Participation in Brazilian Passenger Railway Operation Project through Concession and PPP

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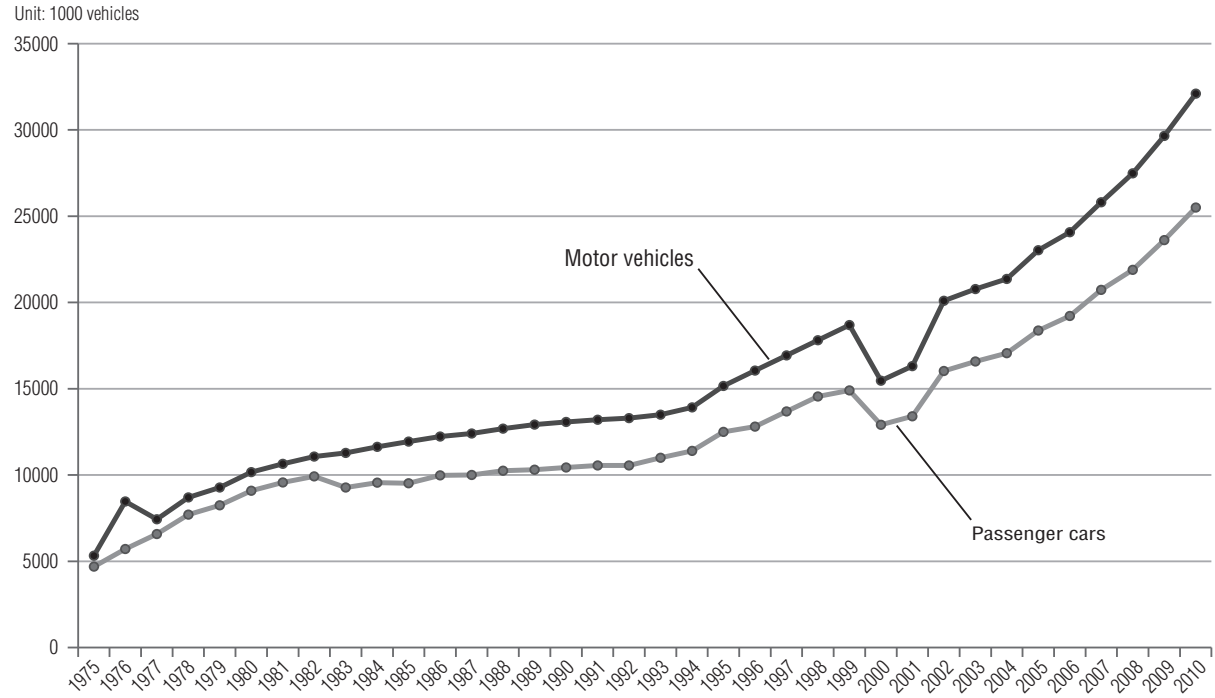
Participation in Brazilian Passenger Railway Operation Projects

A newspaper article published during the soccer World Cup is still fresh in my memory—it reported that the line of cars rushing home to watch the Brazil–Mexico game on television in São Paulo, Brazil's largest city, reached an all-time record length of 300 km. There are other statistics showing that a normal 30-minute commute by car anywhere else takes an average of 50 minutes in São Paulo and 56 minutes in Rio de Janeiro during the peak traffic rush hour. The economic losses from this are serious.

Brazil's middle class has been expanding with the economic growth in the 2000s backed up by rising prices of natural and food resources, leading to a rapid increase in automobile ownership (Fig. 1). This has resulted in chronic traffic congestion in major cities. State traffic bureaus responsible for development of urban traffic infrastructure have not introduced fundamental measures taking into account the medium to long-term increase in public transport users. They have gone no further than development centering on bus networks to improve the current situation, which in turn has worsened road congestion. One of the reasons for the grass-roots demonstrations in Brazil in 2013 was dissatisfaction with public transport facilities that had seen no development or improvement at all. This was the trigger forcing the government to position development of urban traffic infrastructure as a top priority, announcing financial support for such development in each state. Consequently, moves to develop infrastructure in each city have gained momentum.

Public-private partnership (PPP) using private-sector funds and know-how, is expected to be a powerful drive for infrastructure development. In the Brazilian raliway sector,

Figure 1 Trend in Number of Motor Vehicles in Brazil



Source: World Motor Vehicle Statistics Japan Automobile Manufacturers Association, Inc.

PPP was first used for the São Paulo Metro Line 4 Project in 2006. We believe that the biggest advantage of PPP is 'reliable completion of the project in a certain time span', through project management by the private-sector including procurement and construction, even more than 'reducing project costs and improving services'. In other words, 'time *can* be bought'.

Anticipating growth of opportunities in development of urban traffic infrastructure using PPP, Mitsui & Co., Ltd. (Mitsui) established a joint venture company with Odebrecht TransPort S.A. (OTP) in November 2014. OTP is a concession company operating business such as railways, toll roads, airports, etc., and is a member of the Odebrecht Group, Brazil's leading conglomerate. The joint venture was undertaken to participate fully in Brazil's passenger-railway operation. This article describes the history of Mitsui initiatives in passenger railways and the background leading to participation in passenger-railway operation. It also describes the aims from a trading company's perspective, the expectations for Japanese railway operators in this sector, etc.

History of Mitsui Initiatives in Brazil and Lessons from São Paulo Metro Line 4

Mitsui has exported railway carriages, signalling systems, etc., built by Japanese manufacturers to the Brazilian Federal Railroad Network, suburban railway corporations etc, since 1958 (Table 1). In addition, Mitsui has undertaken railway system design, procurement, and construction projects, and accumulated extensive knowledge and long-term experience of Brazil's passenger-railway sector.

Table 1 Mitsui Deliveries to Brazil

Year	Recipient	Japanese manufacturer	Overview of products	Quantity
1958	Ferrovia Paulista Sociedade Anônima ('FEPASA')	Toshiba	Train	90 carriages
1976-77	Rede Ferroviária Federal, Sociedade Anônima ('RFFSA')	Nippon Sharyo, Hitachi, Kawasaki Heavy Industries	Train	120 carriages
1981	FEPASA	Nippon Signal, Kyosan Electric Manufacturing, Daido Signal	CTC system	1 set
1982	RFFSA	Toshiba and Hitachi	Electrical equipment for restoration	58 sets
1983-85	RFFSA	Nippon Signal and Kyosan Electric Manufacturing (Subcontractors were NEC, Hitachi, Kawasaki Heavy Industries, Toshiba, and others)	Signalling and communications system and maintenance equipment	1 set
1984	Empresa de Trens Urbanos de Porto Alegre Sociedade Anônima ('TRENSURB')	Nippon Sharyo, Hitachi, Kawasaki Heavy Industries	Train	100 carriages
1984	TRENSURB	Nippon Signal, Kyosan Electric Manufacturing, Daido Signal	Signalling system	1 set
1985-86	Companhia Brasileira de Trens Urbanos ('CBTU')	Toshiba and Hitachi	Electrical equipment for restoration	320 sets
1985-86	CBTU	Toshiba, Hitachi, Tokyu Car, Koito Manufacturing, NABCO, and NTN	Electrical equipment for restoration	25 sets
1987-98	CBTU	Nippon Signal, Kyosan Electric Manufacturing, Daido Signal	ATC system	1 set
1989	RFFSA	Hitachi	Locomotives	2
1989-91	CBTU	Toshiba and Hitachi, etc.	Electrical equipment for restoration	90 sets
1992-93	RFFSA	NEC	Communications system	1 set
1995	CBTU	NEC	Communications system	1 set
1996	CBTU	Toshiba	Lightning arresters	46
1996-97	CBTU	Hitachi	Main controllers for carriages	23
2003	Companhia de Transportes de Salvador ('CTS')	Toshiba	Electrical equipment for trains made by Rotem of South Korea	24 sets
2004-06	Rio de Janeiro State Suburban Railway Corporation ('CENTRAL')	Toshiba	Electrical equipment for trains made by Rotem of South Korea	80 sets
2009	CENTRAL	Toshiba	Electrical equipment for trains made by Changchun Railway Vehicles of China	120 sets
2012	CENTRAL	Toshiba	Electrical equipment for trains made by Changchun Railway Vehicles of China	288 sets

São Paulo Metro Line 4 (Mitsui & Co., Ltd.)

Along with the move towards use of private-sector resources in Brazil during the 2000s, Mitsui explored new initiatives and leveraged its track record in procuring carriages, etc., to invest in the company constructing and operating São Paulo Metro Line 4 (also called ViaQuatro) in 2007. At the time, we focused on discussions with São Paulo State authorities, lawyers, banks, etc., on how to form a PPP framework, and to reduce and reasonably share various risks between the public and private sectors, such as demand risk, in the concession contract. After participation in that project as a member of the ViaQuatro Board of Directors, Mitsui gradually deepened its involvement in management of the company running the ViaQuatro project, including construction and resolving problems arising during operations, becoming more experienced in Mitsui's ideal role, approach to initiatives, and perspectives when engaging in overseas passenger-railway projects. This experience gave rise to several important considerations when participating in overseas passenger railway projects as follows.

Inevitability of plan

Many newly industrializing economies (NIEs) and other developing countries propose infrastructure development plans using PPPs only to see the plans fizzle out. In this sense, one key precondition for success is the inevitability of the plan, such as when the only choice is to match policy needs (views of citizens, elimination of traffic congestion) with private-sector resources (lack of government funds, actual know-how, and human resources). However, the partners must have the ability to recognize plans meeting these preconditions.

Existence of powerful local partners

Passenger-railway operation and management projects have a 'strong local flavour' in the sense that, over the long term, there are many negotiations with government agencies with jurisdiction and many points of contact with local users. Such projects are difficult for foreign companies to handle alone, even with good local knowledge, making it very important to team-up with partners with strong local connections, especially government agencies with jurisdiction, as well as have the ability to negotiate concession contracts from the authorities.

Project execution capability

The project execution capabilities required of top management and shareholders when operating a project are quite important. Capabilities include those in areas such as: making sure the philosophy with respect to safety and reliability of the overall system is shared between shareholders and the project company and is appropriately implemented; making sure efficient operation, cost management, and optimal investment–all of which have an impact on profitability–are strictly implemented; and holding the aforementioned negotiations with government agencies with jurisdiction.

Full-scale Participation in Passenger Railway Operation

Background

Mitsui's partner, OTP also sends board member to ViaQuatro and amply demonstrated its ability to handle high-level negotiations with the state government on various occasions during board meetings. Mitsui and OTP had a similar philosophy about project operation and risks, so we felt a sense of affinity that led to discussions about working on new PPP projects, not just ViaQuatro. Finally, OTP proposed a comprehensive collaboration.

Generally, in European countries, there is a strong tendency to emphasize functions whereby partnering involves identifying functions required to implement the project and then searching for companies with a best fit to each function. However, in Latin countries like Brazil, it is more common to choose trustworthy partners first and then decide details later.

OTP approached Mitsui (which is not a railway specialist) with a collaboration proposal based first on the mutual sense of trust developed through the ViaQuatro project, and based second on a sense of security resulting from prior deliveries

Figure 2 Business Relationship between Odebrecht and Mitsui

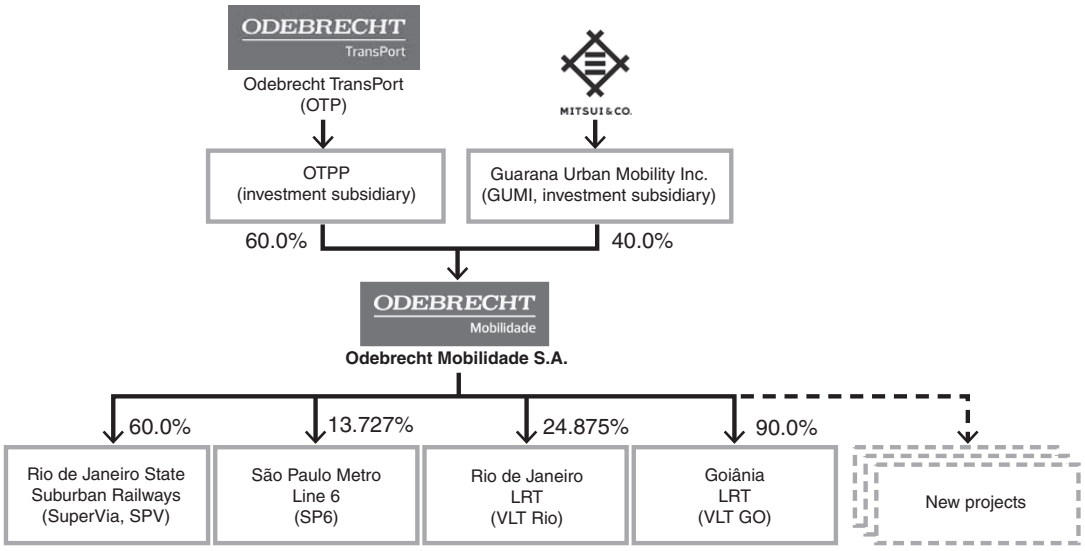
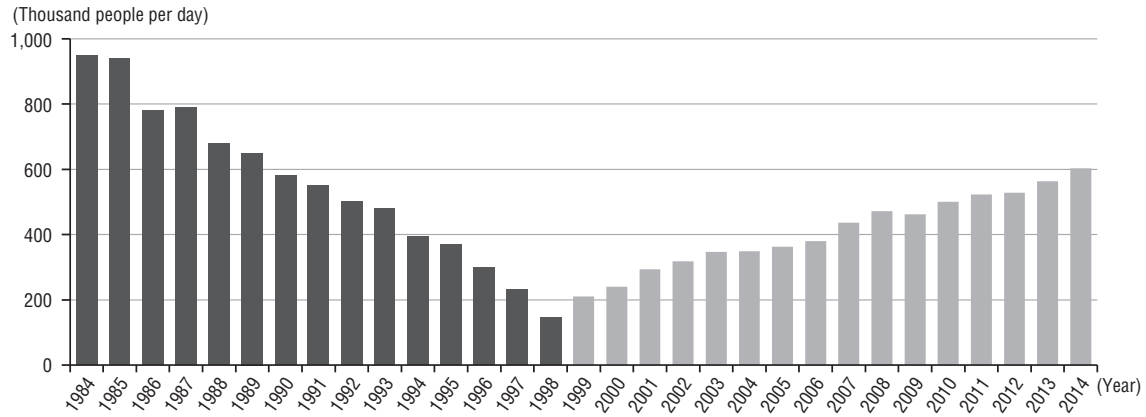


Figure 3 Trends in SuperVia Passenger Numbers



of Japanese-built rolling stock and railway systems. For Mitsui, which was searching for new business based on its ViaQuatro experience, the proposal was a challenging but attractive offer, and we started specific collaboration in August 2012.

Various hurdles

The due diligence and contract negotiations took about 18 months with the final deal taking the form of Mitsui and OTP establishing Odebrecht Mobilidade S.A. (OM), which acquired four OTP assets:

① SuperVia, Rio de Janeiro State Suburban Railways (currently operating)
② São Paulo Metro Line 6
③ Rio de Janeiro LRT
④ Goiânia LRT

OM also aimed to win new PPP projects (Fig. 2). The contract negotiations were challenging, but Mitsui, which had not previously gone beyond its track record and experience with a small investment in ViaQuatro, was engaged in an initiative for full-scale entry into passenger-railway operation and management, so it faced various hurdles even in-house. Some are described in this article.

Feasibility of improving management of Rio de Janeiro suburban railways

When examining the issues, the key concern was SuperVia.

The history of this railway goes back to the opening of the first line in 1858. After the founding of the Brazil Federal Railroad Network in 1957, they occupied an important position in the routes under the umbrella of the Federal Railroad Network; however, the federal government switched subsequently to a policy of prioritizing road investment.

Consequently, after recording passenger volumes of 1.2 million people per day in the first half of the 1980s, they lost strength, falling to just 145,000 people per day in 1996. In 1998, a Spanish consortium won a privatization bid and established SuperVia Concessionária De Transporte Ferroviário S.A. (SuperVia), which became the entity to work on improving operation and management, including introducing newly-built carriages, etc. As a result, railway passenger volumes recovered to approximately 500,000 people per day in 2010 (Fig. 3), but fundamental problems, such as faults in worn-out carriages and tracks, etc., had not been solved. Finally, the Spanish consortium sold the management rights to OTP in 2010.

When Mitsui started collaborating with OTP, OTP explained that its 'policy is to obtain the support of the state government and the Brazilian Development Bank (BNDES) to make a total investment of R$1.2 to R$2.0 billion (¥48.0 to ¥80.0 billion) to increase transportation capacity and generate demand'. However, the railway was already suffering from a negative image due to low previous service levels with poor employee business awareness, dilapidated equipment, etc. Even after OTP acquired the management rights, derailments and carriage malfunctions remained unsolved, and many Mitsui staff doubted the feasibility of improvement, asking 'Can these railways really get better?'

As a result, we hired Japan International Consultants for Transportation Co., Ltd. (JIC) as a technical advisor to conduct local surveys to confirm SuperVia's conditions.

The conclusions are listed below:

- The thinking and policy direction of the current top management of SuperVia are valid, and the motivation and sense of unity of employees are rising under the current top management.
- Much room for improvement can be seen mainly in track and carriage maintenance.
- If knowledge and support for resolving specific issues were to be provided by Japanese railway operators and other operators with experience, an improvement in operation and management as well as consequent growth could be expected.
- In particular, 3 million of the 8 million people living near the railway lines use public transport (6 million round trips per day), but buses take the major share of around 80%, while SuperVia has no more than 10%, offering SuperVia large potential for growth (Fig. 4).

Therefore, the debate inside Mitsui shifted gradually to 'How can the railways get better?'

As specific issues were extracted and countermeasures became clear, the company consensus focused on the direction to take to improve operation and management of SuperVia.

Why would a trading company work on passenger-railway Operation and Management?

Meanwhile, many Mitsui people had doubts about why a trading company would work on passenger-railway operation and management, raising questions, such as 'Should we work on a business that is responsible for protecting the lives of people?' and 'What is the value of working on this for us as a trading company?'

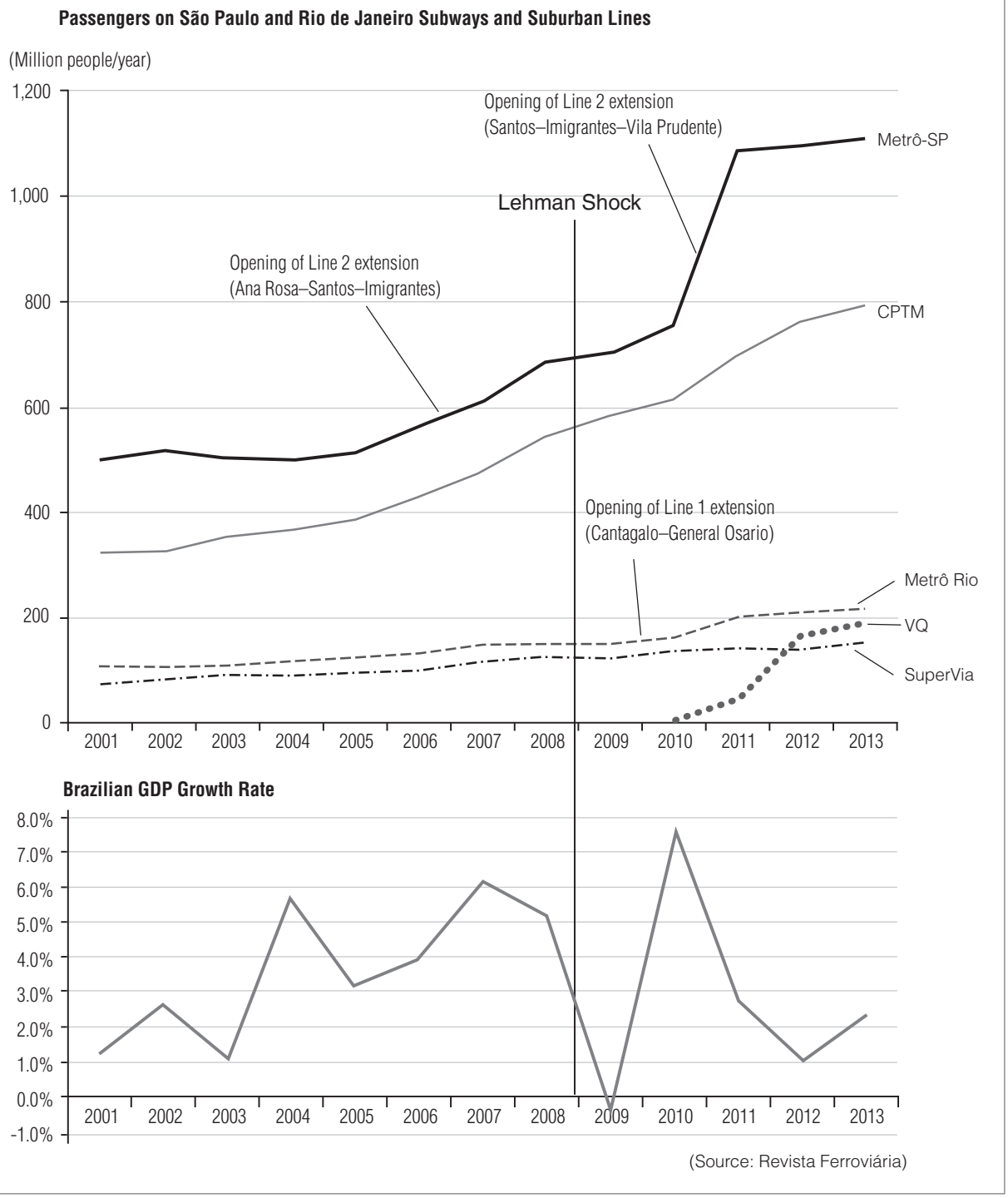
To answer the first question, every project entails risks but we examined the SuperVia safety measures and accident responses from the perspective that 'safety is more important than anything else, so the question of how safety is ensured is important'.

Track gauge widening (left) and dilapidated carriages (right) (Mitsui & Co., Ltd.)

The results confirmed that there is a long way to go before all company employees are properly managed and safety management systems are established to the same level as Japanese railway operators. However, safety awareness itself is high, and the company is devising ways to ensure safety in the context of limited funding while taking necessary measures to prevent major accidents. Currently, Mitsui is proceeding with consultations in cooperation with JIC on reviews of safety investments going forward and additional countermeasures.

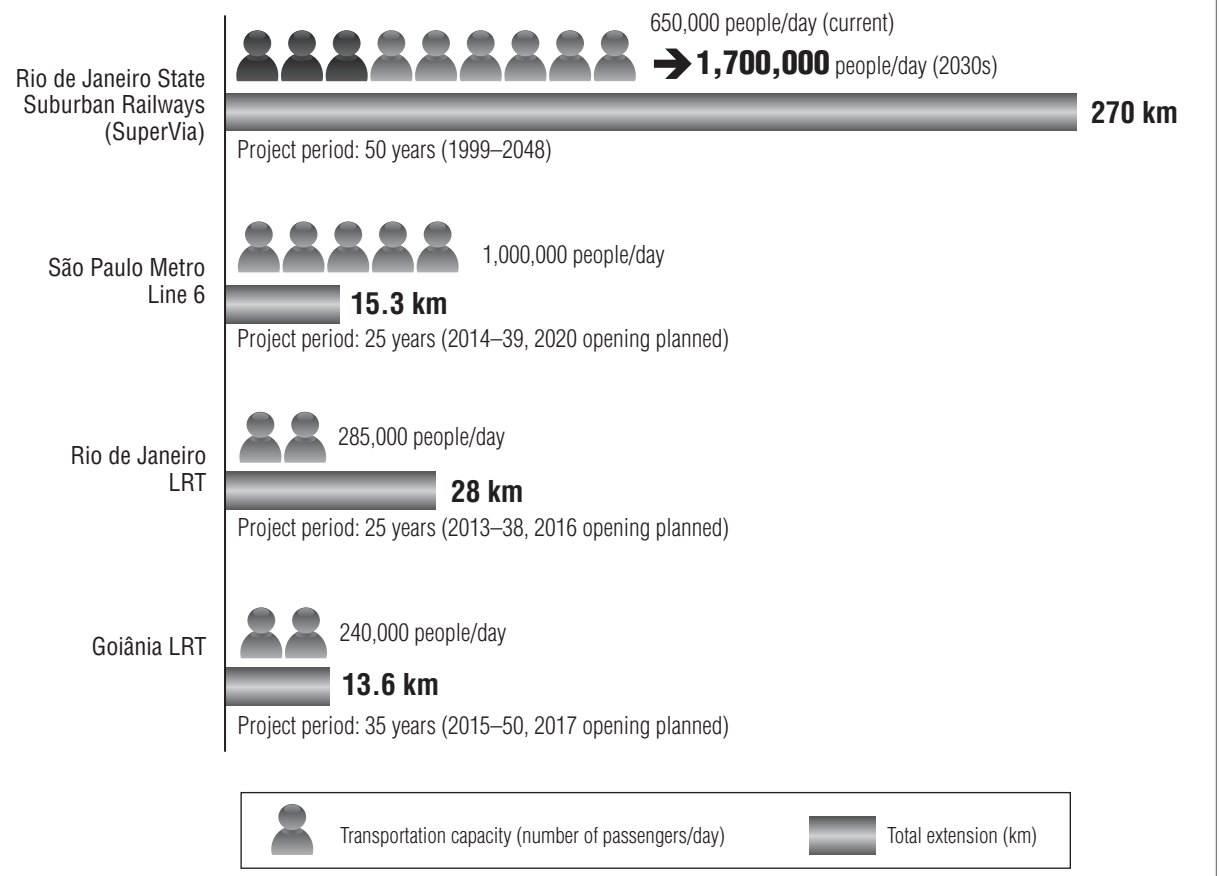
To answer the second question, various debates were held, and they went back to the source. The essence of a trading company's business is to 'arbitrage' by utilizing the gap in information and knowledge between countries. In our challenge of entering passenger-railway operation, we found the gap in the circumstances between the two countries: Japan possesses a variety of experience and technologies in the railway sector, and Brazil has a history of railways but is

Figure 4 Relationship Between Number of Railway Users and GDP Growth



(Source: Revista Ferroviária)

Figure 5 Overview of Assets



in the developmental stage. Our management became sure and convinced that Mitsui's investment participation would bridge this gap, by creating opportunities where Japanese railway management know-how and technologies could be utilized, leading to export of Japanese infrastructure systems as well as involvement of Japanese railway operators, and consequent achievement of safe and stable railway operation, thus contributing to improvement of the lives of the local residents.

Overview of assets

Figure 5 shows the anticipated number of passengers (per day) for each asset, the project periods, and the total extensions.

The features of each asset are described below.

SuperVia, Rio de Janeiro LRT

The existing SuperVia and Rio LRT under construction are backbone public transport for the 2016 Rio de Janeiro Summer Olympics (Fig. 6). The Maracanã neighbourhood hosts the Maracanã Stadium, which is the main venue for the opening and closing ceremonies and the soccer finals, as well as the Estádio Olímpico João Havelange where the athletics events will be held. The Deodoro neighbourhood hosts sports arenas for cycling, hockey, etc. Both these neighbourhoods are served by the SuperVia Line. Furthermore, the Copacabana neighbourhood served by the LRT line hosts sports arenas for beach volleyball, rowing, etc.

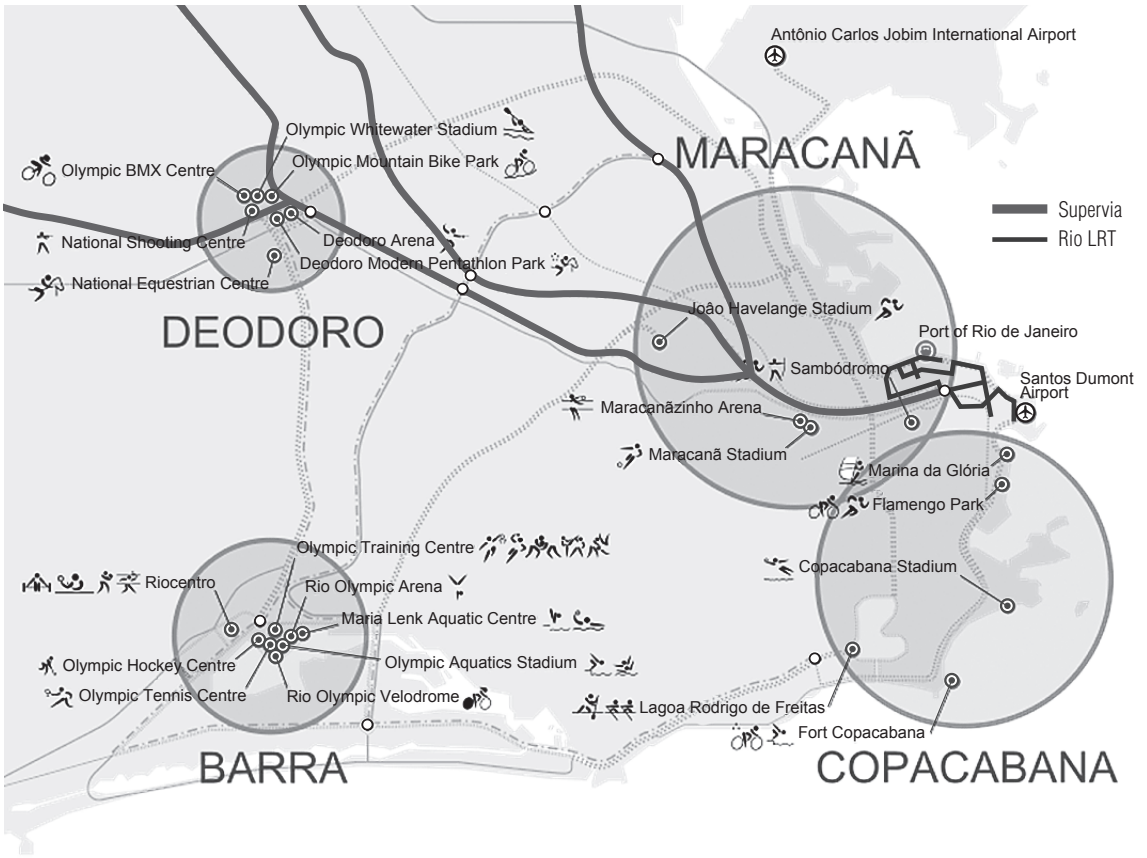
São Paulo Metro Line 6

This PPP project is being undertaken to construct and operate a new subway to alleviate chronic traffic congestion in São Paulo (a key economic hub in Brazil) using a fully-automated, driverless railway system to be supplied and built by Mitsubishi Heavy Industries. Brazil's railway system construction sector has been dominated previously by European companies such as ALSTOM, so this project changes the status quo. It is worth mentioning that Nippon Signal is delivering a Communication Based Train Control signalling (CBTC) system.

Goiânia LRT

Goiás State is Brazil's agricultural powerhouse producing soya beans, etc. The state capital is Goiânia where the city bus transport system has reached full capacity. The plan

Figure 6 2016 Rio de Janeiro Summer Olympics Venues and Routes of SuperVia and Rio LRT



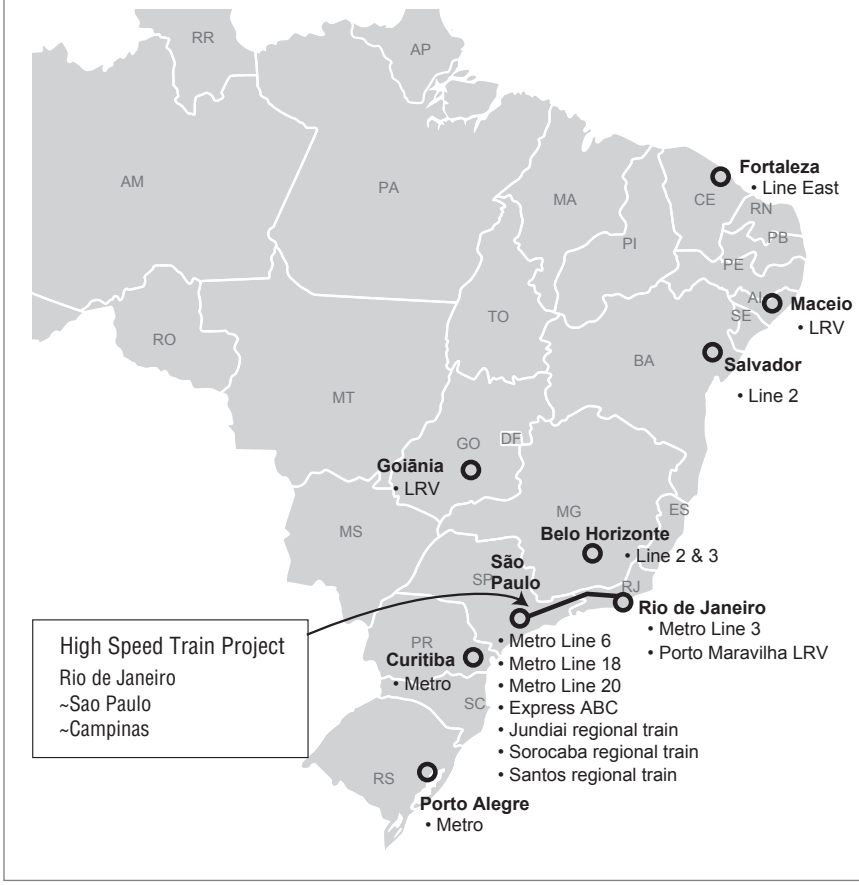
calls for replacement of existing bus-only lanes in the city centre with an LRT system.

Passenger Rail in Brazil's Major Cities Going Forward

Brazil is planning many new passenger-railway developments (Fig. 7).

On election in 2006, then President Lula, announced the PAC economic growth acceleration policy aiming to invest in infrastructure projects, especially urban mobility projects. In 2009, the successor Rousseff Cabinet formulated PAC-2, including many logistics and urban mobility infrastructure development projects. On the other hand, there have been market concerns about Brazil's worsening financial position due to pork-barrel policies by the

Figure 7 Plans for Passenger Rail PPP Projects in Major Brazilian Cities



Lula and Dilma administrations, so a programme of fiscal restraint by the federal government is proceeding under the leadership of Finance Minister Joaquim Levy. Accordingly, around 40% of the R$70.0 billion PAC budget (approximately ¥2.8 trillion) was frozen in May 2015. Urban mobility infrastructure development was presented as a priority sector for PAC and although the impact of the freeze is likely to be limited in the short term, it was thought necessary to give priority to more urgent and required investment.

Expectations of Brazilian Railway Operators and Japan's Contribution

Expectations for Japanese railway technologies

Brazil started life as a Portuguese colony; so it has deep connections to Europe. Most railways were constructed to European and American standards, and most overseas manufacturers, consultants, and railway operating companies in Brazil's passenger-rail market are European. In addition, the huge physical distance between Japan and Brazil has tended to make Brazil a low-priority market compared to Asia, etc. These factors make price competitiveness hard and present a high barrier to market entry.

On the other hand, Brazil and Japan have a history of technology exchanges dating from the JNR era in the 1970s, and the local perception in Brazil is that Japan is an advanced railway country. Brazilian railway operators are very interested in Japanese railway technologies, despite limited contact with Japan, and are willing to understand and learn Japanese know-how in railway construction and operation in Brazil. Furthermore, the lack of investment in the railway sector since the 1980s has led to a lack of human resources for railways: so, there is a need to cooperate in development of engineers. Mitsui believes Japan's accumulated know-how and advanced technologies in efficient and safe railway operation and maintenance can be used to improve railways in Brazil.

Japanese know-how in 'soft' sectors

Brazilian railways have tended to prioritize development of hardware, such as infrastructure, while 'soft' aspects, such as operations, maintenance and education have been postponed. There is room for Japanese railway operators with good know-how in soft sectors to make a contribution.

Furthermore, there is a high likelihood that they can contribute in sectors related to surrounding projects, known as off-rail projects. For example, many commercial facilities in railway stations are simple and there are few cases where businesses surrounding the railway are devising strategies with the needs of trackside residents in mind. Since the earliest days of railways, major operators in Japan have been active in the soft sectors of real estate (trackside and in-station development), bus projects, life services, etc., and have engaged in multifaceted business management that skillfully assesses the needs of consumers. This know-how can be applied in Brazil. Furthermore, Japan's railway operators are collecting travel and ticket data and utilizing this so-called 'big data' in marketing. However, although non-contact cards are spreading gradually in Brazil, use of big data is still immature. Mitsui thinks Japan's outstanding monitoring and security systems, etc., would find high acceptability in Brazil, where crime levels remain high.

Expectations for funding from Japan

Brazil's PPP urban traffic projects are denominated in the national currency and financed using ticket receipts and state-government subsidies. The only financial institutions capable of long-term financing in Brazilian Reals are the federal Brazilian Development Bank (BNDES) and Caixa Econômica Federal (CAIXA). Investors are basically regional companies. On the other hand, the fiscal austerity of the federal government in response to economic stagnation in Brazil has triggered credit uncertainty, limiting access to funds from BNDES. Corruption allegations surrounding Petrobras have complicated the situation. Going forward, there are expectations of financing from Japanese government institutions, such as JICA, JBIC, as well as for investment by Japanese government institutions, such as JOIN, and private-sector companies.

For Entry of Japanese Railway Operators into Overseas Markets

Brazil has high expectations with respect to know-how of Japanese railway operators, and there is a strong possibility of room for entry. So, how can Japanese railway operators enter these overseas markets? Mitsui's experience in Brazil to date is described below.

Understanding local culture and customs

To an outsider, railway operations technologies in Brazil still have room for improvement, but Brazilian operators have decades of experience and self-confidence in Brazilian-style operations. If an attempt were to be made to introduce Japanese-style railway operations without modifications for Brazil, it would not go well. It is necessary to take a flexible approach that understands the Brazilian way of doing things, its culture and customs, and to then prioritize and supplement areas that are lacking. Although we believe that Japanese railway operators have all the technologies required for operations overseas, how to use these technologies, know-how, and experience must be studied based on advice from a local partner.

Systematization

ViaQuatro launched driverless operation and driving control and outsourced support from Paris Metro and Buenos Aires Underground. Railway operators in Europe systematize and document their own experience and know-how to sell to third parties, and it is very apparent that they have been involved in overseas expansion longer than Japan.

In Japan, there is a sense of responsibility and corporate culture whereby company employees do what they should do, relying on craftsmanship and teamwork, without documentation. High-quality operation is achieved due to knowledge accumulation at work sites, but it is necessary for Japanese railway operators to shift the form of administration of their know-how from implicit knowledge to codified knowledge, namely systematization and documentation, when promoting overseas expansion.

Assigning investment priorities (participation in existing projects)

The Japanese economy has matured and is at the stage where existing infrastructure like railways must be maintained for safe and stable operations. In contrast, Brazil is a NIE where sufficient infrastructure has yet to be built and existing infrastructure requires renovation. Furthermore, there are often budgetary restrictions, so new projects must be tackled with awareness of the need to assess investment priorities carefully.

Strategies for winning users

In Japan, each of the operators in the JR group as well as the other major private railway operators, not only run railways but have also segregated bus businesses to help stabilize the number of railway users. On the other hand, Brazil and other NIEs are still in the process of developing their public transport networks, and have not proceeded with segregation of railways and buses. It is important to have a medium-to-long term strategy to achieve bus and railway segregation through collaboration with government agencies and bus companies. A segregation policy is important in the short-term to answer the question of how users can be won from other transport modes by improving service levels.

Concluding Message

Mitsui was able to participate in current passenger-railway operations in Brazil backed up by initiatives in the passenger-rail sector over many years and a few strokes of luck: but, we believe that true 'Challenge & Innovation' for the company starts now. There are still many issues ahead, including rebuilding SuperVia now in the process of improving its business management, as well as the completion and start of three new PPP projects, etc.

Going forward, we intend to continue to obtain the support of various people, including the Japanese railway operators and manufacturers, while skillfully blending their experience and know-how with experts in Brazil to achieve the best mix of Japan's hardware and soft exports.

We are going forward with the dream that one day Brazilian operators will tell us 'Thanks to technologies from Japan we built railways with safe and efficient control'. 'Passenger transport for the 2016 Rio de Janeiro Summer Olympics was perfect' and ordinary Brazilian citizens will tell us 'Thanks to the efforts of Japanese people, we can now ride safe and comfortable railways'. ■

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