction costs /National & local governments 35% each
New town rail construction subsidy	new town rail line construction	Public and third-sector systems*	36% of construction costs /National & local governments 18% each
Interest payment subsidy	new line construction, extensions	Private and third-sector systems	Interest which exceeds 5% /National & local governments equally
Monorail and new transportation system construction subsidy	new line construction	Public and third-sector systems*	57% of construction costs /National government (2/3) and local governments (1/3)

Note: * it is necessary for local governments to invest more in third-sector entities.
Original source is Mizutani, Fumitoshi. Japanese Urban Railways. Ph.D. Dissertation, Harvard University 1993. The author of this thesis modifies the original table.

The most generous subsidy program is a subway construction subsidy which is designed to cover 70 percent of construction costs. The national and local governments share this expense, each paying 35 percent. This subsidy covers not only new subway construction but also large-scale improvements aimed at increasing capacity. It only apples to subway projects which are implemented by local governments or public-dominated third-sector entities. Thus, private railway companies cannot benefit from this program. The total national government subway construction subsidy in FY 1997 was 74.0 billion yen (592 million dollars).[10] Since current subway construction costs in central Tokyo are about 23.5 billion yen (180 million dollars) per kilometer (Shinjuku-line, Tokyo Metropolitan Subway)[11], annual funds from this subsidy cover only about 3 kilometers of construction in central Tokyo.

[10] Japan Transport Economic Research Center. Suji de Miru Tetsudo '97 (Rail Fact Book '97).1997. (Japanese)
[11] Ibid.

The second program is a subsidy for new town rail construction projects which connect new towns in suburban areas to city centers. This subsidy program was established in FY 1973. In general, ridership is low in the early stages, since residential developments in new towns take a long time to grow. This subsidy was created to reduce the initial capital burden, and the subsidy rate was set to cover 36 percent of the construction costs with national and local governments paying an equal share of 18 percent each. This subsidy is applicable to projects implemented by local governments or public-dominated third-sector entities. It also requires private land developers to cover half of the construction costs and to provide their own land needed for the rail projects at a reasonable price. In FY 1997, four new town rail projects in Chiba, Yokohama, Kobe and Osaka were subsidized under this program.

The third program is an interest payment subsidy called "P-line subsidy." In 1972, the Japan Railway Public Construction Corporation (JRCC), a public authority under the control of the MOT, was allowed to participate in the construction or large-scale improvement projects for private rail systems running between suburban areas and city centers. The basic schema is as follows: after completion of the construction by the JRCC with their own funding (P-line fund), the constructed facilities are transferred to a private railway company, and this company then operates the new line, annually paying principal and interest, which is equally divided for 25 years (15 years for new town lines). In this annual payment, any interest that exceeds a 5 percent rate is subsidized by the national and local governments, each paying 50 percent. This program benefits private railway companies, because initial construction funds can be obtained with a lower-interest rate through the JRCC. A third-sector system can also be applied to this program, but the program has no impact when interest rates in the market are lower, as is now the case in Japan.[12]

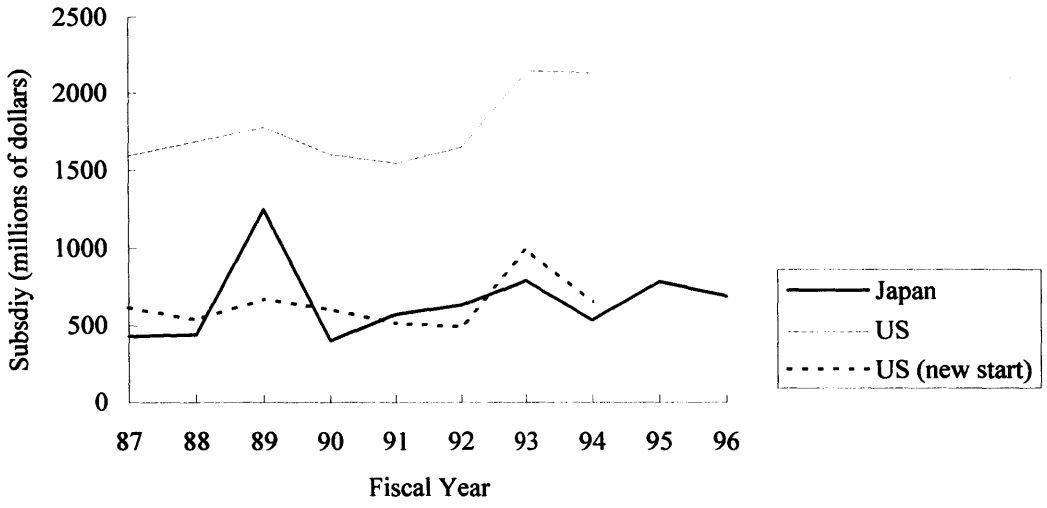
The fourth program is a subsidy for monorail and new transportation systems such as the Automated Guide-way Transit (AGT). This subsidy is applicable to the construction of monorails or new transportation systems built above road facilities. Since FY 1987, it has

[12] The Long Term Prime Lending Rate among major financial institutions in Japan was 2.6 (%/year) on January 9, 1998, according to the Bank of Japan.

been set to cover 57 percent of the total costs and has been applicable to projects promoted either by the public sector or public-dominated third-sector entities. The national government pays two thirds of the subsidy. The remaining one third is paid by local governments. Different from the first three subsidy programs, whose funding sources are the General Account, the funds for this program come from the Road Improvement Special Account, which is funded largely by motor fuel taxes. The reason this program can use funds from motor fuel taxes is that the Ministry of Construction (MOC) regards monorails and other new transportation systems as parts of road facilities which can improve traffic conditions in urban areas. In addition, unlike the first three subsidies which are under the control of MOT, MOC has jurisdiction over this subsidy program.

These are the major governmental subsidy programs for urban/regional rail constructions or large-scale improvements in Japan. Figure 3-3 compares the total amount of the four subsidy programs in Japan with that of U.S. federal subsidies for rail capital projects. Japanese government subsidies were provided mostly for "new-start" projects. If we compare subsidies for new-start projects in Japan and the United States, the figures are similar.

Figure 3-3 Subsidies for Rail Capital Projects in Japan and the United States



Note: Subsidies by the national government. Japanese subsidies include subway construction subsidies, new town rail construction subsidies, interest payment subsidies, and subsidies for monorail and new transportation systems. US subsidies include subsidies used for "rail modernization" and "new start" projects. Exchange rate is 125 yen = 1 dollar

Source: Japan Transport Economic Research Center. Suji de Miru Tetsudo '97 (Rail Fact Book '97). 1997 (Japanese): City Planning Association. City Planning Handbook. 1987-1997 (Japanese). American Public Transit Association. 1996 Transit Fact Book.

3-3-2 Free- and Low-Interest Loans

Through the Corporation for Advanced Transport & Technology (CATT), formerly known as "Railway Development Fund (RDF)," the national government has supported major inter-city rail and urban rail construction projects implemented by the JRCC by providing interest-free loans. The RDF was established in 1991, as a government agency responsible for providing financial assistance for rail development.[13] The CATT can provide interest-free loans using the proceeds from the sale of existing Shinkansen facilities to three JR railway companies in 1991.

Loans from the Japan Development Bank (JDB) are another major funding source for

[13] Ono, Akio. "Role and Function of Railway Development Fund". Japan Railway and Transport

rail development. Even though the JDB is legally a private institution, it provides low-interest loans for railway companies to support capital projects which improve safety, capacity, and service quality. Furthermore, on behalf of the national government, it can provide interest-free loans to third-sector projects through the Industry Investment Account whose funds comes from the sale of Nippon Telephone and Telegram (NTT) stock in 1987 and 1988.[14]

3-3-3 Deregulation

Even though the overcrowding rate has been higher on private railway lines in the Tokyo metropolitan area, private railway companies had little incentive to invest in capital improvements, such as the doubling of existing double-tracks. This was because they could not expect increased revenue from fares to cover the construction costs. For private railway companies, user fees (collected after the opening) have normally used to cover the construction costs; however, interest payments have been a burden to these companies. In order to relieve this situation, a "City Railroad Improvement Special Fund" was established in 1986, so that private railway companies (other than the JR-Railways) could retrieve some portion of their construction costs by imposing extra fares on users even during the construction period.[15] The accumulated extra revenue was limited to 25 percent of total construction costs until 1994, when it was expanded to 50 percent. This system has been applied to five private railway companies in Tokyo.[16]

This chapter has provided background information on urban/regional rail systems in Japan, which will cast light on the case studies and recommendations in Chapters 4 and 5.

Review, April 1997.

[14] The NTT was privatized in 1985 and the national government sold the stock in 1987 and1988.

[15] Fare is regulated by the national government (See 4-6-2).

[16] Koutsu Shimbun (Transport Newspaper). July 8, 1997. (Japanese)

Chapter 4 Case Studies of the Third-Sector Rail Development Projects in Japan

4-1 Introduction

This chapter presents three case studies of rail development projects in Japan: the Joban Shinsen (New Joban Line) Project, the JR Tozai Line Project and the Narita Airport (Tokyo International Airport) Access Line Project. Each project was/is being developed by a third-sector entity which was established specifically for the project. Since the projects have different goals, historical backgrounds, and economic surroundings, the degree of public and private involvement varies from case to case.

The Joban Shinsen is a regional commuter rail in the Tokyo Metropolitan area, which is now implemented by a third-sector entity supported only by the public sector up to the present. The JR Tozai Line is an urban rail in Osaka, which was developed by a third-sector entity whose stock was shared equally by public and private sectors. The Narita Airport Access Line is an airport access rail system in the Tokyo Metropolitan area, which was developed by a third-sector entity supported mainly by the private sector in their capital contributions.

The overview of these three case projects is given in Table 4-1. The case studies share a common outline which facilitates comparison. Each case study is organized into the following sections:

- Overview (including purposes and results)
- The Process Before Implementation
- Organizational Structure of the Third-sector Entity
- Project Structure
- Financing

After the three case projects are explained, they are examined and analyzed.

Table 4-1 Overview of the Case Study Projects

Project	Joban Shinsen	JR Tozai Line	Narita Airport Access Line
Rail Type	Regional (Commuter) Rail	Urban Rail (Subway)	Airport Access Rail
Operation Kilometers	58.3 km	12.3 km	8.7 km (JR line) 2.1 km (KER line)
Concerned Prefectures	Tokyo, Saitama Chiba, Ibaraki	Osaka	Chiba
Construction Period	1992-2005(FY)	1988-1997	1989-1991(1992) [3]
Construction Cost	1,050 billion yen (8.4 billion dollars)	338 billion yen (2.7 billion dollars)	50 billion yen (0.4 billion dollars)
Equity : Debt	(less than) 20 : (more than) 80[1]	24:76	20:80
Third-sector Entity	MIR (Metropolitan Intercity Railway Corporation)	KRR (Kansai Rapid Railway Corporation)	NRR (Narita Rapid Railway Corporation)
Share of Stock			
Public Sector	100 %	50%	3%
Private Sector	0 %[2]	50%	97%
Ownership	MIR	KRR	NRR
Operation	MIR	JR-West (West Japan Railway Company)	JR-East (East Japan Railway Company) KER (Keisei Electric Railway Corporation)

Note: 1 80 percent of the construction cost will be covered by interest free loans from the government and the remaining 20 percent will be covered by the combination of equity and other loans.
2 At the point of 1997
3 Even though the Narita Line began operations in 1991, one of the two airport stations was completed in 1992
4 Exchange rate: 125 yen = 1 dollar

4-2 Joban Shinsen (New Joban Line)

The Joban Shinsen (New Joban Line) is a commuter rail which is currently being constructed by a third-sector entity invested in by the public sector up to the present 1997. Even though private capital contributions are expected in the future, this project is a typical case of the public sector taking a leading role through a third-sector entity.

4-2-1 Overview

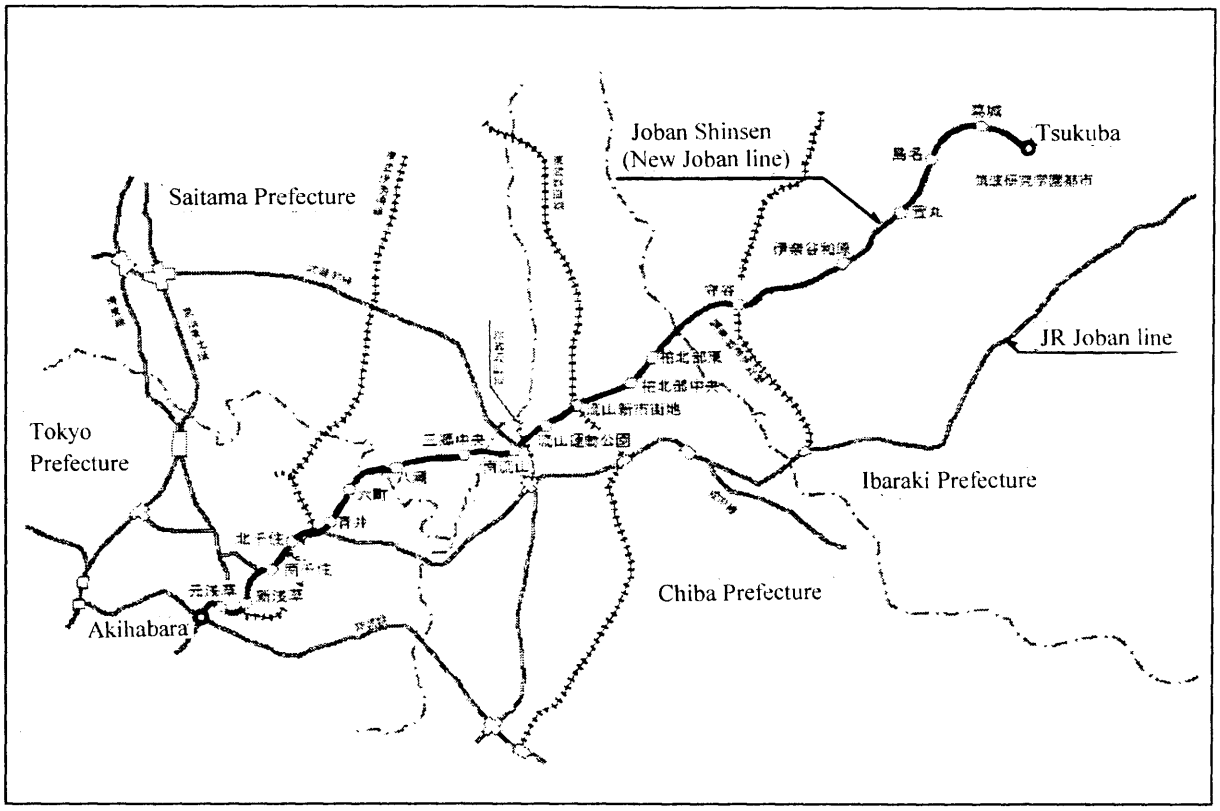
The Joban Shinsen project is the largest urban commuter rail project in Japan; it is now in the construction stage. This new line will connect downtown Tokyo (the town of Akihabara) with the city of Tsukuba, a distance of 58.3 kilometers (See Figure 4-1). This will take 45 minutes when it is completed in FY 2005. The town of Akihabara is located between the two largest rail terminal stations in Tokyo: Tokyo and Ueno Terminal Stations. The city of Tsukuba is a major Japanese research center and has a steadily growing population. In the dense Tokyo prefecture area, 77 percent of the new line will be underground.

There are two major reasons for this project. First, the new line is expected to reduce serious passenger overcrowding on the existing Joban Line which runs parallel to the new line and is operated by the East Japan Railway Company (JR-East), the largest of JR-Railways. Among the commuter lines in the Tokyo Metropolitan area, the existing Joban line is one of the lines with a high passenger overcrowding rate in morning and evening peak periods. Secondly, the new line is expected to promote residential development as well as industrial development along the line. Since the areas the new line covers includes large undeveloped spaces outside of dense Tokyo prefecture area, this project is expected to produce 170 thousand homes or about 10 thousand hectares of land development for residential purposes.

According to the 1992 economic impact study conducted by the Metropolitan Intercity Railway Corporation (MIR), a third-sector entity established to implement this project, the

Joban Shinsen can create economic benefits, amounting 2,800 billion yen (22.4 billion dollars) by the year 2010.

Figure 4-1 The Joban Shinsen Project



4-2-2 The Process Before Implementation

The Joban Shinsen Project was first recommended in a report published by the Council for Transport Policy of the Ministry of Transport (MOT) in July 1985. The project had previously been reviewed by the Japan National Railways (JNR), but it had not been discussed publicly because the JNR's capital investments were restricted due to a long-term financial and administrative crisis. In the same report, the council recommended the establishment of a third-sector entity to implement the project, because it would entail huge construction costs and requires the cooperation of many concerned parties. A bill

concerning promotion of a third-sector entity was passed in 1989, but it took a lot of time to formulate the third-sector entity. That was because JR-East, which it was assumed would be a major participant, declined to participate in the organization. According to Matsuda, the current president of JR-East, the reasons that JR-East declined were as follows:[1]

1. The project had huge construction costs. Furthermore, considering the rapid growth of land prices in the Tokyo Metropolitan area, it was clear that the construction costs would exceed the anticipated costs.
2. There was a risk that the project would not pay for itself for a long time because of the slow pace of residential development along the new line, a result of the rapid increase of land prices.
3. The government's financial support plan was not fixed.

In the planning stage, taking into account that this project would have a huge economic impact on the region, JR-East proposed the "tax increment financing" method. [2] If adopted, this would have been the first time such a method had been used in Japan, but the proposal was not accepted by the government.

Then, with strong leadership from the national government, a third-sector entity, MIR, was established in March 1991, funded by four prefectual and twelve municipal governments. Even though private corporations such as real estate developers, commercial banks, and general contractors were expected to invest in MIR, by 1997, no equity investment from the private sector had been made. Attracting private participation in the project has not been as easy as first envisioned.

After this project was recommended by MOT, the Tokyo Metropolitan area was hit with an extraordinary increase in land prices, and average-income people were no longer able to buy houses within the commuting areas. Thus, in 1989, in order to encourage further residential development in the Tokyo Metropolitan area, the government passed an act which

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[1] Matsuda, Masatake. "Joban-Shinsen ni tuite Kangaeru (Think over the Joban-Shinsen)". Journal of Transport and Economics, October 1989.
[2] Ibid. See 2-3-5.

requires a combination of railroad and housing construction. The act is called the " Special Measures Act for Integrated Promotion of Residential Areas and Railroads in Major Metropolitan Areas", and it focuses on the Joban Shinsen Project. The Joban Shinsen Project is designed so as to have residential development begin while the new line is being built. Thanks to the enforcement of this law, right-of-way acquisitions have been implemented with the "land readjustment method", a form of value-capture. The land readjustment projects have been carried out by public bodies such as prefectual governments, municipal governments, and the Housing and Urban Development Corporation (HUDC), which is a government authority under the control of the Ministry of Construction (MOC).

4-2-3 Organizational Structure of the Third-Sector Entity

Equity in MIR is owned by the four prefectual and twelve municipal governments involved. MIR is composed of a staff of forty-two persons who temporally come from the public sector, i.e., the national government, prefectual governments, and HUDC. The board is composed of a president and seven directors, who come from MOT, MOC, the Ministry of Home Affairs and four prefectual governments.[3]

4-2-4 Project Structure

Figure 4-2 shows the structure of the Joban Shinsen Project. While MIR will own the facilities and operate the service, construction work is being managed by the Japan Public Railway Construction Corporation (JRCC), an expert group for railroad construction under the control of MOT.[4] The following is the basic scheme of this project:

1. the JRCC will construct the Joban-Shinsen line, using loans from public and

[3] Data of February, 1998. Personal Interview, Metropolitan Intercity Railway Corporation, March,1998

[4] The JRCC was established in 1964 to promote the construction of new rail lines on behalf of the JNR. At the time, the JNR had to focus on increase of its own existing lines' capacities and was not promoting new line construction.

private sectors

2. the JRCC will transfer the constructed line to MIR

3. MIR will own and operate the new line, and make payments on the loans to the JRCC.

Right-of-way acquisition in non-land readjustment areas is carried out by the JRCC. Right-of-way in land readjustment designated areas has been arranged as a part of land readjustment projects by concerned prefectual governments, municipal governments, and the HUDC, and is purchased by the JRCC.

In 1992, the project was originally estimated to open in FY 2000 with costs of 800 billion yen (6.4 billion dollars). After five years, inauguration was extended to FY 2005, and the project cost also increased to 1,050 billion yen (8.4 billion dollars). One of the major reasons for this was administrative delay in the designation of land readjustment areas in city plans.[5] Being developed jointly with land readjustment projects, the Joban Shinsen Project can receive financial benefits since the JRCC does not need to pay for unnecessary lands or obstacle facilities. (i.e. purchase area is equal to the right-of-way.) However, land readjustment projects need a lot of time due to the requirements of complicated administrative processes and tough negotiations with individual property owners. In general, the completion of the land readjustment projects will require at least four years from the time they are designated in city plans.[6] Thus, the Joban Shinsen Project has received the benefit of a reduction in the right-of-way acquisition costs, but it takes risk of the delay the construction work.

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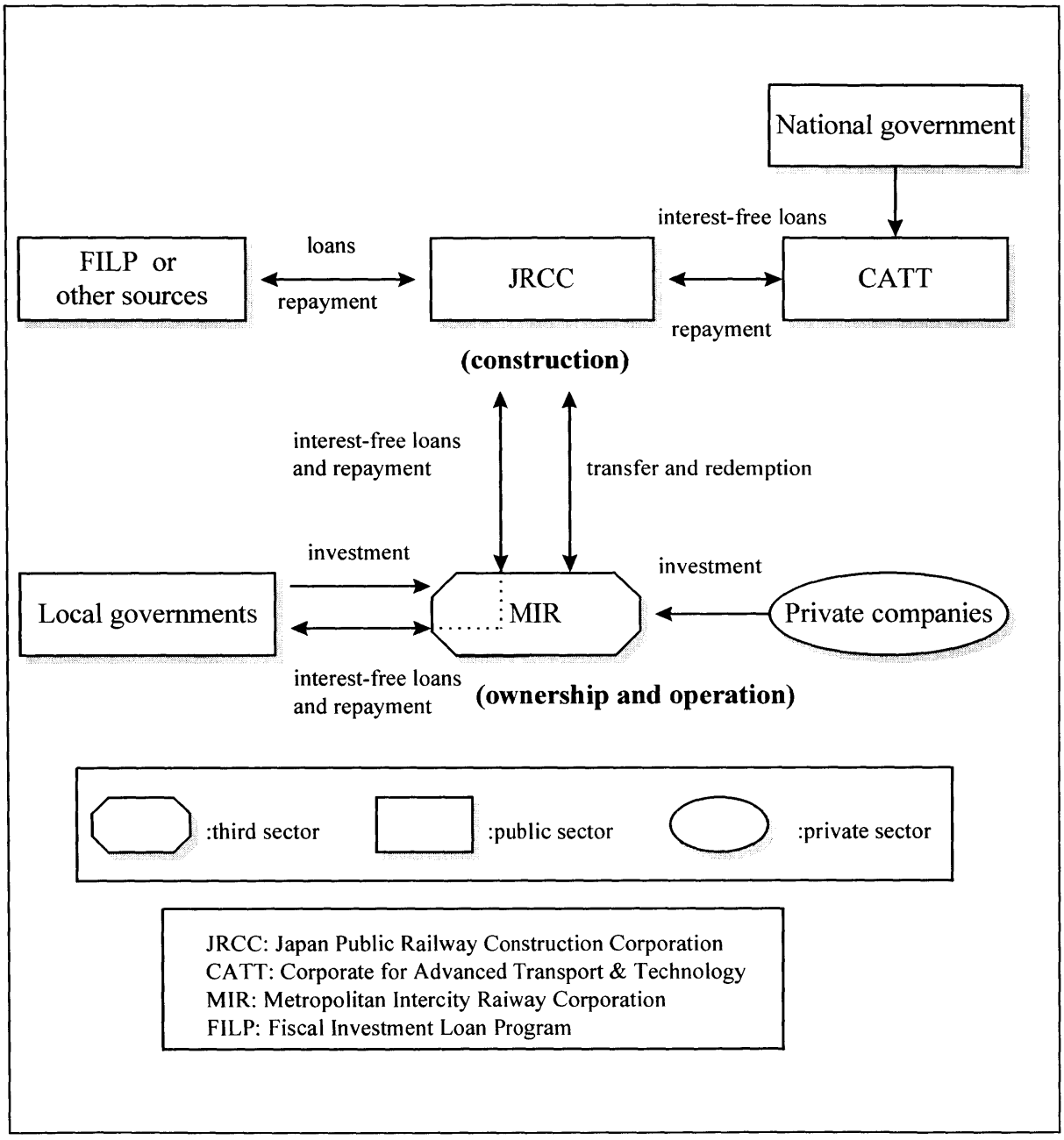
[5] Takamatsu, Masanobu. "Joban Shinsen no Saikin no Genjyo (Present Status of the Joban Shinsen)". Mintetsukyo, April 1997. (Japanese)
[6] Ibid.

Figure 4-2 Project Structure of the Joban Shinsen Project



4-2-5 Financing

Table 4-2 shows the financial sources for the Joban Shinsen Project. The construction costs largely depend on interest-free loans from the Corporation for Advanced Transport & Technology (CATT) and local governments (four prefectual and two municipal governments).[7] CATT provides interest-free loans for the project, covering forty percent of the total construction costs. In addition, CATT requires the same matching rate of interest-free loans from local governments. Thus, 80 percent of the construction costs will be covered by interest-free loans. Furthermore, the redemption conditions of the loans are given preferential treatment. Repayment for CATT is an equivalent amortization for ten years following an unredeemable period of six years. Repayment for prefectual and municipal governments is an equivalent amortization for ten years following an unredeemable period of eight years. The remaining 20 percent of construction costs depends on a combination of the third-sector equity and other funds which can be taken from Fiscal Investment and Loan Programs (FILP)[8], bond issues or other funding sources.

Table 4-2 Financial Sources for the Joban Shinsen Project

Source of Funds	Share
Equity from 4 prefectures, 12 municipalities and private sectors and other sources such as loans from FILP or bond issues	20 %
Interest free loans from CATT	40 %
Interest free loans from 4 prefecture and 2 local governments	40 %
Total	100 %

Note: Total project cost is estimated at 1,050 billion yen (8.4 billion dollars)(1997)

Source: Nihon Keizai Shimbun. "Symposium for the Joban Shinsen", November 27, 1997.(Japanese)

[7] See 3-2-2, Loans from the Corporation for Advanced Transport & Technology (CATT)

[8] Using public funds from the postal savings and welfare pension program, the Japanese government has conducted the banking business for the public purposed projects.

4-3 JR Tozai Line

The JR Tozai[9] Line (hereinafter referred to as the Tozai Line) Project was developed by a third-sector entity whose equity has been shared equally between the public and private sectors, and has been operated by the West Japan Railway Company (JR-West) which is one of six divided regional passenger railway companies privatized from the Japanese National Railway (JNR) in 1987. In this sense, this project is regarded as a pure public/private partnered rail project.

4-3-1 Overview

The Tozai Line began to operate in March, 1997. The project, a 12.3 kilometer line between stations of Amagasaki and Kyobashi, directly connected the east and west sides of the Osaka Metropolitan area via the central business district of Osaka city. Most of the line was underground (10.2 kilometers). This line connected both the existing JR-Takarazuka Line and JR-Gakkentoshi Line, with the result that direct access from the west to east sides of the metropolitan region by the JR-West line was made possible. (See Figure 4-3)

There are many goals of this project. First of all, it was built to strengthen the rail network of JR-West. Furthermore, with joint redevelopment projects in some central Osaka areas promoted by the Osaka municipal government, this project is expected to contribute to further economic growth in the Osaka Metropolitan area. It is also expected to relieve passenger overcrowding in the ring-shaped JR line and traffic congestion in dense Osaka area. In addition, new town developments have been promoted around the Osaka area, especially in the Kobe Sanda International Garden City which is located along the JR-Takarazuka Line, an extension of this new line on the west side. Also, along the JR-Gakkentoshi Line, an extension of this line on the east side, Kansai Science City has been steadily growing. These large-scale developments have given the Tozai Line Project better prospects. Moreover, this line connects with subways and private railway lines at terminal

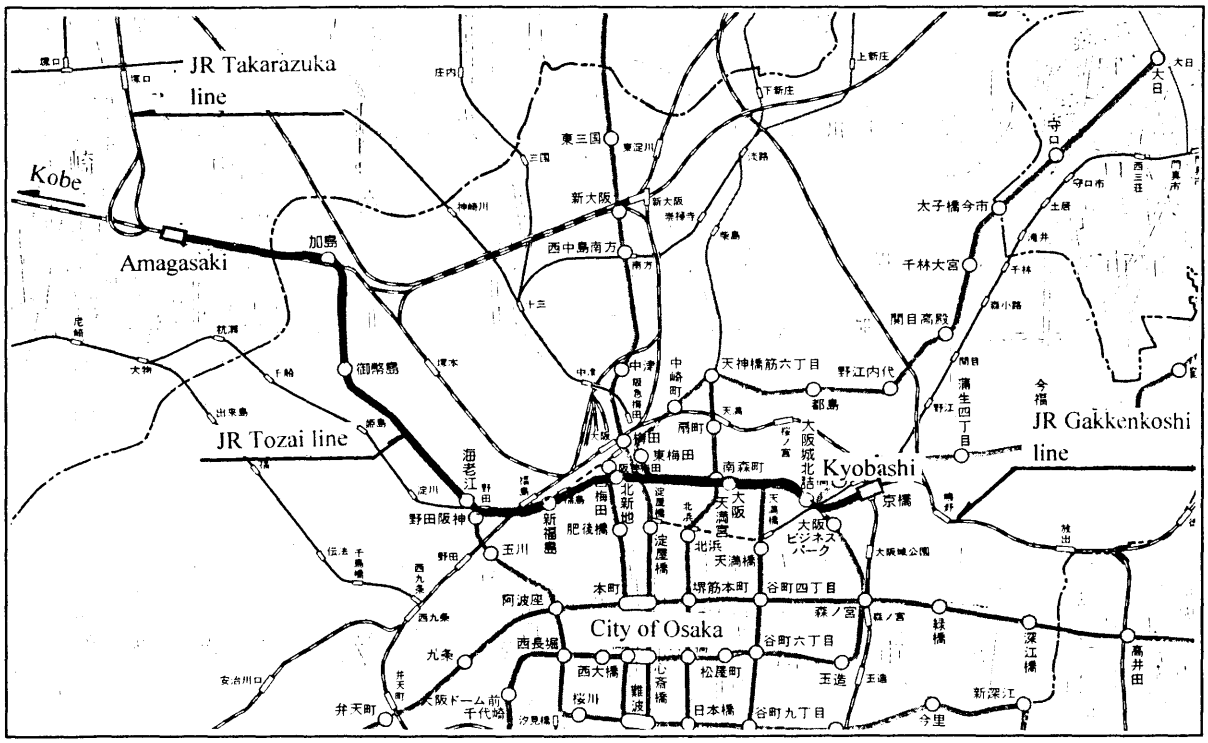
[9] "Tozai" in Japanese means "East and West".

stations; it has definitely improved the rail network in the Osaka Metropolitan area.

The inauguration was originally set for FY 1995; however, due to unexpected underground conditions such as softer soil and higher groundwater level[10], this was postponed to 1997. Also, construction costs were estimated to be about 235 billion yen (1.9 billion dollars) in the planning stage, but finally reached about 338 billion yen (2.7 billion dollars) mainly due to unexpected increase in land costs and the underground conditions mentioned above.[11]

Current ridership is about half of what it was estimated, even though ridership has been gradually increasing month by month.[12]

Figure 4-3 The JR Tozai Line Project



[10] Kokuni,Toshiki. "The JR Tozai Line". Journal of Japan Railroad Facility Association (Nihon Tetsudo Shisetu Kyokai Shi),April 1996. (Japanese)
[11] Personal Interview, Osaka Municipal Government, March 1998.

4-3-2 The Process Before Implementation

The Tozai Line Project plan dates back to the late 1950s. It was not until 1971 that official authorization for it was granted by the Urban Transportation Inquiry Committee of the City Planning Council of the Ministry of Transport (MOT). The JNR was granted approval for the construction by MOT in 1981, but the financial difficulties facing the JNR at that time led to the project's suspension.[13] Later, in 1987, the JNR was privatized, and JR-West took over the approval of the Tozai Line Project.

For the newly created JR-West, large-scale investments like the Tozai Line Project were difficult to carry out, because it had a huge deficit and required solid financing after the privatization. JR-West was not able to realize this project on its own. However, demand for the new line was so strong in the Osaka economic community which expects revitalization in the region as a result of the project. Then, thanks to the cooperation among the regional public and private institutions, a third-sector entity, the Kansai[14] Rapid Railway Corporation (KRR), was established in 1988, to construct the line and lease the constructed track to JR-West. The public and private sectors shared the stock of KRR equally. In this sense, KRR is a pure public/private company.

The primary incentive for establishing a third-sector entity was to realize better access to interest-free loans from the government's sales of the Nippon Telephone and Telegram (NTT) stock, which JR-West itself could not access (discussed later in this section 4-3-5). An equally important factor was that a third-sector entity could deal with various investors to promote the construction. In addition, JR-West had no previous experience with the construction of subways, but the Osaka municipal government did.[15]

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[12] Data source: Kansai Rapid Railway Corporation.
[13] Kishino, Toshishige and Kunihiro, Toshihiro. "Construction Plan for the Katafuku Connecting Line". JTA Tunnel Symposium, Tokyo, Japan,1990.
[14] The term "Kansai" is used to show a larger regional area of which the Osaka is at the center.
[15] Fukui, Koichiro, et al. Japanese National Railways Privatization Study II. CFS Discussion Paper Series, The World Bank, December 1994.

4-3-3 Organizational Structure of the Third-Sector Entity

Table 4-3 shows the share of equity in Kansai Rapid Railway Corporation in 1992. As already mentioned, the equity of KRR is shared 50:50 by public and private sectors. Major investors from the public sector are the Osaka prefectual government and the Osaka municipal government, and the principal private investor is JR-West. They own 22.5 percent of the total stock respectively, so none of the three has a leading role in this project. In addition, 11 private companies including commercial banks, the Osaka Gas Corporation, and the Kansai Electric Power Corporation (KEP) shared a relatively large portion of the stock when KRR was established. The number of private investors has increased to 148 companies through two equity increases.[16] The industries of these private institutions include insurance, steel, construction, railway vehicles, signals and so on. Many of them are beneficiaries of railroad construction work.[17]

KRR had a staff member who temporally came from various public and private institutions. During construction, major staff contributors were JR-West, Osaka municipal government and the Osaka prefectual government. Other staff members came from public institutions such as MOC, the Hyogo prefectual government and private institutions such as KEP, JDB and commercial banks.[18] During construction, the president of KRR was assisted by an experienced retired person from JR-West.[19]

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[16] Date of September, 1997.
[17] Personal Interview, Osaka Municipal Government, March 1998.
[18] Kawaguchi. Katafuku Renraku Sen no Genjyo (Current Status of the Katafuku Rail Construction). Kansai Economic Research Center, August 1994. (Japanese)
[19] Date of September, 1997.

Table 4-3 Share of Equity in the Kansai Rapid Railway Corporation

	Share
Public	50.0%
Osaka Prefectual Government	22.5%
Osaka Municipal Government	22.5%
Hyogo Prefectual Government	4.0%
Amagasaki Municipal Government	1.0%
Private	50.0%
West Japan Railway Company	22.5%
Japan Development Bank	10.0%
Private Commercial Banks	12.5%
Kansai Electric Power Co., Osaka Gas Co., etc.	5.0%
Total	100 %

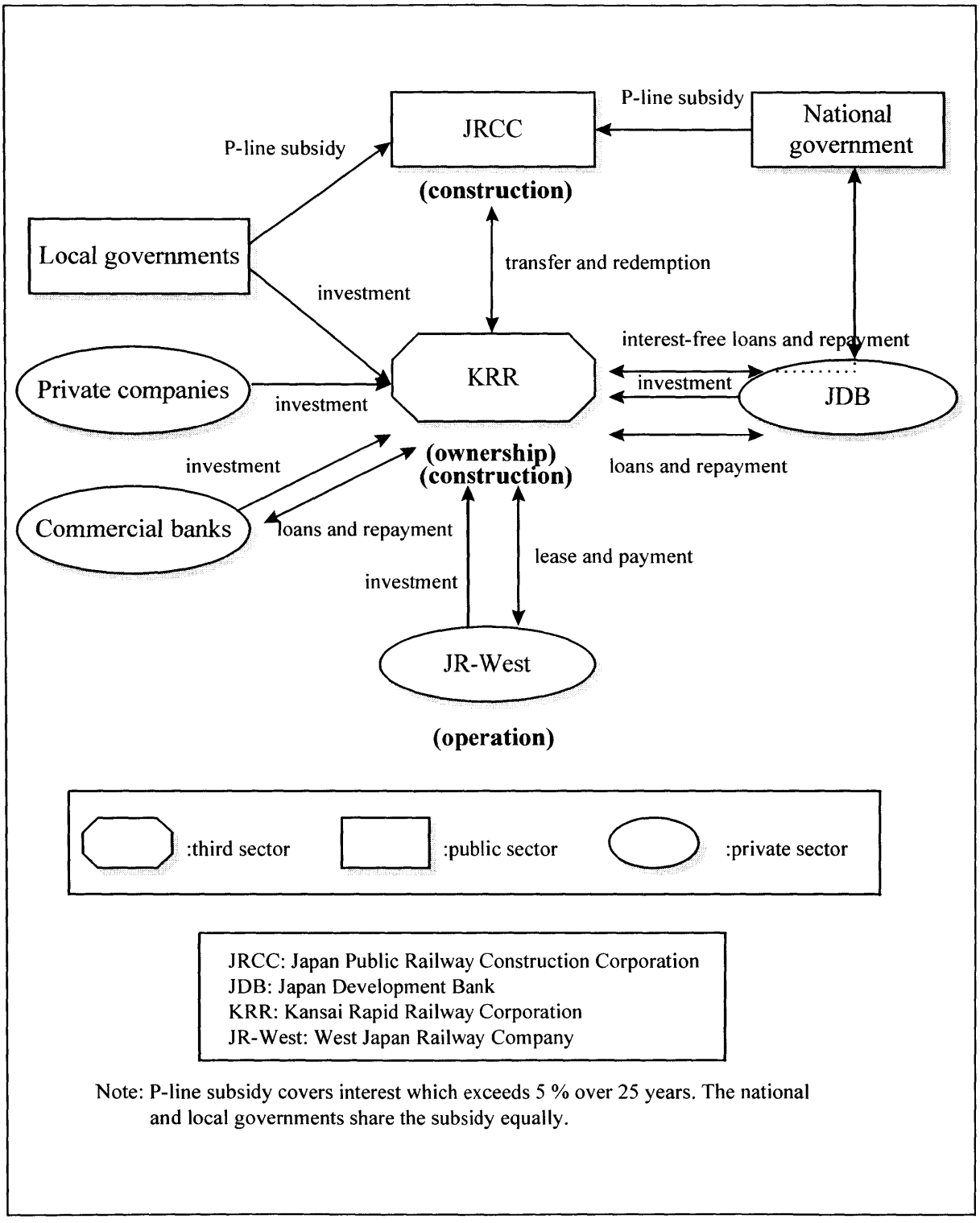
Note: Data from 1992

4-3-4 Project Structure

Figure 4-4 show the basic structure of the Tozai Line Project. KRR owns the facilities and leases them to JR-West. Construction in the inter-station sections was managed by the JRCC, because this project received government subsidy (P-line subsidy) which can only be applied to construction implemented by the JRCC. This partnership between a third-sector entity and the JRCC is similar to that of the Joban Shinsen Project.

KRR was in charge of management for construction work at stations. In the sections where the new line was close to or crossed over existing public and private rail lines, the operators of the lines such as the Osaka municipal government, JR-West, Keihan Electric Railway Corporation and Hanshin Electric Railway Corporation, managed the construction of the new line in order to avoid problems.

Figure 4-4 Project Structure of the JR Tozai Line Project



Note: P-line subsidy covers interest which exceeds 5 % over 25 years. The national and local governments share the subsidy equally.

JR-West paid an annual leasing fee of 13.8 billion yen (110 million dollars) in the beginning and that fee increases ten percent every three years. The leasing fee was set up in the planning stage so that the cash flow of KRR would be balanced for thirty years after operation starts.[20] In this sense, equity investors could not expect profits (dividend payment) for a long time after the commencement of the service.

4-3-5 Financing

Table 4-4 shows financing sources for the Tozai Line Project. The financing structure is divided into two sections: stations and inter-station sections.

Money to construct the stations came largely from KRR's own funds. The rest came from loans from JDB and some commercial banks. In addition, interest-free loans from the national government were applicable when the Privatization Act was partially amended in June 1988. The amended act justified the application of new funds from the sale of NTT stock to the refurbishment of the railways, with the understanding that their stations would be equipped with facilities which could be used for multiple public purposes, such as public meeting halls, exhibition rooms and civic centers. The application of the NTT funds is limited to third-sector entities, and the Tozai Line Project was the first to benefit from this funding scheme.[21]

The funds to construct facilities between the stations were from the JRCC, commonly known as "P-line funds", whose interest over 5 percent is subsidized by national and local governments.[22]

These enormous loans are to be repaid by KRR, principally using the leasing fees from JR-West.

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[20] Personal Interview, Osaka Municipal Government, March 1998.
[21] Refer to 3-2-2 Interest Free Loans from the Japan Development Bank.
[22] See 3-2-1 Subsidy.

Table 4-4 Financial Sources for the JR Tozai Line Project

Source of Funds	Amount (billion yen)	Share
Station only		
Equity	8	23.7%
Interest -free loans from the government	12	3.5%
Loans from the Japan Development Bank	8	2.4%
Loans from commercial banks	13	3.9%
Inter-station sections		
P-line funds from the JRCC	225	66.5%
Total	338	100.0 %

Note: Date of March,1997
Source: Kansai Rapid Railway Corporation

4-4 Narita Airport Access Rail Line

The Narita Airport Access Line (hereinafter refereed to as the Narita Line) was developed in 1991, by a third-sector entity invested in largely by private institutions: private railway companies, Japanese airlines, and commercial banks. The new line is operated by two private railways of the East Japan Railway Company (JR-East) and the Keisei Electric Railway Corporation (KER), and has achieved significant improvement of accessibility to the Tokyo International Airport.

4-4-1 Overview

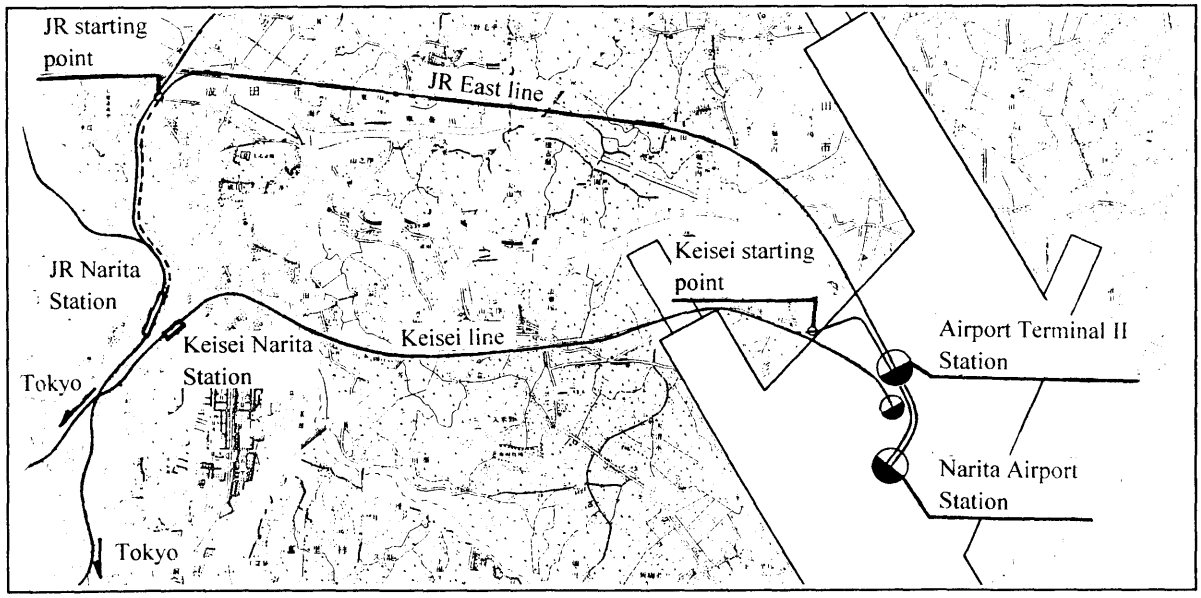
The Narita Line began operation on March 1991, connecting Narita Airport (the New Tokyo International Airport) with the existing two private railway lines; JR-East line (with 8.7 kilometers) and KER line (with 2.1 kilometers). (See Figure 4-5) The two new lines share facilities such as a tunnel and two stations within airport property, and make direct rail access to the international airport from central Tokyo possible.

Narita Airport, which opened in 1978, is located about 60 kilometers away from central

Tokyo, and is one of the busiest international airports in the world in terms of its number of airline passengers. However, accessibility to the airport from central Tokyo had been inconvenient since the airport's opening. The surface highway artery had always been so congested that a lot of time was needed to reach the airport. Furthermore, even though rail access by JR-East and KER had been available, people were required to transfer to airport terminal buses at the rail stations. Under these conditions, direct rail access had become a major issue for the national government.

In earlier government plans, the Shinkansen, or Bullet Train, was to run directly from central Tokyo to the airport. Although the Shinkansen project was never realized because of political changes, some railroad facilities, such as tracks, had already been constructed on many parts of the proposed JR-route. These unused facilities were transferred from the JRCC to the Japan National Railways Settlement Corporation[23](JNRSC), when the JNR was privatized in 1987.

Figure 4-5 The Narita Airport Access Line Project



[23] Japan National Railways Settlement Corporation (JNRSC) was created primarily to repay the long-term debt held by the Japan National Railways (JNR) through the sales of surplus assets and newly created JR-Railways' stocks.

In 1987, the share of rail access was 14.1 percent among all entrees to the airport. After the opening of this project, rail share increased over the years as Table 4-5 shows. According to a plan used to apply for a railway business license, the new line was expected to raise the rail share up to 20.5 percent among all entrees. Thus, results have been greater than expected. JR-East and KER have introduced new sophisticated express trains to the line in order to increase their ridership. Cooperation and competition between the two railway companies have contributed to the increase in rail share; both have made good use of their ability to capture the market.

Table 4-5 Mode Share in the Narita Airport Access

Survey date	Air departure passengers (%)			All entrees (including airport workers, airline crews etc.) (%)		
	Rail	Bus	Auto	Rail	Bus	Auto
1987.11	19.3	49.7	26.3	14.1	28.3	55.1
1991.12	42.0	35.6	20.0	26.9	23.3	47.8
1993.1	35.9	38.4	22.3	26.8	22.9	47.7
1994.3	39.4	36.9	18.5	24.3	24.3	45.5
1995.3	45.1	34.3	17.1	28.0	23.2	43.9

Source: Narita Airport Authority

4-4-2 The Process Before Implementation

On June 10, 1986, the Minister of Transport formally announced the basic scheme of the Narita Lines Project that would connect the airport with the existing JR-East and KER lines and make use of the unutilized Shinkansen facilities. In addition, he recommended that the project be carried out by a third-sector entity, which would be invested in by public and private sectors, including the Narita Airport Authority (NAA), a government authority which manages the entire operation of the airport. According to Yamaguchi, the president of the newly created third-sector entity, the reasons for the establishment of the third-sector

entity were as follows:[24]

1. It was desirable for the public sector to participate in this project, since this project had to meet the strict requirements of the national government that expected the immediate improvement of the inconvenient airport access conditions.

2. There were many anticipated beneficiaries of this project in public and private sectors by this project and their investments were strongly encouraged.

Under the guidance of MOT, a third-sector entity, the Narita Rapid Railway Corporation (NRR) was established in October 28, 1986. The investors from the private sector in the NRR were two railway companies, JR-East and KER, three major Japanese airlines, Japan Airlines (JAL), All Nippon Airways (ANA) and Japan Air System(JAS), and 14 nation-wide and local commercial banks. Those from the public sector were the Chiba prefectual government and five concerned municipal governments. NAA eventually declined to invest in the NRR because of opposition from the Ministry of Finance(MOF). The reason was very political. MOF was worried about appearance of political opinion that would require further financial support by the national government for future railroad projects, especially future Shinkansen projects. Instead of sharing NRR equity, NAA took charge of building and owning a portion of the tunnel facility in the area of the airport. By lending the facility to the NRR at a reasonable fee, the financial burden of NRR has been reduced.

For NRR, one of the most serious issues was the price of the unused Shinkansen facilities transferred from the JNRSC. There were some arguments about the sale price within the government, because construction of the facilities had cost more than conventional rail lines, a result of the larger scale of the Shinkansen facilities. The price, which was finally set at 27.8 billion yen (222 million dollars), was decided on the basis of a hypothetical design that estimated the construction price of a similar conventional rail line.

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[24] Yamaguchi, Masahiro. Narita Kuukou Kousoku Tetsudou-sen no Ayumi (Histroy of the Narita Aiport Access Line Project). Narita Rapid Railway Corporation,1996. (Japanese)

4-4-3 Organizational Structure of the Third-Sector Entity

Table 4-6 shows share of equity in the Narita Rapid Railway Corporation. The private sector's share reaches 97 percent. Both JR-East and KER have invested in the NRR with the same one-third share, because they are competitive partners. Since an increase of the airline users could be expected, three major Japanese airlines, JAL, ANA and JAS, have invested in NRR in proportion to the number of their passengers at Narita Airport. Private commercial banks have also invested in NRR, mainly because they will receive a financial benefits from the construction work.[25]

NRR had a staff that came temporarily from concerned public and private sector organizations during construction. The president of NRR came from MOT and the general affairs were supervised by directors whose parent organizations were NAA, the JRCC and the Chiba prefectual government. The construction was managed by two departments within NRR: one was responsible for JR-route construction and the other was responsible for KER route construction. The departments were managed by staff from JR-East and KER respectively.

Table 4-6 Share of Equity in the Narita Rapid Railway Corporation

	Share
Public	
Chiba prefectual government and five municipal governments	3%
Private	
East Japan Railway Company	33%
Keisei Electric Railway Corporation	33%
Japan Airlines, All Nippon Airways, Japan Air System	20%
Private commercial banks	11%
Total	100 %

Note: Data of April 1, 1995
Source: Yamaguchi, Masahiro. Narita Kuukou Kousoku Tetsudou-sen no Ayumi (Histroy of the Narita Aiport Access Line Project). Narita Rapid Railway Corporation,1996. (Japanese)

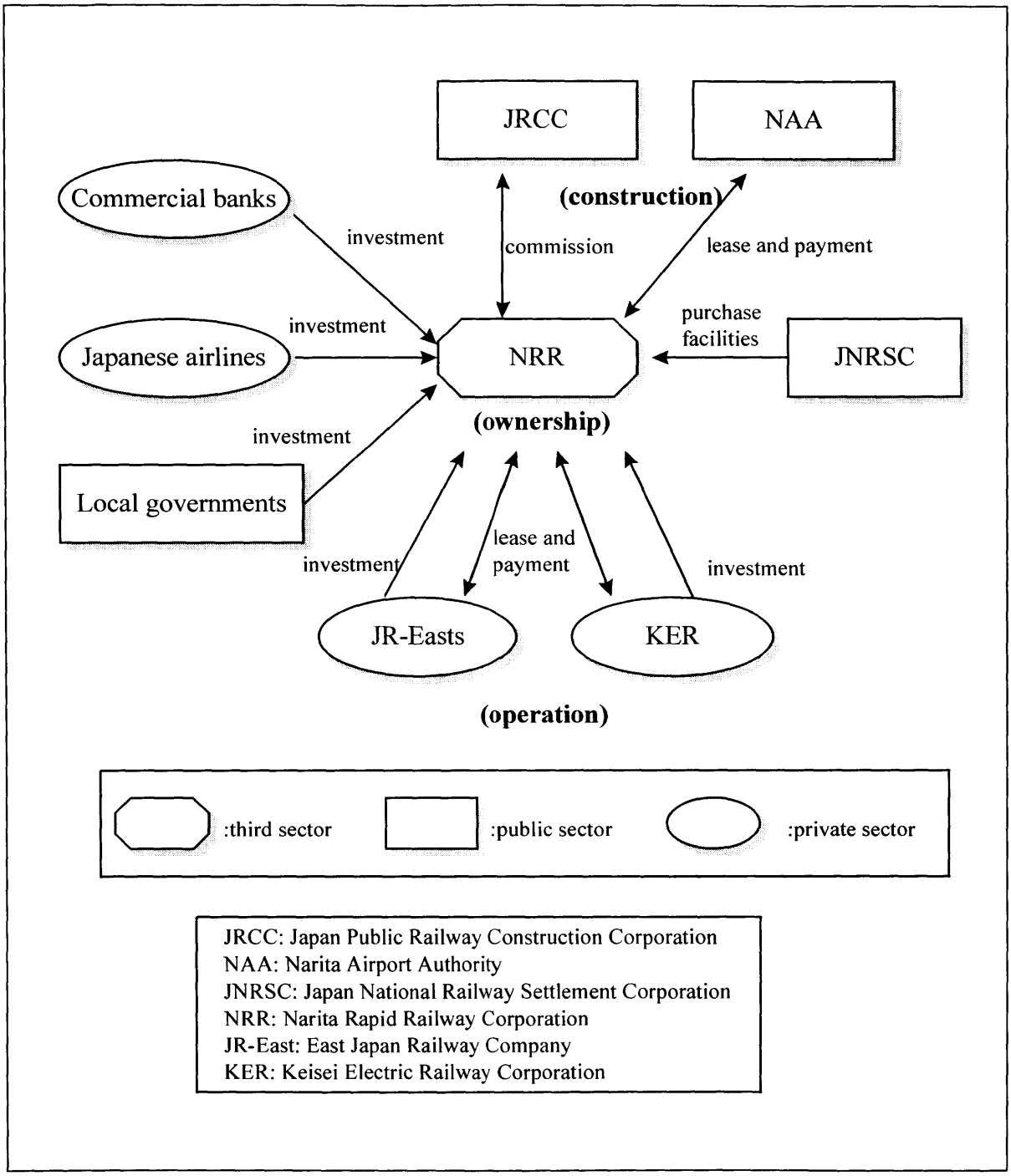
[25] Ibid.

4-4-4 Project Structure

Figure 4-6 shows the structure of the Narita Line Project. Most construction was contracted out to the JRCC. This project required immediate implementation, and it was thought that the JRCC was the most appropriate organization to manage the job. As already mentioned, NAA built part of the tunnel facility which it now leases to NRR.

Both railway companies have operated the service by borrowing facilities from NRR and paying fixed annual leasing fees which were determined after the construction cost was determined. This process of decision for the lease fees is different from that in the Tozai Line Project because the decision in the Tozai Line Project was made in the planning stage. Because rail developments, generally, need long-term countermeasures, the annual lease fees were determined so that the cash flow of NRR would be balanced over a 25 years period. Thus, equity investors can not expect profits from their investments for a long time. The term of the lease is 25 years, so that the railway companies have taken operating risks and had incentive to increase their ridership. Since JR-East and KER have been in charge of the maintenance of the facilities, the annual leasing fees exclude the cost of maintenance.

Figure 4-6 Project Structure of the Narita Airport Access Line Project



4-4-5 Financing

Table 4-7 shows the financial sources for the Narita Line Project. The total construction cost was about 50.0 billion yen (400 million dollars). Eighty percent of the cost was paid by loans from the Japan Development Bank (JDB) and other private commercial banks. Twenty percent of the cost was paid by the equity shared by the public and private institutions that would benefit from this project. Even though relatively low-interest loans from the JDB were available, no direct financial support from the national government was given to the project because of its profitability.

Table 4-7 Financial Sources for the Narita Airport Access Line Project

Source of Funds	Share
Equity	20 %
Loans from the Japan Development Bank	40 %
Loans from private commercial banks	40 %
Total	100 %

Note: Total project cost is about 50 billion yen (400 million dollars)

Source: Yamaguchi, Masahiro. Narita Kuukou Kousoku Tetsudo-sen no Ayumi (History of the Narita Airport Access Line Project). Narita Rapid Railway Corporation,1996.(Japanese)

4-5 Case Study Findings

This section clarifies the third-sector method used in Japanese urban/regional rail infrastructure developments through case studies.

4-5-1 The Process Before Implementation

The process before the projects were realized, including the process for the establishment of third-sector entity, varies from case to case, depending on the characteristics and objectives of each project.

The national government played a significant role in initiating the projects of the Joban Shinsen and Narita Line. One of the major objectives of the Joban Shinsen Project was to encourage residential development along the new line and supplement the shortage of housing which average-income people could afford to purchase within commuting distance of metropolitan Tokyo. Because the issue was beyond the scope of a prefectual government, the national government took a leading role in promoting the Joban Shinsen Project. The goal of the Narita Lines Project was of a nation-level interest, since its objective was to improve the accessibility of the largest and most important international airport in Japan. Thus, the national government played a significant role to promoting the project and creating the third-sector entity.

On the other hand, even though the national government had authorized the basic plan of the Tozai Line Project, it was realized and implemented by the combined power of the public and private sectors in the region, e.g., the Osaka prefectual government, the Osaka municipal government and JR-West. It was their cooperation which created the third-sector entity and made the project possible.

In all case studies, the private sector (private railway companies) participated in the project-based planning (such as financing and construction planning) directly or indirectly through third sector entities, even though JR-East decline to participate in the Joban Shinsen Project at all.

4-5-2 Organizational Structure of the Third-Sector Entity

Equity partners of the third-sector entities are made up of various public and private sectors. In all the cases, the public sector includes only concerned prefecual and municipal governments, but the equity share of the public sector is modulated from case to case.

Among the private sector investors, private railway companies, which operate the new lines, and commercial banks are major investors in the third-sector entities. It is notable that some expected beneficiaries of private institutions have also participated in the projects as investors. In the Tozai Line Project, the Kansai Electric Power Corporation and the

Osaka Gas Corporation shared a portion of the stock of the third-sector entity. Many other private companies, most of them related to railroad construction work, have also invested in the third-sector entity, expecting the new line to increase their business opportunities. In the Narita Line Project, three major Japanese airlines have invested in the third-sector entity, because the new line is expected to increase their passengers.

Even though the national government has made no capital contribution to the third-sector entities in any of the three cases, it involved in management of the entities by contributing staff for important positions. In the projects of the Joban Shinsen and the Narita Line, the presidents of the third-sector entities were and still are assisted by personnel from MOT.

4-5-3 Project Structure

Table 4-8 describes the major entities responsible for each stage of the case projects. Various sectors took responsibilities for the project in each stage. Among them, the national government's leadership should be noted. It participated in the construction and financial tasks largely through the JRCC. The advantages of the JRCC in the construction stage are as follows:

First, the JRCC can access less expensive financial sources from the market. For example, the JRCC can issue railroad construction bonds guaranteed by the national government. In the cases of the Joban Shinsen and Tozai Line Projects, the third-sector entities were relieved of the burden of collecting funds for construction, because the JRCC assumed that responsibility.

Secondly, the JRCC has an advantage when acquiring right-of-way as a public authority. Right-of-way acquisition is one of the main factors that determines the completion data of a project. The JRCC has the power of eminent domain, while third-sector entities and private railway companies do not. This power can reduce the risk of delay in the construction stage.

Table 4-8 Major Entities in Each Stage of the Case Projects

Stage	Joban Shinsen Project	Tozai Line Project	Narita Line Project
Basic Planning	JNR	JNR	MOT
Detailed Planning	MIR	KRR	NRR
Construction	JRCC	JRCC and KRR	JRCC
Financing	JRCC and MIR	JRCC and KRR	NRR
Operation	MIR	JR-West	JR-East and KER
Ownership	MIR	KRR	NRR

Note: MOT, JNR and JRCC represent the public sector (national government); MIR, KRR, and NRR represent the third-sector; JR-West, JR-East and KER represent the private sector

4-5-4 Financing

The national government supports the financing of projects largely within the restricted framework of the financial support systems described in Chapter 3, and this depends largely on project profitability. Financial assistance from national and local governments can be seen in the Joban Shinsen and Tozai Line Project, but the Narita Line Project does not depends on the financial support from the governments if we do not consider the loans from the JDB.

In the Joban Shinsen Project, about eighty percent of the total cost will be covered by interest-free loans from national and local governments. In the Tozai Line Project, national and local governments supported the cash flow by providing interest-free loans and lower-interest loans. The loans covered about seventy percent of the total construction costs.

4-6 Case Study Analysis

This section evaluates the third-sector method used in Japanese urban/regional rail infrastructure developments through case studies.

4-6-1 Risk Distribution

In general, a rail development project is considered to be very risky. There are many potential risks at various stages, which can make the financial situation worse or even make the project insolvent. In order to clarify public/private partnerships in third-sector projects, it is useful to analyze how the risks are shared between public and private sectors. In urban/regional rail development projects in Japan, the following risks are regarded as greater: "permission" risk in the planning stage; the "technical" and "right-of-way acquisition" risks in the construction stage; and the "market" and "financial' risks in the operation stage. Explanations and allocations are described as follows:

Of the three cases, the Tozai Line Project is a good example of how cost overrun (caused by unexpected softer soil conditions ["technical" risk] and higher land prices ["right-of-way acquisition" risk] in the construction stage was shared between public and private sectors, so that the risk did not impede the project cash flow. Table 4-9 shows the change in funds for the Tozai Line Project. The construction costs in the inter-station sections depended only on P-line funds from the JRCC. The P-line fund is a kind of loan, even though the interest in excess of 5 percent is subsidized. So a large portion of the increased cost of the inter-station section had to be absorbed by KRR. On the other hand, KRR's financial burden for constructing stations was relieved by increasing its own capital and decreasing loans from the JDB and private commercial banks. To increase the equity, the local governments and JR-West increased their capital contribution in proportion to their assigned equity share.[26] The remaining private sector share for the equity increase was made largely by increasing the number of private investors.

[26] The shares of the public sector (50%) and JR-West (22.5%) have not changed.

Table 4-9 Change in Funds for the JR Tozai Line Project

Source of Funds	Estimated Amount (billion yen)	Final Amount (billion yen)	Change (billion yen)
Stations	85	113	28
Equity	26	80	54
Interest -free loans from the government	9	12	3
Loans from the Japan Development Bank	25	8	▲ 17
Loans from commercial banks	25	13	▲ 12
Inter-station sections			
P-line fund from the JRCC	151	225	74
Total	236	338	102

Source: Kansai Rapid Railway Corporation

In the planning stage, the most critical risk is the "permission risk", and sometimes permission to start a project can not be obtained or delayed because of opposition from citizens or because of environmental problems. In every case, the risk is to be allocated to the third-sector entities and shared among the third-sector investors.

In the operation stage, the most uncertain risk is the "market risk", a situation in which the actual ridership is lower than expected. In the projects on the Tozai and Narita Lines, the market risk was taken by private railway operators. In the Tozai Line Project, JR-West has to pay a fixed annual leasing fee over thirty years, regardless of ridership. Even though KRR is not expected to yield profits for a long time, it does not have to own the market risk at the operation stage. However, the "financial risk" in the operation stage, i.e., when interest rates in the market are higher than expected, has to be taken by the third-sector entity, which may eventually distribute the risk to public and private investors in proportion to their capital contributions. This risk-allocation scheme is found in the Narita Lines project.

Table 4-10 summarizes how each studied case allocates the higher risks in the planning, construction and operation stages to project participants. In this risk-allocation, it should be

noted that risks in the construction stage are not always allocated to the JRCC which have responsibilities for a risk-related task (Compare Table 4-8 and Table 4-10). This allocation scheme is not an effective approach, because it produces little motivation to decrease risks.

In the risk allocation scheme of third-sector projects, private railway companies have to take a large portion of the risks at various stages, since they are required to participate in the project both as investors and as operators. They are, therefore, very cautious about risks.

The two projects of the Joban Shinsen and Narita Line show a marked contrast in terms of JR-East's attitude and its involvement in them. Even though JR-East was expected to be a major participant in MIR, it declined to participate in the Joban Shinsen Project. That was because the Joban Shinsen Project is a high-risk project with huge construction costs. The right-of way acquisition depends largely on the success of related land readjustment projects which require long and tough negotiations. Also, the future ridership depends on the success of new residential and industrial developments along the line. On the other hand, the Narita Line Project was a low-risk project. A large portion of the facilities had already been built before the project started. There was little right-of-way acquisition needed. Also, demand was large since there was no direct rail access to the world's busiest airport and the major highway was usually blocked with heavy traffic. Thus, JR-East actively participated in this project from very beginning.

The Joban Shinsen Project shows that risk-sharing scheme of the current third-sector method is not always effective to attract the private railway companies (potential major private investors) especially in high-risk projects.

Table 4-10 Risk Allocation in the Case Projects

Risk	Joban Shinsen Project	Tozai Line Project	Narita Line Project
Planning stage			
Permission risk	MIR	KRR	NRR
Construction stage			
Technical risk	MIR and the governments*	KRR	JR-East and KER
Right-of-way acquisition risk	MIR and the governments*	KRR	JR-East and KER
Operation stage			
Market risk	MIR	JR-West	JR-East and KER
Financial risk	MIR	KRR	NRR

Note: Major risk share entities. Risks allocated to the third-sector entity would eventually be distributed to public and private investors in proportion to their capital contributions.
*Financing of the construction largely depends on interest-free loans from the governments

4-6-2 Motivations for Cost Efficiency/Higher Quality of Service

Cost efficiency and higher service quality are two of the expected benefits of public/private partnerships, as discussed in Chapter 2. This sub-section evaluates the factors and issues that motivate increased cost efficiency and service quality.

Construction Stage

In the projects on the Tozai and Narita Lines, private railway operators owned a significant share of the stocks of third-sector entities. They also managed construction indirectly by contributing staff members. If constructions costs were higher than expected, they had to increase their capital contribution to the third-sector entities or pay more for their lease. On the other hand, if construction costs were lower than expected, they could have benefited by decreasing the lease fee or receiving profits from the investment earlier than expected. For private railway companies, this condition would have worked as an incentive to construct facilities efficiently.

However, management of the third-sector entity was limited in the construction stage; the JRCC assumed responsibility for the construction in all the three cases. It is true that the JRCC's responsibilities for construction and financing could have increased cost efficiency as we have seen, but the JRCC had little reason to increase cost efficiency, since the risks were not largely allocated to the JRCC (national government). Furthermore, there were no potential competitors to take over its job. This was truly a public monopoly situation. These conditions would have a negative effect on cost efficiency.

Operation Stage

In the projects on the Tozai and Narita Lines, private railway companies have an incentive to operate the service efficiently, since their annual leasing fees are fixed in advance over a long term by contract with third-sector entities. These companies have been trying to increase their ridership through their own strategies, for instance, by introducing sophisticated express trains like the ones on the Narita Line Project. In a larger sense, since the private companies have to pay taxes proportional to their profits, the public sector would also benefit from their increased revenue. Also, the competition between JR-East and KER in the case of the Narita Line Project has contributed to improvements in the quality of service.

Even though the private railway companies are motivated to increase cost efficiency on a project basis, fare regulation discourages the reduction of systematic operational costs. Fares are regulated by the national government in accordance with the Railway Business Law. Such regulation is not project-based, but rather is structured basically on a rate base system[27] for each railway operator. This structure provides little motivation to reduce operational costs, since these can be recovered through fare increases.

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[27] Fare is calculated as follows,
Fare = (OC+(V-D)*r)/Q
where OC = operating cost (including depreciation)
V-D = rate base (V = value of assets, D = accumulated depreciation)
r = rate of return

Fares are an important aspect of service quality. How does this regulation system impact fares on the new lines? In our case studies, the Joban Shinsen and Narita Line Projects are two good contracting examples of its impact on fares. In a case of the Narita Line Project where the private railway companies have large rail-line networks, fares on the new line would "not be directly" influenced by an increase of the construction costs (leasing fees) despite risk sharing in the construction stage. In a broader sense, risks allocated to the private operators would finally be distributed to users of all the lines operated by the private railway companies. On the other hand, in a case of the Joban Line Project, where the third-sector entity would be responsible for operation as well as ownership, construction costs would directly influence fares of the new line because the third-sector entity would simply operate the line and try to set fares to cover capital and operational costs. In this case, if construction costs are greater than expected, fares would be higher. Since users are sensitive to price, higher fares could decrease ridership, and this could insolvency or necessitate additional financial support in the operation stage.

4-7 Strong and Weak Points of the Third-Sector Rail Development Projects

Lastly in this chapter, this section describes the significant strong and weak points of third-sector rail development projects.

The most significant advantage to the third-sector method is its ability to make use of numerous public and private sector funds collected as equity investments and thereby make the project possible and contribute to the project's financing. The third-sector entity works as a "dish" for collecting funds from many public and private beneficiaries, even though such investments are distinctly long-term.

The weak point of third-sector projects lies in cost efficiency, as the following two points demonstrates. First, the risk-allocation scheme of the third-sector projects does not produce effective project delivery since it creates little motivation to decrease risk. Within third-sector projects, risks in the construction stage was not always allocated to the JRCC

responsible for the task related to the risk. Secondly, as relates to the first factor, the national government's involvement in projects is extensive. In every case, it heads a project in the construction stage, and as a result, makes only limited use of private sector motivation in cost efficiency.

Furthermore, risk-allocation scheme of the current third-sector projects requires private railway companies to assume a large portion of risk at various stages. This risk-sharing scheme has been a factor to prevent private railway companies from participating in the projects, especially when the project involves high-risk factors.

This chapter has examined some characteristics of Japanese third-sector rail development projects, as seen in the three case studies. Based on the findings of this chapter, the next chapter develops ideas for more effective public/private approaches to rail infrastructure development in Japan.

Chapter 5 New Public/Private Partnerships for Urban/Regional Rail Development Projects in Japan

5-1 Introduction

Based on descriptions and analyses in the previous chapters, this chapter develops ideas for more effective public/private approaches which could promote urban/regional rail infrastructure development projects in Japan.

The first section suggests strategies for future Japanese urban/regional rail development projects. The second proposes three types of project structures based on those strategies and examines some actions which make the project structures feasible.

As presented in Chapter 3, urban/regional rail systems in Japan include public and private systems. Subways in cities are operated mainly by concerned municipal governments, while other rail systems are operated mainly by private railway companies including JR-Railways. Thus, future urban/regional infrastructure development can be grouped into the following three types in accordance with the characteristics of the new rail lines:

1. "new start" lines which are physically independent of existing public and private rail systems. (like the Joban Shinsen Project)
2. "new start" lines which link up with existing public rail systems or "extension" lines of public rail systems
3. "new start" lines which link up with existing private rail systems or "extension" lines of private rail systems. (like the Tozai Line Project and the Narita Lines Project)

Since this thesis has examined projects which fit into groups 1 and 3 in its case studies, the following discussions will apply to future types of group 1 and 3 projects.

5-2 Recommended Strategies for Future Urban/Regional Rail Development Projects in Japan

Recommended strategies are made in regard to cover the weak points of the current third-sector method described in Chapter 4. They are also made in regard to its strong points.

5-2-1 The Role of the Third-Sector Entity

It is recommend that *the third-sector entity should work as a "dish" to collect the funds from various public and private beneficiaries in order to help realize and finance the project as it now works.* As presented in 4-6, the most significant advantage of the third-sector method is that it has the potential of using various concerned public and private sector funds as equity investments, and it can translate the project in the planning phase into implementation. This advantage to third-sector entities is well-suited for rail development projects, for the following two reasons: (1) rail developments in Japan are expected to have an economic impact which can attract public and private institutions (not only private railway companies) because of the public's dependence on rail systems; and (2) these rail developments require high construction costs which attract numerous private banks as can be seen in the case studies.

It is recommended, however, that *the role of the third-sector entity be limited to the following two tasks: collecting funds from various public and private institutions and owning the facilities.* Third-sector ownership of the facilities has been common in Japan, thus there would be little public opposition for the ownership even though the public funds were used for their constructions as seen in the case studies. However, from experiences of various third-sector projects, the method has a drawback since the third-sector entity is subject to various public pressures, particularly when the government assumes a leadership role in its management. Thus, it tends to suffer from bureaucratic problems, and it is often difficult to make good use of private sector motivation to gain efficiency, especially in the implementation stages such as construction and operation stages. Then, this recommended

strategy should be applied to the third-sector entities of which the public sector prevails in the management by owing more stock than the private sector.

5-2-3 Project Structure

The next recommendation is made so that a project can make more use of private sector skills and motivation throughout the project cycle.

Professor John Miller's analysis, as described in 2-3-2, give us a key to a possible solution for ineffectiveness of the third-sector rail development projects. The current third-sector project structure is too "segmented" to pursue systematic efficiency. Also, taking into account that this segmented project structure is a factor that produces ineffectual risk-allocation scheme, this thesis recommends that *the project should be packaged so that a single private party (or private-dominated third-sector entity) can be responsible for as many tasks as possible, from detailed planning to operation.* By so doing, "incentives are created for the interrelationships between the tasks to be value-engineered such that efficiencies, which can ultimately lead to reductions in cost, may be found."[1]

5-2-2 Planning Partners

Planning for rail lines can be sub-divided into two stages; basic planning and detailed planning. Basic planning extends from an examination of the project's necessity to decisions on fundamental project issues, such as route, station locations, and environmental problems. Detailed planning includes more technical issues such as decisions on scheduling, delivery method, and financing.

Even though the private sector participation in the detailed planning can be seen in all case studies "directly" or "indirectly through third-sector entities", it is recommended that *the*

[1] Greenberg, Paul Clark. Delivery of Tren Urbano Stations As Strategic Urban Nodes, Thesis (MS), Massachusetts Institute of Technology, 1996.

basic planning should be also implemented by partnerships between the concerned public sector and the potential private investors of the third-sector entity. Potential private investor involvement in the basic planning might help maximize the overall regional benefits of the rail project by including private plans in the rail project. This coordinated public and private activity could strengthen the economy of the region.

A further advancement in public/private partnerships is the development of regional strategic rail plans with the partnerships. Unlike other transportation systems, Japanese rail systems are owned and operated largely by the private sector, and every region has some major private railway companies. Because those potential private institutions which will participate in the planning are easily specified, public/private partnerships in such a planning stage are prospective, at least in regard to rail planning. In addition, since other regional-based private institutions, such as the Kansai Electric Power Corporation and the Osaka Gas Corporation, have shown an interest in rail projects as seen in the Tozai Line Project, such regional private utilities could also become prospective planning partners in regional strategic transportation planning.

5-3 Restructuring of the Third-Sector Rail Development Projects

On the basis of the strategies recommended above, three types of project structures are proposed for future Japanese urban/regional rail development projects, based on the degree of "public interest" and "private interest".[2] (See Table 5-1) Private interest can be sub-divided into two types of interests: private railway company interest and private project beneficiary interest (such as land developer interest).

[2] The idea of this matrix comes from:
Ishigami, Keitaro. "New Approaches to Public-Private Projects in Japan". NRI Quarterly, Nomura

Table 5-1 Categorization of Project Types

		Public interest	
		High	Low
Private interest	High	Category 1 (private interest is higher than public interest) Category 2 (public interest is higher or same as private interest)	Category 4
	Low	Category 3	Category 5

5-3-1 New Project Structures

Category 1

When the project fits in Category 1, it is recommended that the private sector should control the third-sector entity by owing more stock than the public sector. In such a case, public involvement with management should be limited so that the third-sector entity will not be subject to political pressure. According to the possible nature of the private interest, three types of project methods (structures) are possible as Figures 5-1 (Type 1), 5-2 (Type 2) and 5-3 (Type 3) indicates. Type 1 and Type 3 structures are combinations of the franchise and third-sector methods. All types are formed with the assumption that the public sector could, if necessary, provide support[3] enough to make the project "at least profitable". While such support is theoretically possible since public interest is high, it would have to be provided to the concessionaire "indirectly" through the third-sector entity. This process makes it easier for the government to get a public consensus.

A Type 1 structure is preferable when a private railway company such as the JR-Railway is one of the leading project initiators because of its high interest in the project. By making use of its in-house construction engineers, the private railway company takes responsibility for detailed planing, financing and construction, as well as for the operation, by receiving the

Research Institute, Winter/Spring 1995.

[3] i.e., with subsidies and land donation. The government's guarantee for the debt would be also useful way.

concession and using equity funds from the third-sector entity. After building the facilities, the private railway company should then transfer them to the third-sector entity, and operate the service by long-term contact with the third-sector entity. Before establishing the third-sector entity, the basic planning should be carried out with a public/private partnered process. Such a project structure can make good use of the private railway company's skills and motivation, and distribute the risk more equitably.

Type 2 and Type 3 structures are suited to a project in which a private railway company is hesitant to implement the project, while the other private firms such as land developers are strongly interested in it.

A Type 2 structure should be used when the third-sector entity has the ability enough to implement the entire process of project delivery and, if possible and preferable, operation. This project structure depends on the private nature of the third-sector entity throughout the project life, since it alone assumes the responsibility for planning, financing, construction, operation, and ownership. On the other hand, a Type 3 structure is appropriate when the third-sector entity lacks sufficient skill to implement the entire project process on its own. In such a case, with the support, such as land donation, from the concerned public and private sectors, the franchise method should be applied to make the most of the private advantages. The basic scheme of Type 3 is the same as that of Type 1.

In both Type 2 and Type 3 structures, the operation might be contracted-out to the private railway company with an incentive/penalty provision, or carried out by the third-sector entity or the private concessionaire itself in such a way that the private railway company will not have to bear the market risk.

Furthermore, in order to introduce the franchise methods in the Type 1 and Type 3 structures, project-based agreements for the operational performance such as rate of return would be necessary between the third-sector entity and private concessionaire. The agreement for rate of return, for instance, could also provide motivations to increase the ridership for the third-sector entity or the investors.

Categories 2 and 3

When a project is suitable for Category 2, the public sector would own the controlling interest in the third-sector entity and lead its management. The same is true if a project fits in Category 3, since private investments in the third-sector entity would be limited. In such a case, either a Type 1 or a Type 3 structure is preferable to make good use of the private sector skills and motivation, because the third-sector entity is likely to have a public feature. Bidding process should be used in this case. In order to introduce the franchise method, significant support from the public sector needs to be given to the private concessionaire.

Categories 4 and 5

We do not need to consider projects that fall into Categories 4 and 5. Projects in Category 4 should be implemented by the private sector alone, and projects in Category 5 are not valuable either to public or private sectors, and consequently, interest in them is low.

Figure 5-1 Recommended Project Structure (Type1)

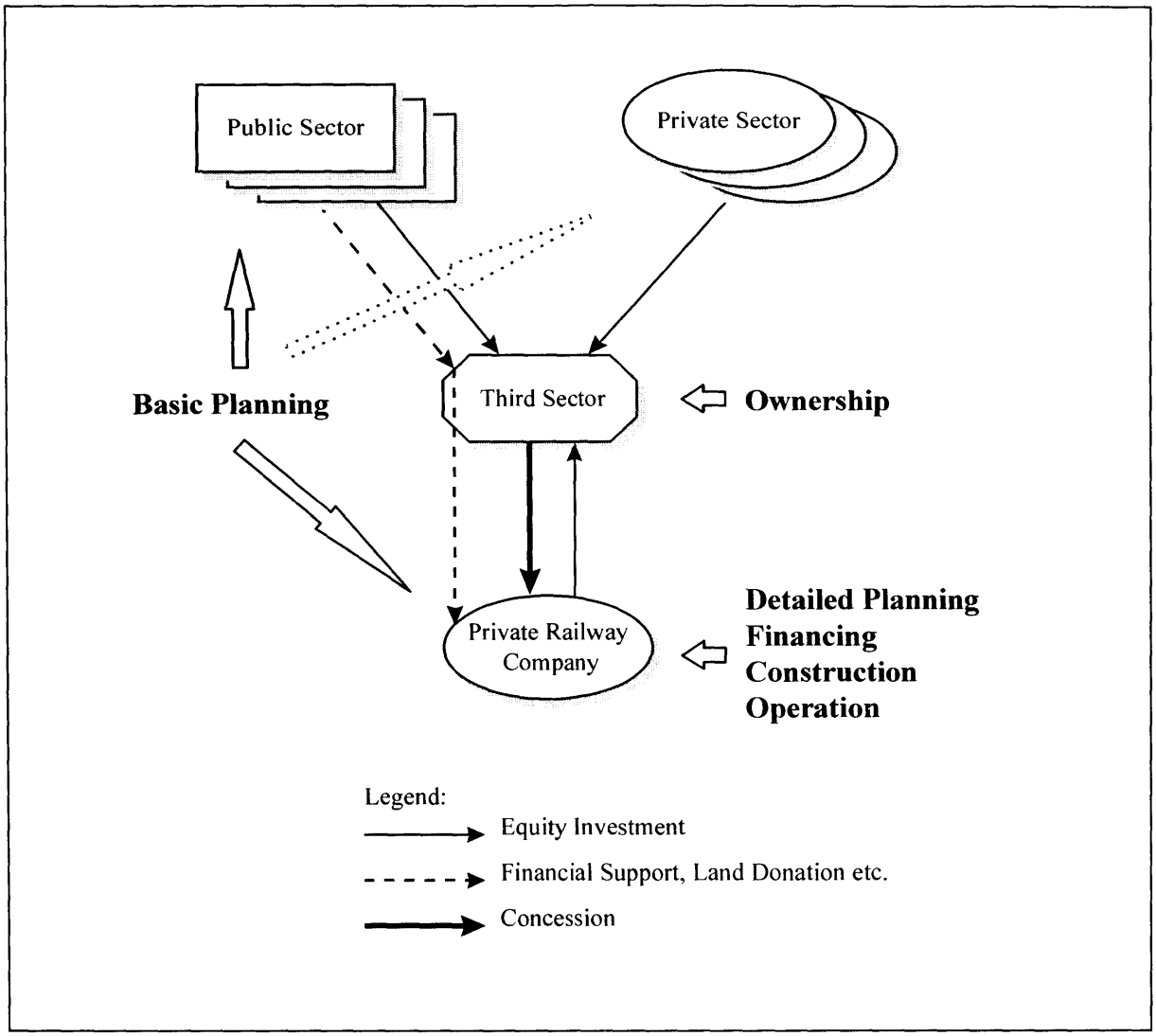


Figure 5-2 Recommended Project Structure (Type 2)

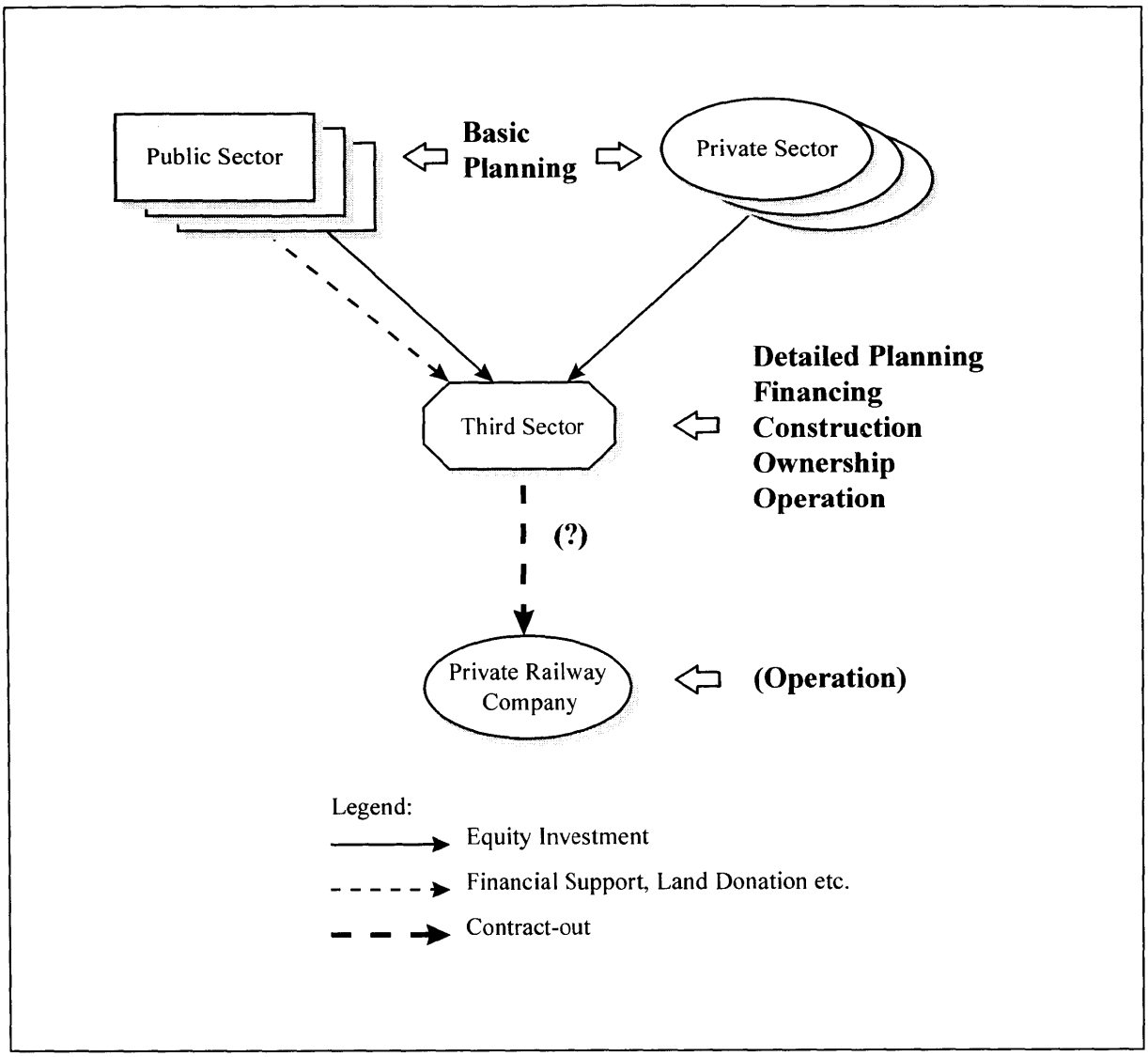
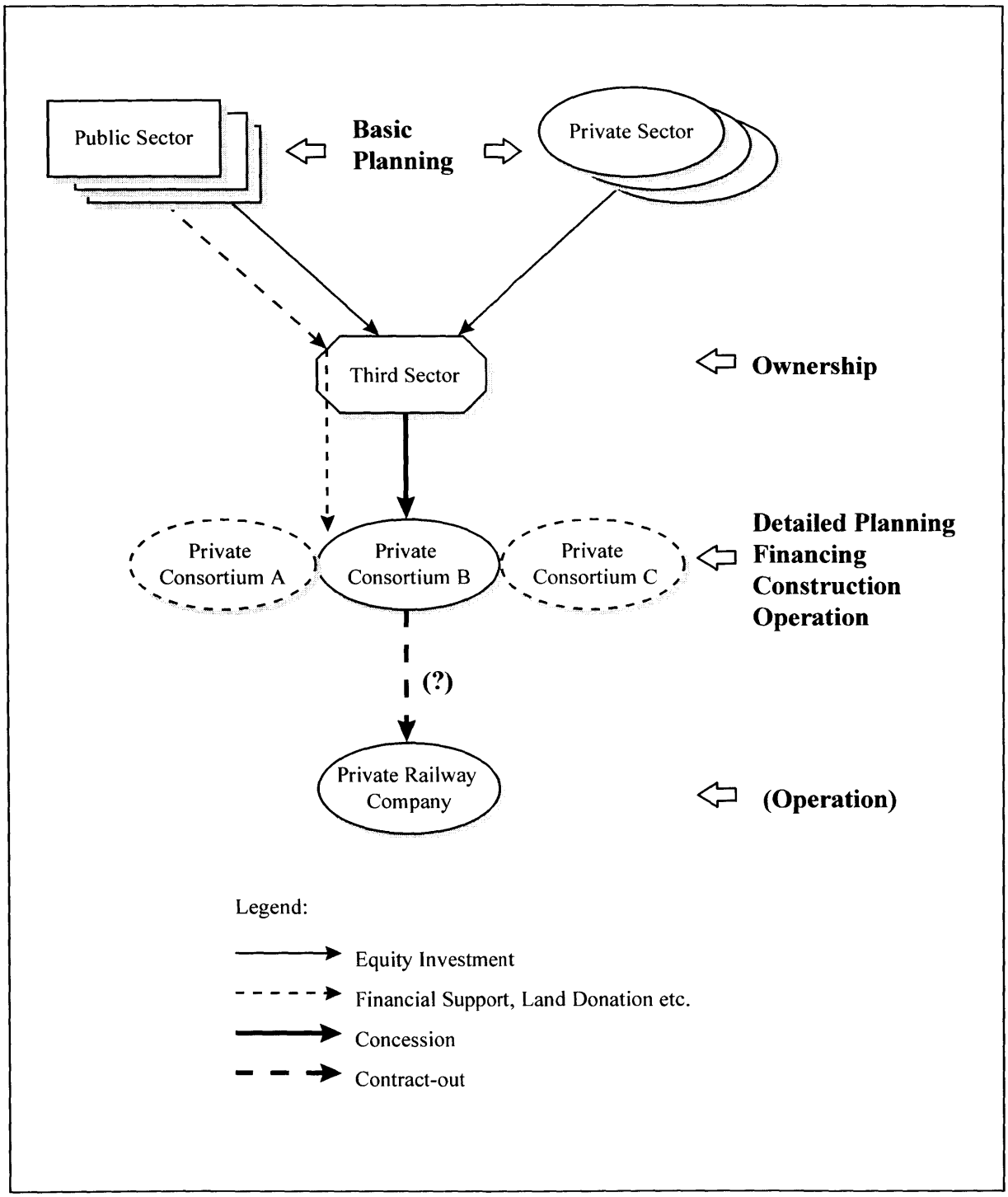


Figure 5-3 Recommended Project Structure (Type 3)



5-3-2 Required Actions

This sub-section examines actions necessary to make the proposed methods feasible. It also examines ways in which to promote effective public/private partnerships.

Right-of-way Acquisition

Right-of way acquisition is one of the important tasks in the construction stage, and it has a strong influence on a project's success, especially in Japan. As described in the Joban Shinsen Project, delays in right-of-way acquisition have been a dominant factor in the increase of construction costs and the postponement of the completion date. Also, an unexpected increase in land costs often increases the overall cost of the project, as was the case in the Tozai Line Project.

In general, the public sector is more accustomed to this task, with its eminent-domain power which can sometimes help to solve the problem. Also, it is expected that the private sector's responsibility for such a high-risk task would prevent that sector from participating in the project as a concessionaire. Therefore, it is recommend that the public sector, i.e., national or local governments, should take responsibility for that task.

After the public sector acquires the right-of-way, it should be donated or sold to the private concessionaire through the third-sector entity, depending on the project's profitability. However, the public sector should guarantee financial losses caused by the delay or/and increased costs of the right-of-way acquisition; in this way that the private concessionaires (including private railway companies) would not have to assume the risk of right-of-way acquisition. These clear agreements on respective roles, responsibilities, and risk-sharing between the public and private sectors are necessary and inevitable so as not to prevent the private entry to the projects.

The Role of the Government

As described in Chapter 4, Japanese third-sector projects have been led largely by the national government, at least in the planning and construction stages. Its involvement in planning is necessary when a project is of a nation-wide interest. It should be limited, however, so that the intentions of the third-sector entity and the private concessionaire could be reflected in the final plan. Furthermore, its involvement in the construction stage through the Japan Railway Construction Public Corporation (JRCC) should be limited to such tasks as right-of-way acquisition and technical support. These limitations are in line with current Japanese government policy which is promoting "smaller government".

However, the governments' leading role as a "coordinator" for the creation of the third-sector entities and as a "stimulator" to encourage private investments would be still needed in many cases. Even if private benefits are clearly expected from the project, the private firms are likely to hesitate to invest in the third-sector entity unless they confirm that their investments are critical to the inception of the project.

Financial Support Systems

The current financial support systems of the Japanese government need to be more flexible. Their present rigidity of the systems, as described in Chapter 3, would be an obstacle to introduce to any of these proposed project structures. Under current financial support systems, some programs such as the P-line subsidy and interest-free loans from the governments are applicable only to projects whose construction work is managed by the JRCC. These restrictions should be eliminated so as not to encourage public sector involvement.

Because proposed project structures would require public support, the promotion of increased rail development might need new funding sources of the government. As a potential new funding source, one solution lies in the application of value-capture methods or

public/private bargaining methods[4] on a project-to-project basis as can be found in the United States. Such application has already been introduced in the Joban Shinsen Project. Even though it is unique, the land readjustment method used in the project does not always constitute a benefit to the rail project because of the necessity for tough negotiations and because of complicated administrative process involved. Both of these have become significant causes of delays in construction. Thus, other low-risk value-capture methods, such as that of the Special Assessment District, should be considered as a means of supplementing public funds.

The gasoline tax, which is now widely criticized for its use in Japan, is another potential funding source for supplementing rail funds, and it is used in this way for transit programs in the United States.[5] As discussed in Chapter 3, the gasoline tax is now used only for constructions of monorails and AGT systems. Other rail modes can not access it. This inequitable allocation might be the result of the organizational structure of the national government. In Japan, the Ministry of Construction (MOC) governs road planning (including planning for monorails and AGT systems) and has jurisdiction over the gasoline tax, while the Ministry of Transport (MOT) governs public transportation planning. The projected administrative reform at the national level, which includes merger of MOC and MOT, may provide a good opportunity to reconsider the use of the gasoline tax.

Regulation

As described in 4-6-2, current fare regulation provides operators with little incentive to increase systematic operating cost efficiency. In order to overcome the problem of the current "rate base system", introduction of a "price cap system"; i.e., incentive regulation based on the consumer price index, is publicly debated in Japan. This system is now widely

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[4] See 2-2-5,2-2-6.

[5] In the United States, the Surface Transportation Assistance Act of 1982 provided that 1 cent of a 5 cent per gallon increase in the Highway Trust Fund tax on motor fuels would be placed into a Mass Transit Account for transit capital projects. The Omnibus Budget Reconciliation of 1990 raised to 1.5 cents the portion of the Highway Trust Fund tax on motor fuels to be placed in the Mass Transit

used in Great Britain for public utilities such as telephone, gas and electricity. With a price cap system, private railway companies could change fares freely in accordance with the adjusted consumer price index. Thus, they would have incentives to reduce their systematic operating costs. Since railway fare increases in the past were often above the consumer price index in Japan[6], introduction of the system would also provide benefits to consumers. It would provide benefits to private operators as well, because it could reduce their assessment costs.

The system, however, has the possibility of reducing incentives for private operators which might otherwise make large-scale capital investments, and thereby, negatively effect the introduction of the Type 1 method proposed in this thesis. Therefore, it is recommended that such capital costs (investments) be considered separately from the framework of the price cap system. In addition, there are other issues to be considered about the price cap system. One of these is inequity among customers. The system is expected to allow fares to be set differently in terms of rail lines, thus fares are likely to be determined in accordance with competitive situations involving other transportation. Also, a reduction in the quality of service is another potential problem. Thus, when introduction of the price cap system is considered, careful attention must be paid to quality of service and equity among customers.

5-3-3 Risk Sharing of Proposed Project Structures

Table 5-2 shows the risk-allocation in three proposed project structures. Selected risks are thought to be higher within Japanese urban/regional rail development projects.[7] Unlike three case study projects, risk at each stage is allocated to a major entity responsible for the risk-related task. This risk-allocation could make it easier for the private sector to enter into the projects and provide motivation to reduce risk at each stage, resulting in effective project

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Account.

[6] The CPI increased 25 % from 1980 to 1995. The fare of major JR Railways (JNR) increased about 42 %, from 1980 to 1989, and the fare of other large private railways increased about 68 % (average), from 1983 to 1995.

[7] See 4-6-1

delivery and operation.

Table 5-2 Risk Allocation in the Proposed Project Structures

Risk	Type1	Type2	Type3
Planning stage			
Permission risk	Third sector	Third sector	Third sector
Construction stage			
Technical risk	Private sector (private railway company)	Third sector	Private sector (private concessionaire)
Right-of-way acquisition risk	Public sector	Public sector	Public sector
Operation stage			
Market risk	Private sector (private railway company)	Third sector	Private sector (private concessionaire)
Financial risk	Private sector (private railway company)	Third sector	Private sector (private concessionaire)

Note: Risk allocated for the third sector would eventually be distributed among public and private investors in proportion to their capital contributions.

Chapter 6 Conclusion

6-1 Conclusion

This chapter concludes this thesis, which focuses on and evaluates Japanese public/private partnerships using a third-sector method, particularly those within urban/regional rail infrastructure developments. The primary objectives of this thesis are: (1) to clarify and evaluate the current third-sector method used in Japanese urban/regional rail development projects; and (2) to develop ideas for more effective public/private approaches which could accelerate these Japanese projects. The conclusions are mainly made based on these objectives.

Before focusing on the Japanese public/private partnership rail projects, Chapter 2 offers an overview of public/private partnerships in the provision and operation of infrastructure in terms of their benefits, types and issues. Furthermore, as a background information for the following chapters, Chapter 3 explores Japanese urban/regional rail systems in terms of ownership, market share and trends, and presents the current Japanese national government systems that provide financial support for urban/regional rail development projects.

Through case studies of three Japanese urban/regional rail development projects (two are recently developed and one is now under construction), Chapter 4 examines the characteristics of current third-sector approach. As its strong point, the third-sector method has a potential to collect the funds from various public and private beneficiaries as equity investments. This advantage could help translate the projects in the planning phase into implementation. It is well-suited for the Japanese rail projects which are expected to have a economic impact that could attract public and private institutions (not only private railway companies) because of the public's dependence on rail systems. However, risk-sharing scheme of the current third-sector projects does not always provide incentives for cost efficiency, and requires private railway companies to assume a large portion of risk at

various stages. This risk-sharing scheme has been a factor to prevent private railway companies from participating in the projects, especially if the project involves high-risk factors.

Then, Chapter 5 develops ideas for more effective public/private partnerships in the provision and operation of rail systems which could promote future urban/regional rail development projects, and recommends some strategies. In view of the fact that a third-sector entity demonstrates bureaucratic tendencies, it is recommended that the entity should have limited responsibilities in the collecting of funds as equity investments and in the owning of facilities. (This recommendation is not applicable if the private sector can dominate the third-sector entity) However, the inclusion of expected private institutions in the third-sector entity for the earlier-stage planning is recommended to help maximize the overall regional benefits of rail projects and strengthen regional economies with a public/private partnered process. In addition, to make greater use of private sector skills and motivations in efficiency, this thesis recommends that the project be set up so that a single party (private or private-dominated third-sector entity) can take responsibility for as many tasks as possible, from detailed project planning to operation.

In keeping with these strategies, three types of project structures are proposed to make better use of private sector skills; these would be selected according to the characteristics of future rail development projects in terms of the degree of public and private interests and in terms of nature of private interest. Their effectiveness is shown, but some alterations are needed to make the proposed structures feasible.

There are many types of public/private partnership methods in use throughout the world, and some of these are described in this thesis. The solution presented here for more effective public/private partnerships to provide rail infrastructure in Japan does not depend exclusively on the selection of a single method, but rather on a combination of methods (i.e., third-sector method, franchise, lease, contract-out, value-capture and development exaction) from planning to operation, in accordance with the characteristics of individual projects.

Even though application of the proposed methods for actual projected rail projects in

Japan should have been examined to show their feasibility and practical uses, it does not appear in this thesis due to the author's time constraints and lack of information. Future research is actually needed to show such practical uses. Also, there are many third-sector projects other than those described in this thesis within Japanese urban/regional rail developments. Projects which have a physical connection to existing public rail systems are excluded in this thesis. Their evaluation could help to form effective public/private partnerships for future Japanese rail developments at a more comprehensive level.

Recently in Japan, more attention has been paid to the use of private funds and skills for public infrastructure development as a possible solution to the continuing post-bubble economic slump. At the same time, however, the current Japanese public/private approach to infrastructure development, using a third-sector method, has been widely criticized by planners, economists and politicians. They have expressed interest in the successes of other countries' public/private approaches. The Japanese government is trying to stimulate further private entry to public infrastructure development and services with enacting the "PFI (Private Finance Initiative) Promotion Law". The proposed project methods in this thesis would be PFI options for providing urban/regional rail infrastructure in Japan and could promote the projects more effectively by attracting the private sector and relieving the burden of the entry into the projects.

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