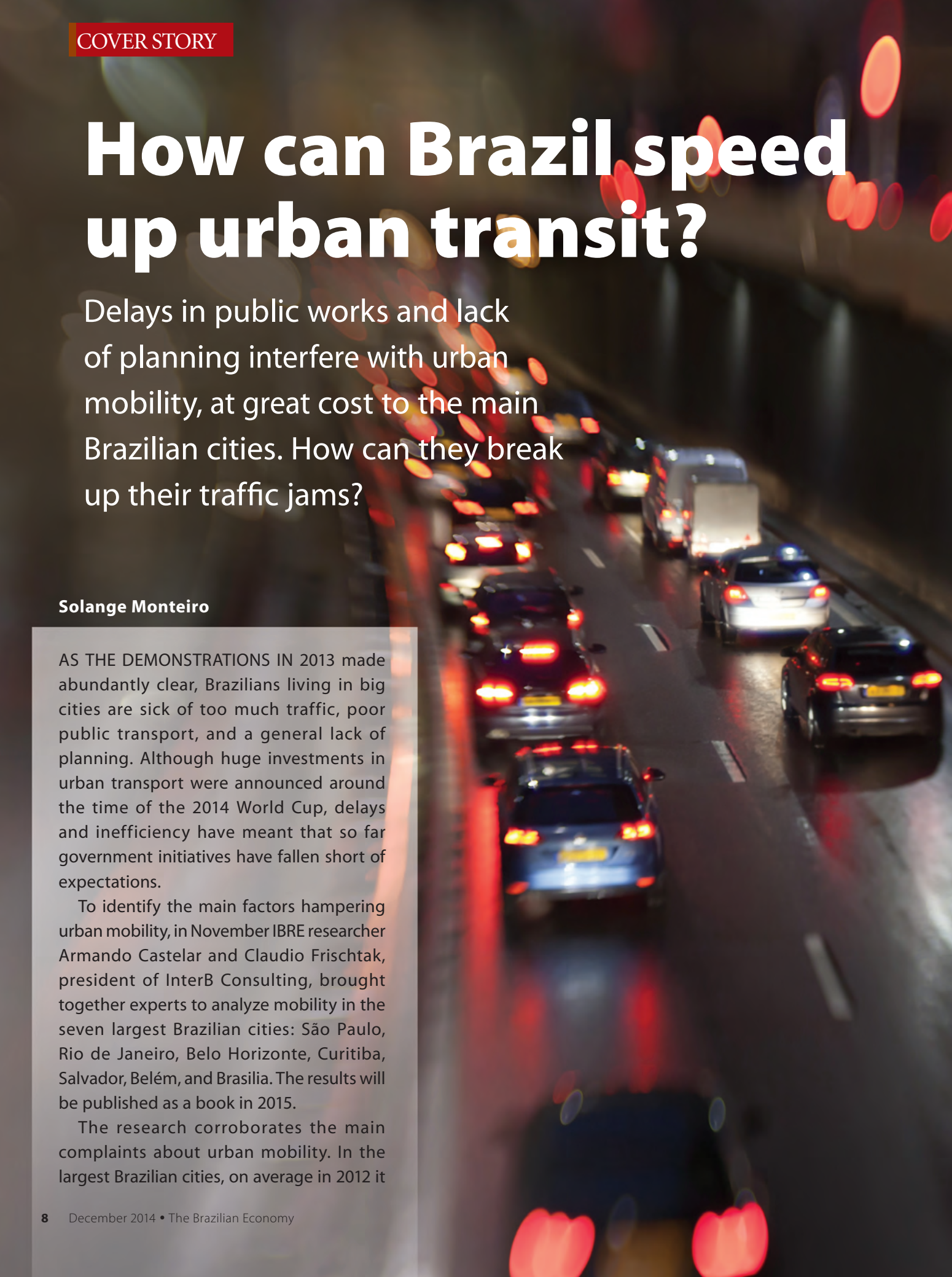
How can Brazil speed up urban transit?

Delays in public works and lack of planning interfere with urban mobility, at great cost to the main Brazilian cities. How can they break up their traffic jams?



Solange Monteiro

AS THE DEMONSTRATIONS IN 2013 made abundantly clear, Brazilians living in big cities are sick of too much traffic, poor public transport, and a general lack of planning. Although huge investments in urban transport were announced around the time of the 2014 World Cup, delays and inefficiency have meant that so far government initiatives have fallen short of expectations.

To identify the main factors hampering urban mobility, in November IBRE researcher Armando Castelar and Claudio Frischtak, president of InterB Consulting, brought together experts to analyze mobility in the seven largest Brazilian cities: São Paulo, Rio de Janeiro, Belo Horizonte, Curitiba, Salvador, Belém, and Brasilia. The results will be published as a book in 2015.

The research corroborates the main complaints about urban mobility. In the largest Brazilian cities, on average in 2012 it

took 41 minutes to commute from home to work, compared to 24 minutes in non-metropolitan urban areas. "In Rio de Janeiro, where the travel time is longest—47 minutes—27% of the people spend more than an hour getting to work; in São Paulo, it's 24%. Only Shanghai has an average commuting time longer than these two cities," Castelar says. Among the most affected are the new rising middle class, whose rising incomes in recent years brought them out of poverty but no closer to work, services, and leisure options. Marcio D'Agosto, coordinator of the Transportation Engineering Program at Coppe / UFRJ, has pointed out that "Transportation is closely linked to economic activity; a small increase in economic activity greatly increases demand for transport." Castelar commented, "Unless there are changes, welfare gains arising from better integration of these people into the labor market will be eroded by time spent on commuting daily."

The costs of inefficient urban mobility are estimated by taking into account average commuting time, fuel consumption, air pollution, personal stress, and respiratory problems. In all cases, the losses far outweigh the amounts invested in public transport. In São Paulo city alone, a study by economist Marcos Cintra of the São Paulo Business School of Getulio Vargas Foundation, found that in 2012 the cost of traffic jams totaled US$16 billion—more than double the US$7 million initial budget for the Program for Growth Acceleration (PAC). A study by the Federation of Industries of Rio de Janeiro (Firjan) found that in 2013 these costs amounted to US$12 billion in the metro Rio de Janeiro and US$28 billion in São Paulo, consuming 2% of GDP.

Brazilians living in big cities are sick of too much traffic, poor public transport, and a general lack of planning.

Castelar, Julia Fontes of the National Treasury, and IBRE's Luísa de Azevedo estimated the economic impact of traffic jams in 2012 by multiplying the average hourly wage by the difference between the longer metropolitan commuting time and shorter commuting time in small cities. They found that a

Photo: Fabio Rodrigues Pozzebom/ABr



Metropolitan Region of Brasilia city, Federal District

Municipalities **11**

Population **3.5 million**

Average commuting time from home to work **35.2 minutes**

11% of population take more than an hour to get to work

- Urban transport in the region is centralized, resulting in one of the country's largest number of cars per inhabitants as well as the biggest difference between the commuting time of the poorest and richest among the metropolitan areas.

> **"Transportation is closely linked to economic activity; a small increase in GDP greatly increases demand for transport."**
>
> *Marcio D'Agosto*

middle-income person in a large metropolitan area who could get to work as fast as a similar person in a smaller city would save US$1,000 a year. For all income groups together, the annual savings would reach US$25 billion.

Photo: Vitoriano Junior



Metropolitan Region of Belo Horizonte city, Minas Gerais State

Municipalities **34**

Population **5.8 million**

Average commuting time from home to work **36.8 minutes**

15.8% of population take more than an hour to get to work

- Belo Horizonte's rail, operating since 1986, transports 230,000 people a day. The metro rail project is important to meet the increased demand for transport.

Urban sprawl

Changing this appalling situation demands integrated planning that takes into account other aspects of urban mobility beyond infrastructure to improve the efficiency of transportation projects. One aspect is how urbanization has evolved in major metropolitan areas. Without proper planning, expansion stimulates excessive geographic sprawling rather than heightening population density in central areas, where services and employment are. "Commuting from home to work is taking longer, which particularly penalizes people who live far from city centers, who are generally the poorest," says Castelar. This problem may be repeated in other cities undergoing rapid urbanization. Frischtak points out that "From 1980 to 2010, the Brazilian urban population increased from 68% to 84% of total population. By 2050 it could reach 91%."

Joaquim José Guilherme de Aragão of the Department of Civil and Environmental Engineering at the University of Brasilia (UNB) makes an example of Brasilia, the nation's capital. "Starting in the 1990s, we had a disorganized occupation, with the explosion of satellite towns and distribution of land to meet political goals," he says. "Today 75% of Brasilia's population lives outside the central area, although 60% work there." In his opinion, the region suffers from transportation planning based on legitimizing works already decided, with no strategic vision. "The result is one of the highest number of cars per inhabitants in the country, 45 cars per 100 habitants, and also the largest difference in Brazil between the commuting times of

the poorest and the richest." de Aragão argues that, before making any large investments, the region needs to set priorities for management, regulation, and redesign of the transport network to balance demand and supply that benefit the more isolated and poorer neighborhoods of Brasilia, where 41% of the population is concentrated.

Pedro da Luz Moreira, president of the Institute of Architects of Brazil, notes that the tendency to urban sprawl also affects Rio de Janeiro, where people have migrated from areas in the northern neighborhood to Barra da Tijuca, in the western neighborhood, raising demand for new transport infrastructure. "It makes no sense to encourage investment in Barra da Tijuca. Most of the new properties are being built in areas that have no urban infrastructure. We have to reverse this situation and make real estate investments in areas of the city that are already urbanized," he says.

Alan Grimard, director of the UN Human Settlements Program (UN-Habitat) in Latin America, says that big cities require both a population densification in the central region and a qualified decentralization. "We also need to stimulate economic development in other areas, creating poles that generate jobs and offer commerce and services, shortening travel distances." In other words, he suggests, increase accessibility rather than mobility.

Irrational "planning"

Urban planning becomes even more complex when it is necessary to reconcile the interests of several municipalities and the state, as is necessary for intercity transportation operations. Moreira believes that creation of the Ministry of Cities in 2003 has not helped. "We continue to regard urban space as not essential to urban planning. Governments care more about macroeconomic questions, which have little relation to territory, and do not look into microeconomics and how to improve access to opportunities in Brazilian cities."

A middle-income person in a large metropolitan area who could get to work as fast as a similar person in a smaller city would save US$1,000 a year.

Photo: Tupungato/Shutterstock.com



Metropolitan Region of Curitiba city, Paraná State

Municipalities **29**

Population **3.6 million**

Average commuting time from home to work **32.2 minutes**

11.1% of population take more than an hour to get to work

- Since the 1970s, Curitiba has expanded the policies restricting vehicle access to the city's downtown, and promoting the use of non-vehicle transportation such as bike riding and walking.

The costs of inefficient urban mobility are estimated by taking into account average commuting time, fuel consumption, air pollution, personal stress, and respiratory problems. In all cases, the losses far outweigh the amounts invested in public transport.

Photo: Cayambe



Metropolitan area of Belém city, Pará State

Municipalities **7**

Population **2.1 million**

Average commuting time from home to work **33 minutes**

10.5% of population take more than an hour to get to work

- Belém has only one large river vessel line. In 2015, river transport will be expanded: 10 new river ports will be built and connected to the bus rapid transit system.

Ronaldo Guimarães Gouvea, professor in the Transport Engineering and Geotechnical Department of the Federal University of Minas Gerais, believes that lack of coordination of Ministry of Cities initiatives has created distortions, noting that "In Santa Catarina state, which has 7 million inhabitants, the number of large metropolitan areas went up from three to eight, while São Paulo state, which has 44 million inhabitants." Why? "The interest is in obtaining a credit line for sanitation projects, which the Ministry of Cities provides for metropolitan areas."

Metropolitan areas like São Paulo city, which has an intermunicipal Department of Transportation, and Curitiba, which coordinates metropolitan areas itself, can make progress faster. "With the integrated transport network in the region, which includes 250 bus lines from the capital and 106 from 13 municipalities, we have better bus tariffs," says Cléver de Almeida, head of the Department of Administration and Social Security of the State of Paraná. To do this, however, consultation is necessary, which in some cases may be politically sensitive. "This year, a metropolitan authority in Salvador city was established, but the municipal government did not join because it did not participate in defining the rules," said Sandro Cabral, professor at the School of Management of the Federal University of Bahia (UFBA). "This interferes with rational and technical planning of the transport system," he says, noting that Salvador city accounts for over 70% of the metropolitan population in Bahia state. "Belo Horizonte city has also seen friendly fire within the state administration as the development agency working to integrate transport is at odds with the transport department," Gouvea says.

Car hegemony

Another factor that has worsened traffic jams has been the tax break that has promoted car sales since 2008. Naturally, more people bought cars. Controlled prices for gasoline exacerbated the problem. "Government policy has gone in the opposite direction to the recommendations [for public transport]," says Castelar.

All indications are that promotion of car sales will continue. The Ministry of Mining and Energy projects a huge increase in the light vehicle fleet, from 36 million in 2013 to 130 million by 2050. The government believes this is a realistic goal because it would approach the developed country level of one car for every two inhabitants. What separates Brazil from developed countries, however, is the efficiency of public transport there, which allows the population to use public transport for commuting and use cars only for leisure activities. "Commuting time between home and work is a critical variable in the choice of transport. A policy that makes public transport faster and reliable is important. If it is faster, more people will opt for it," says Castelar.

The metropolitan region of Curitiba city is an example of best practices for urban mobility in Brazil. "In Curitiba, 70% of the people have cars—the highest population-to-car ratio among large Brazilian cities. Yet it does not have traffic jams like São Paulo or Rio," Almeida says. He notes that 45% of daily commuters use public transportation. "Only 27% of journeys are made by car or motorcycle, and the rest by non-motorized modes: 22% walk and 6% bicycle," he says.

Another factor that has worsened traffic jams has been the tax break that has promoted car sales since 2008. Naturally, more people bought cars. Controlled prices for gasoline exacerbated the problem.

Photo: Cidadeolimpica.com



Metropolitan Region of Rio de Janeiro city, Rio de Janeiro State

Municipalities **19**

Population **11.8 million**

Average commuting time from home to work **47.4 minutes**

27.1% of population take more than an hour to get to work

- In Rio de Janeiro, the use of public transport fell from 84% of the total in 1998 to 72% in 2012. One of the public transport challenges is to better integrate various legs of a trip with one fare. Today, both the metropolitan and municipal fares allow only one transfer and have time limits.

> **"A policy that makes public transport faster and reliable is important. If it is faster, more people will opt for it."**
>
> *Armando Castelar*

In Curitiba, since the 1960s urban planning has focused on the city's axes of expansion where most residents live and are served by Bus Rapid Transit (BRT). "Of the 2.5 million passengers who use buses every day, less than 30% go downtown," Almeida says. Today, the focus of urban planning [in Curitiba] is the first metro rail line and encouragement of non-motorized transport. "Recently we increased parking restrictions in downtown, and we intend to extend the bike paths from 70 km to 400 km," he says.

Bike paths are in the master plan of most metropolitan areas; in Belém, the goal is to allocate 100 km for biking. "We asked for federal government support to build bike paths, but there is financial support only for mass transit. So we included the BRT project in the package," says Maisa Sales Tobias, director of the Belém Department of Urban Mobility. All BRT stations will have bike racks and connections to the bike path network. "Today about 2.2 million people commute by bike," she says. "It is a tradition that is expanding."

Photo: AFNR/Shutterstock.com



Metropolitan Region of São Paulo, São Paulo State

Municipalities **39**

Population **20.2 million**

Average commuting time from home to work **46 minutes**

23.5% of population take more than an hour to get to work

- In the region, metro rail transport use is estimated to have saved about R$7 billion in 2012, as a result of reduced traveling times, and cut [fuel] consumption and emissions, among other items. In 2014, are estimated to be R$11 billion.

Bus rapid transit

In working to improve public transport capacity, one question is whether investments in BRTs will reduce the public transport deficit. As a faster and cheaper method of increasing supply, created in Curitiba in the 1970s, today the BRT runs the risk of having its capacity overrun by rising demand, for which metro rail transport would be more adequate. "The BRT is a medium capacity transit system. In Belo Horizonte, the two BTR corridors created clearly do not have adequate capacity to transport enough passengers," Gouvea says.

The same seems true for Rio, where the BRT project took routes initially projected for metro rail. "The BRT project gained support because we needed to improve public transit for the Pan American Games, but nothing was done at the

time," says José Eugenio Leal, professor of industrial engineering at the Catholic University of Rio de Janeiro. "Then in the urban transport master plan of 2012, it was argued that for Rio to win the 2016 Olympics, BRT was a more credible public transit alternative than metro rail. Today, if you take the west express corridor, you see that it is good for connections, but there is nothing around it."

Another point the experts highlight is the importance of the right technology for a BRT project. "We have seen a low level of sophistication. In fact, the project requires a properly-sized station platform, adequate signal time, and crosswalks," Leal says. Aragão agrees: "In Brasilia, in the short term BRT did not help because it was not designed as a service but as public works. The construction industry benefits, but we still have a culture of local bus lines. If that continues, we will continue losing to the car."

Urban rails

The most robust plan for metro rail transport is underway in São Paulo city, home to one in ten Brazilians. "We are confident that the way forward is investment in mass transit," says Saulo Pereira Vieira, coordinator of Planning and Management of the State Metropolitan Transport Department. He estimates that savings from metro rail operation —in terms of reduced travel time, less fuel consumption, and fewer accidents—was US$3 billion in 2012 and is expected to hit US$4 billion this year. "By 2030, with all the planned expansions, metro rail will save US$11 billion a year," he says.

Currently, São Paulo city has 335 km of metro rail that carry 7 million passengers daily and serves 22 municipalities. "Another 127 km of metro rail is being built by two public-private partnerships, which will transport another 4 million passengers, Vieira says, adding that the project is scheduled for completion in 2018. " The investment was made possible by raising the state debt limit.

The São Paulo metro rail system has parking lots at stations so people can leave their cars and take the train to the city, and bike racks have been added. Throughout, the Metropolitan Transport Department had the support of city hall, which approved the Strategic Master Plan in mid this

Photo: Portal da Copa/ME (victoria.camara)



Metropolitan area of Salvador, Bahia State

Municipalities **13**

Population **3.5 million**

Average commuting time from home to work **40 minutes**

18.7% of population take more than an hour to get to work

- The first 6 km from Salvador metro rail have been since 2009, but it operated only during the World Cup. In April 2013, the city transferred to the sate government the management and operation of the metro rail, enabling its expansion.

year, allowing higher population density along the transport axes. "That way," Vieira says, "we will ensure better use of the transport infrastructure."

Good governance

To move forward with longer-term projects and greater investment, experts point out the importance of better governance of the transport system. In São Paulo city, plans to expand mass transit have been threatened by allegations of fraud and price-fixing in metro rail bids. Progress in Salvador city has been deadlocked by a lack of consultation between state and municipal authorities that has delayed progress on metro rail operations. The first metro rail line in the city, just 6 km, took eight years to build and since completion in 2009 has not been operating. "The decision to make the municipality responsible for metro rail operation has cost years of delay," Cabral says. Among the reasons for the delay are design errors, evidence of overpricing, lack of funding, political disputes, and limited municipal capacity to manage the system, which have made it economically not viable. According to Cabral, "to enable the operation of such a short stretch of metro rail, the fare would be more than US$10 per trip."

Since the transfer of the metro rail operation to the state in 2013, progress has been faster with bidding carried out for expansion of line 1, creation of line 2, and better management of suburban trains. But Salvador's metro rail system operated only during the World Cup; its full operation is still pending. Cabral believes that governance of urban mobility should have two pillars: technical staff qualified in traffic engineering, urban planning, public safety, economics, environment, and the applicable law; and political leaders who seek the public welfare and plan for the long term. Leaders should seek consensus on a long-term plan and demonstrate the tradeoffs between alternative plans. While governance and mass transit have not improved, inequalities in metropolitan regions have deepened. In Salvador's metropolitan region, the fleet of cars rose 60% between 2005 and 2013 and there has been a 27% increase in commuting time since 1992. Yet most of the poor still have neither cars nor access to decent and reliable public transport—reflecting the reality of exclusion of the poor that still challenges Brazil.



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