



Lessons from Japanese Experiences of Roles of Public and Private Sectors in Urban Transport

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In most industrialized countries, public ownership, subsidies, operating deficits, and inefficient operation are the main topics of discussion when policymakers discuss urban public transportation. However, in Japan, most private railway operators provide adequate urban transportation services. They are financially independent and their rail operations are usually profitable. This contrasts with transport systems in other industrialized countries.

While market conditions for urban railway systems in Japanese metropolitan areas may be unique in terms of passenger volume, the success of Japanese mass transit is more likely due to the fact that many railway operators are privately owned and have broadly diversified their businesses. Their innovative diversification strategies have been used to build the stable ridership necessary not only to survive but to thrive. For example, private railway companies took the lead in developing the areas served by their networks.

This article examines how the experience of efficiently managed private railways can be applied to development of integrated public transportation systems that will improve local communities and compete effectively with motor vehicles. These aims are important policy objectives as road traffic continues to grow. The hope is that this discussion will serve as a first step in discovering whether the successes of Japan's private railways offer lessons that can be applied to other transportation systems.

Can Transit Systems Make Ends Meet?

One important policy issue revolves around the question of how funds should be obtained to cover the costs incurred by essential urban public transit systems. In the early days of public transport, farebox revenues covered most costs and

continued to do so for many years after services started—some companies even made profits. However, today's situation is entirely different. In many cases, transportation services that society depends on cannot be maintained by fare revenues alone.

Table 1 lists public transportation systems in a number of major cities and compares the extent to which operating costs are covered by fares. It should be noted that the farebox ratios do not permit precise comparison, because different accounting procedures, subsidies, revenue definitions (especially concerning fare subsidization measures), and deficit accounting procedures are utilized by each city. However, it is clear that fares do not even cover operating expenses (staff and non-staff costs, fuel, etc.), except for the three Japanese companies. According to Bly *et al.*,¹ and Allen,² the fiscal situation of transit systems tended to deteriorate during the 1970s. In 1971, only eight out of 34 surveyed carriers or transit authorities in European and North American cities enjoyed a farebox ratio of more than 100% and only slightly less than half (16) had farebox ratios below 80%. However, by 1977, there were no transit authorities that enjoyed a ratio of 100% or more, and 42 out of 43 had ratios below 80%, with slightly more than half (22) below 60%.

Clearly, it is rare for a European or North American transit authority or corporation to be able to assume financial responsibility for capital investments needed to construct new lines, boost capacity and procure new assets. Instead, the public sector—national or local governments—must generally pay for such improvements. The same is true for procurement of new rolling stock (often treated as capital investment in Europe and North America), construction of depots, etc.

In contrast, the Japanese operators stand out with farebox ratios greatly exceeding 100%. This favourable situation is not a reflection of excess profits earned due to monopoly situations. The ratios are based on operating costs that exclude items such as depreciation and interest on debt. Bearing this in mind, the ratios appear justifiable for a business pursuing corporate profits in a free market situation. In Japan, the basic rule has been that urban railways and other public transportation bodies should be self-supporting, meaning that they should pay for their own operating and infrastructure costs. This self-supporting principle is applied not only to public transportation bodies but also to other bodies involved in the construction and improvement of transportation infrastructure. Expressways are a good example. Although not every

Table 1 Ratio of Fares to Operating Costs for Public Transport Systems^{3,4}

	1980	1991
London Underground	78	84
RATP (Paris)	74	43
Toronto	72	68
Brussels	30	28
Milan	23	28
Stockholm	32	30
Copenhagen	58	52
Munich	60	42
Vienna	50	50
Zurich	63	66
OMTB (Osaka)	108	137
TRTA (Tokyo)	171	170
Hankyu Corporation (Osaka region)	123	123

individual expressway is self-supporting, new construction is based on the principle that pooled tolls from all expressway users (including future users) must provide sufficient revenue to cover all construction costs. This approach promotes inefficiencies, because heavily used sections subsidize other sections within the same system (and, in some cases, one generation of users subsidizes another). Thus, Japanese transportation policy is essentially user pays based system. There are a number of special subsidy programmes to support construction projects provided by public and semi-governmental bodies, but subsidies are limited. For example, the Subway Construction Cost Subsidization Programme (*Chika kosoku tetsudo seibi jigyoji hojo seido*) offers subsidies to publicly operated subways and Tokyo's Teito Rapid Transit Authority (TRTA) and pays 70% of construction costs of eligible infrastructure. The Infrastructure Construction Subsidization Programme (*Infura hojo seido*) offers subsidies to publicly operated and semi-public bodies operating monorails and Automated Guideway Transit (AGT) systems and pays 59.9% of the total infrastructure cost. However, these construction subsidy systems have long been criticized. One problem is that they focus on development of special management systems, unique track systems, and highly specialized technologies that negatively affect investment choice. The Subway Construction Cost Subsidization Programme only offers subsidies for construction of designated rapid subways using specialized technologies and tracks. In addition, if, for example, a developer invests in a local construction project, profits earned from the development come under a recompensation policy. Thus, if revenues are obtained from a third party, such revenues are subtracted from the construction costs, reducing the amount eligible for subsidy. Furthermore,



TRTA's Marunouchi Line Series 02 EMU

(TRTA)

the Infrastructure Construction Subsidization covers only infrastructure for monorails and AGTs and the subsidy cannot exceed 59.9% of construction costs no matter how worthy the project. Moreover, private railways are not eligible for these subsidies. Shoji⁵ provides a more detailed discussion of government subsidies in Japan. In actuality, slightly less than half of the cost of constructing a new subway line is subsidized. This is because subway companies must use their own capital to cover 20% of the total construction costs, and because the costs of rolling stock and some staff expenses are not eligible.

If the user pays principle is followed to the letter, only profitable services should be provided, meaning that any system failing the market-viability test should be closed in order to avoid placing a fiscal burden on society. However, it is easy to imagine cases where the self-supporting principle should be set aside to meet so-called public service obligations (PSOs). Consequently, many urban (or regional) passenger transportation systems in Europe and North America do not limit

their services to areas where fare revenues will cover expenses. Hence, construction and improvement projects are promoted under very different basic principles from those in Japan.

Two Principles Steering Transit in Different Directions

The basic purpose of any urban public transit system is to carry people as efficiently and effectively as possible. However, defining the aims of a transit system in more detail is not easy.

Over the years, governments have used a variety of economic measures to intervene in the public transportation market and have sometimes become directly involved. Probably, the main reason is that some required transportation services cannot be provided under the self-supporting principle that subjects transit to market forces. A public transport system has two basic objectives that it is expected to achieve simultaneously—to serve the public interest and to be profitable. However, the two objectives can sometimes be in conflict. In such

cases, the policy must focus either on the public interest or on profitability. The choice significantly determines how the system evolves because any improvements will be based on the chosen principle. For example, the operator may choose to promote mobility and accessibility by striving to develop and maintain a system that is fair to society as a whole while respecting budgetary limitations. Or the operator may promote commercial objectives according to the self-supporting principle while making exceptions in special cases.

As described above, the general worldwide trend has been for urban public transit systems to take the first approach. This has helped maintain public transit systems that offer relatively low fares and generate large networks.

However, the public-interest approach has led to several problems such as inefficiencies in management and operations, and inefficiencies in services. Today, far-reaching reforms are being introduced worldwide to correct these problems. Such reforms have been made necessary by budgetary restrictions to control excess subsidies, worsening government finances, and a change in public opinion especially among taxpayers. A guiding principle behind all such reforms is private-sector involvement. The most pressing challenge is how to involve the private sector, which generally has a better track record than the public sector, in making public transportation systems more competitive with motor vehicles and in promoting development of local

communities. In Japan, all discussions have pointed to private Japanese railway operators, which play an important role in metropolitan and local passenger services while maintaining a favourable bottom line without relying on subsidies.

Outline of Rail Transport in Japan

Private railway companies are common and play an important role in Japanese passenger transport, especially in urban areas. Operators receive almost no subsidies from local and central governments and the total costs are recovered from the farebox.

Japan has 174 railway operators providing passenger and freight services; 88 are private companies offering passenger services and 15 of these are the 'majors' providing services mostly in Japan's three large metropolises (Nishi Nippon Railroad (Nishitetsu) is an exception). The remainders are 'minors' and six are 'quasi-major' because they provide services in and near metropolises, but not on the scale of the 'majors.' Three are 'quasi-private' (less than 50% of shares owned by public sector). Strictly speaking, the 'minors' include several mixed private-public ('quasi-public') companies. Moreover, there are several definitions of minor. According to *Annual Railway Statistics* published the former Ministry of Transport, there are six categories of passenger operators (excluding tram, monorail and AGT operators): the six JR's, 15 majors, TRTA, six quasi-majors, 98

local minors, and 12 municipals. The local minors include 38 so-called third-sector railways (quasi-public) handed over by JNR (currently JR's) but excluding six category-3 operators that build and sell/rent infrastructure to category-1 and category-2 operators but not running train services themselves. The remaining 67 operators provide passenger service outside metropolitan areas. Table 2 shows the breakdown according to ownership and type of service.

In principle, Japanese government policy dictates the principle of self-sufficiency for public transportation. Although there is some ongoing discussion about this and some municipal transport authorities are experiencing financial difficulties, most private railways operate on a commercial basis. Therefore, Japanese public transport operators generally decide their own levels and types of service. They receive almost no subsidies while providing massive tax revenues to government coffers. While the 15 majors are almost completely self-sufficient, some operators in less densely populated areas, receive small subsidies. In 1995, subsidies to small and medium railways totalled ¥3 billion (¥100 = US\$0.84), representing only 1.6% of total revenue of such railways. In 1985, total subsidies to minor railways were just ¥918 million (1995 prices), representing only 1% of total revenues. To put this in perspective, 1994 subsidies to the British Columbia Rapid Transit Company in Vancouver, Canada, totalled US\$230 million. Also fare-reimbursement to the private railway operators for discount fares (such as pensioners) is unknown.

Some researchers attribute the unique success of Japanese private railways to the extremely high traffic volumes. This might be true for the major operators in Japan's three main metropolitan areas where some private companies have traffic densities (average daily passenger-km divided by route-km) of more than 20,000

Table 2 Railway Operators in Japan

Type of service	Ownership	Number of companies
Passenger	Private	88
	Public	14
	Quasi-public	50
Freight	Six passenger JR's	6
	JR Freight	1
	Private	15
Total		174

Table 3 Passenger Density and Number of Profitable Companies (1995)

Density*	Number of companies	Railway division profitability				Companies with overall operating profits	Companies with current profits (after taxes)
		More than 100%	100%–95 %	95%–80%	Less than 80%		
More than 40,000	1	1	0	0	0	1	1
20,001–40,000	5	4	1	0	0	5	2
10,001–20,000	10	10	0	0	0	9	9
8,001–10,000	0	-	-	-	-	-	-
6,001–8,000	8	5	0	3	0	3	2
4,001–6,000	5	3	1	1	0	2	2
2,001–4,000	13	5	3	5	0	6	4
0–2,000	21	1	4	5	11	8	5
Total	63	29	9	14	11	34	25

* Density = Average daily passenger-km/route-km

(in FY1997). For comparison, London Underground is the most congested passenger service in Europe with a transport density of about 45,000. However, density alone does not guarantee success. The provision of capacity necessary to cover rush hours creates huge overcapacity during off-peak periods. Also, many publicly operated subways operate at a deficit although they are eligible for some construction subsidies and rebates for concessionary fares to pensioners.

Moreover, even among the majors, not all private railways have extremely high densities. For example, the traffic density of Nishitetsu is only 34,000. In addition, it should be pointed out that there are numerous private railways that operate successfully even in less populated areas of Japan. Table 3 shows the number of minor private companies classified by passenger density and profitability (ratio of railway revenues to costs, including depreciation). The table also indicates whether these companies make operational profits or losses.

There are many profitable companies not operating in high-density markets. Twenty-nine of the 63 companies studied were profitable in the rail division at the operations level and further 9 covered more than 95% of their operating costs.

Only 11 of 21 companies with traffic densities of less than 2000 passenger-km/route-km/day were unable to cover 80% of operating expenses. Overall, when diversified operations are taken into account, 34 of the 64 companies were profitable.

This is quite remarkable considering that passenger fares do not cover expenses for operating, maintaining and administering rail operations in Europe and North America. In most cases, the farebox ratio does not exceed 80% (Table 1). Although most companies carrying more than 10,000 passenger-km/route-km/day were profitable, passenger density itself does not seem to be crucial to overall profitability if passenger-km density is more than 2000.

Diversification Strategy

The rail boom that occurred in many industrialized countries in the late 19th and early 20th centuries also occurred in Japan. Most Japanese railway companies started operations in the late 19th or early 20th centuries and have long business histories. However, unlike the bankruptcies that plagued railway operators elsewhere, many Japanese railways continue to operate even today

although loss-making lines have been closed (to be replaced by buses operated by the same company). Additionally, many freight services have been rationalized in response to competition from trucking companies.

Generally, it is taken for granted that there must be a large potential ridership before construction of infrastructure for urban transport will even be contemplated. This is because when the public sector funds a project, there must be obvious need before it can be considered politically viable.

In Japan, the 1906 Railway Nationalization Law dealt a severe blow to private railway operators. Under this law, private railways could only build new lines that did not compete with government lines. They were thus compelled to serve areas with small populations. While private companies anticipated that rail operations could be self-supporting, the limited customer base forced them to 'generate' ridership through business diversification.^{6,7}

Today, private railways generally divide their operations into four divisions: railways, transport, real estate, and other business. In general, the rail division operates commuter services but some companies provide intercity, resort access, airport access and freight services as well.

Table 4 Revenue Percentages of Majors and Minors (1995)

	Number	Overall operating profitability*	Revenue percentages			
			Rail	Transport	Real estate	Other business
Majors	15	115	51%	11%	21%	17%
Minors	63	101	38%	32%	13%	17%

* Overall operating profitability = Operating profit/operating cost (including depreciation)

The transport division handles services such as bus and taxi links to railway lines, intercity express bus services and sightseeing-bus operations. The real-estate division mainly develops commercial and residential properties and/or leases these properties. The other business division operates various retail ventures, restaurants and leisure facilities such as amusement parks, stadiums and museums.

Table 4 shows the differences in the operating revenues of each division for major and minor companies. While revenues earned from real estate and other business divisions are similar between majors and minors, the transport division generally plays a more important role in the minors. Bus services are operated in many cases as an alternative to railway services. In general, this type of bus service is not a complementary service but is due to the low population densities being more appropriate to bus services. Thus, in some cases, the transport division or part of its operations might be classified as the main business.

In addition to in-house diversification, private railways also form multi-company groups. In many cases, the group flagship is the railway company. The group members are linked by cross-shareholding and other financial ties, interlocking directorates, long-term business relationships and other social and historical links. Although many group companies remain fairly independent with weak links, the sum of the group covers the entire 'food chain' and offers a full range of lifestyle services.

Diversification offers several advantages:

- Rail ridership increases as passengers are attracted to other in-house or group businesses.
- Short- and long-term changes in ridership contributes to levelling off passenger volumes between peak and off-peak periods (and direction).
- Group companies can utilize rail passenger base.
- Internalization of externalities brought about by creation of rail infrastructure lead to profitability which makes it easier for the company (and group companies) to improve services.
- The company can more easily develop a market-oriented outlook based on experience from operating non-rail deregulated business environment.
- Railway operation costs are reduced by sharing operating costs group members between rail and diversified divisions.
- Group managerial resources are used effectively, reducing operating costs.

It appears that diversification is a rational strategic choice from early in a company's operations as long as the diversified operations are related. In fact, private railway companies have a long history of diversification. In most cases, they started early by diversifying into housing, amusement parks and other attractions, street lighting and supply of electricity. This counters the classic argument that diversification should only be considered when a company's products or services reach a later point in the life cycle.

It is important to note that Japanese private

railways have long been permitted to operate non-rail businesses. However, rail and non-rail businesses are strictly separated by the Railway Accounting Ordinance (*Tetsudo kaikei kisoku*) which controls the allocation of rail and non-rail costs by making cross-subsidization unlawful.

Private Railways and Government

The Japanese example provides us with a role model that may lead to increased private provision of public transport services, including rail transportation. The idea is not new—the original Metropolitan Line in London and the Canadian Pacific Railway in Canada followed similar development patterns. While Canadian Pacific originally received huge subsidies and land grants to complete its network, its Japanese counterparts were not so fortunate and had to contrive imaginative methods of attracting ridership and internalizing the benefits accrued by their infrastructure development.

Diversification plays an important role for the many private railways in Japan although differences vary greatly in scale, services and profitability. These companies might have benefited by being allowed to thrive on competitive principles. Private companies are also better able to diversify. Private initiative allows development of long-term business strategies that are not possible when subject to political cycles. Diversification has been the main reason for the success of the majors and most minors as well.

The diversification we are discussing here is not random but is aimed strictly at increasing rail ridership. This focused, methodical, long-term strategy has given these transport providers a reliable ridership base.

While factors such as favourable market conditions (densely populated cities with concentrated urban cores) and the regulated fare system (full cost pricing) have improved rail profitability, it was (and still is) an innovative diversification strategy that has allowed the railway companies in Japan to build the stable ridership needed to survive and thrive.

However, high passenger density, regulated fares and strategic business diversification alone do not guarantee success. Without serious and continuous efforts to rationalize their businesses, private railways would not have been able to set the reasonable fares required by the market. Comparison of average fares per passenger-km between private and municipal railways shows that the private railways have relatively low fares. An adult single fare for a one-way, 13.8 km journey costs ¥220 on the private Hankyu Electric Railway (in the Osaka region), ¥310 on a train operated by the Osaka Municipal Transportation Bureau (OMTB) and about ¥320 on London Underground. A 1-month season ticket for an adult travelling the same distance costs ¥8,890 on Hankyu, ¥10,980 on OMTB, and about ¥12,300 on London Underground. Japanese railway operators decide the service levels and type of services offered based on market trends and demand because they depend solely on passengers in the face of stiff competition from roads. As a result, the services are reliable, punctual, safe, fast and convenient.

Perhaps the Japanese example of private railways offers a viable means of dealing with urban transport problems while reducing subsidies. But can it be applied to other countries and what lessons can be learned?

The most important lesson is that any policy promoting construction of rail infrastructure should be based on a clear understanding of the needs of the local communities served by system. Decisions at the local level regarding the nature of the system should carry more weight than decisions at the national level. Of paramount importance is whether the services are so important that they should be provided even if they will never be profitable.

In Japan, private railways make their own decisions regarding network, operating patterns, schedules and fares. In Europe and North America, other parties have input to these decisions through public debate, perhaps creating an inefficient environment for public transport. Public debate should be restricted to whether the system should be self-supporting, and if not, to what extent and for what purposes subsidies should be granted.

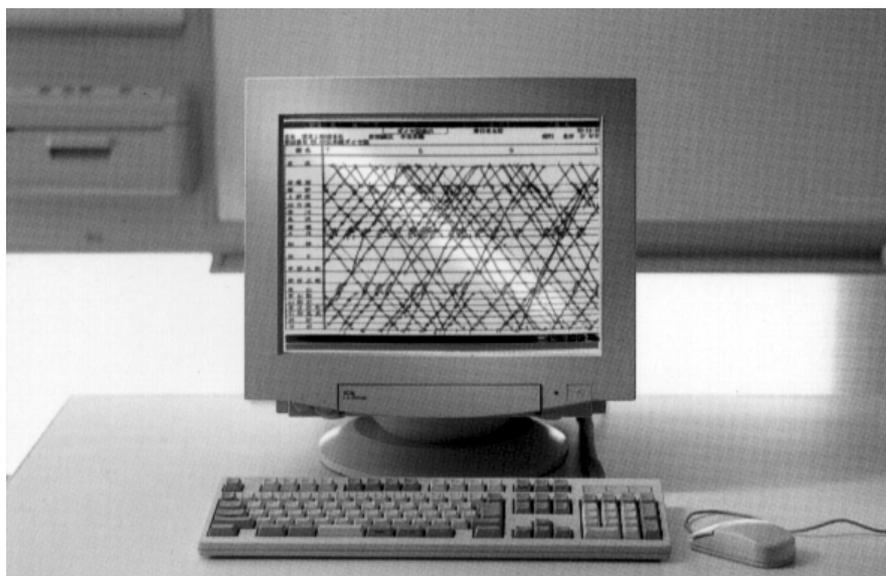
Once the principles have been defined, the private railways should be permitted to develop and operate on their own. If socio-economic conditions make it impossible to give private capital free rein, the railway should at least be permitted a

sufficient degree of autonomy.

It can be argued that private railways in Japan developed in close harmony with trackside communities to the mutual benefit of both. Clearly, the transport provider must have a long-term commitment to the community it serves. Consequently, contractual arrangements between the government and the provider should be long term, perhaps at least 30 years. Long-term relationships should be used to create an environment in which railways not only provide transportation but are also able to effectively design and improve their services.

If a planned transit system clearly cannot be self-sufficient, construction subsidies should be available to reduce capital costs. Even so, the public sector should only be involved in funding the construction phase and construction should be entrusted to private business as much as possible.

Other cases where local and national governments should offer funding include investment in new infrastructure and rolling stock after a disaster, such as a devastating earthquake exceeding the risk⁸ levels normally envisaged by private



Train diagram on PC monitor

(JR East Japan Information Systems)



Kansai Thru Pass enables users access to Kansai network. (Surutto KANSAI Association)

companies. Another case might be when a provider is expected to achieve special policy objectives, such as barrier-free access.

What about subsidies for operating expenses? This is not an easy question to answer except in the case of compensation for income lost through fare discounts to special passenger groups such as pensioners. However, two unacceptable situations include automatic subsidies to cover deficits in the current fiscal year, and subsidies to alleviate debt carried over from previous years—both situations lead to inefficient operations. In this regard, one possible solution is an initial ‘dowry’ similar to the Management Stabilization Fund established after the JNR privatization for the new JRs in Hokkaido, Shikoku and Kyushu that were expected to be loss-making from the start. Other possible subsidies might include:

- Subsidy for expenses incurred when allocating revenue shares by use of smart cards like *Surutto Kansai* (Kansai Thru Pass) which permits users access to the networks of various carriers in Kyoto, Osaka and Kobe areas.

- Subsidy to compensate railways for integrating passenger fares between different railway companies with linking networks. Without such a system, passengers would pay higher total fares than would be paid when travelling the same distance on a single carrier.

Such subsidies should be considered as facilitating the national transport objective of free passage from one system to another allowing each company to maintain its autonomy. ■

References

1. P. H. Bly, F. V. Webster and S. Pounds, Subsidisation of Urban Public Transport, *TRRL*, Report SR 541, 1979.
2. J. E. Allen, Public Transport: Who Pays?, in T. Young and R. Cresswell (eds.), *The Urban Transport Future*, Essex, Construction Press, 1982.
3. House of Commons, *Fifth Report from the Transport Committee, Session 1981-82, Transport in London*, Vol.1, (ordered by House of Commons to be printed July 1982), HMSO, 127-1, 1993.
4. J. Pucher and C. Lefevre, *The Urban Transport Crisis in Europe and North America*, Macmillan Press, 1996.
5. K. Shoji, *Toshi Kokyo Kotsu Seisaku* (Urban Public Transport Policy), Tokyo, Chikura Shobo, 2001.
6. T. Saito, *Shitetsu Sangyo: Nihon-gata Testudo Keiei no Tenkai* (Private Railways: Developments of Japanese Style Railway Management), Kyoto, Koyo Shobo, 1993.
7. K. Shoji and B. J. Killeen, *Ote-shitesu no takakuka-senryaku ni kansuru ichi-kousatsu* (An Appraisal of Diversification Strategy as Utilized

by Major Private Railways in Japan), *Kotsugaku Kenkyu* 2000, pp. 185–194, 2001.

8. F. Mizutani and K. Shoji, Lessons from the Great Hanshin Earthquake: Towards Transportation Infrastructure, in *World Transport Research: Selected Proceedings of 8th World Conference on Transport Research*, Vol. 3: Transport Modeling/Assessment (Antwerp, Belgium, July 12–17th, 1998), Elsevier Science (October 1999), pp. 499–512, 1999.

Further Reading

F. Mizutani, *Japanese Urban Railways: A Private-Public Comparison*, Avebury, Ashgate Publishing, 1994.

F. Mizutani and K. Shoji, A Comparative Analysis of Financial Performance: U.S. and Japanese urban railways, *International Journal of Transport Economics*, 24(2), pp. 207–239, 1997



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