



Contents lists available at ScienceDirect

Research in Transportation Economics

journal homepage: www.elsevier.com/locate/retrec

Mega events and the transformation of Rio de Janeiro into a mass-transit city

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ARTICLE INFO

Article history:

Received 27 October 2015

Received in revised form

29 June 2016

Accepted 20 July 2016

Available online xxx

JEL classification:

R41

R42

Z2

Keywords:

Mega events

Mass transit

Bus Rapid Transit

Rail systems

2016 Olympic Games

ABSTRACT

After bidding three times, Rio de Janeiro was finally selected to host the 2016 Olympic Games. In its third and successful attempt, Rio changed the focus of its transit supply strategy from rail to bus, with BRT corridors featuring as the main innovation. The backbone of the plan included the implementation of an integrated high-capacity bus based transit network fully integrated to other modes including boat, LRT, metro and suburban rail. Once fully implemented, Rio shall have a world-class transit system and expects the share of daily trips made by mass transit to increase from 18% to 63%, benefiting almost 1.5 million passengers per day. We focus our work in describing bus improvements from regulation and control to the implementation of BRS lanes and four BRT corridors. We address benefits in terms of travel time and emissions from optimizing services and renewing the bus fleet. We highlight the gains in user's satisfaction before and after the BRT. We also report measures to improve safety of the bus transit system and important challenges that still lie ahead to overcome problems deriving from the own success of BRT and from overestimating the performance of important BRT components.

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1. Introduction

In 1992 Rio hosted The Earth Summit, a landmark in terms of international climate conferences. In 1993, when Rio's strategic plan was formulated, the hosting of mega events became a policy objective as a way of promoting economic development, projecting a new image of the city and contributing towards urban regeneration (Silvestre, 2012). Mega events allow cities to boost their economies, reposition them in the global tourist market, revamp transport and service infrastructures, create vibrant cultural quarters and establish a network of high-grade facilities (Andranovich, Burbank, & Heying, 2001; Gold & Gold, 2008). They make also possible national and international media recognition and great exposure for the host city (Andranovich et al., 2001).

Barcelona, which hosted the 1992 Olympic Games, is considered a model to follow, given the legacy left for the city, which experienced a profound transformation (PMRJ, 2014). The consequences of the city's nomination were immediate: unemployment underwent a dramatic fall (almost 50% between 1986 and 1992, while in the country the decrease was of 25%), the housing market came back to life and the construction industry experienced a boom as consumption of civil construction materials and employment in the sector rose by at least 55% and 72%, respectively (Brunet, 1995). Barcelona succeeded in maintaining the growth generated because the public administration understood that the Games should serve the city and not vice-versa. In terms of urban transportation, Sydney also stands as an example. Coordinated actions between different public sectors and transit operators allowed the transportation system to deliver a high quality service during the 2000 Games (Hensher & Brewer, 2002).

Rio de Janeiro also wants to grasp the opportunity to transform the city, especially on providing infrastructure to mass transit (PMRJ, 2014). While hosting the 2007 edition of the Pan American

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Games, Rio+20 and the World Youth Event in 2013 provided important urban mobility lessons, they did not result in improvements for the transport system. While special bus services and temporary priority lanes helped in moving participants around town, this succession of events evidenced the need for providing permanent solutions to the ever-increasing congestion problems Brazilian cities like Rio are facing due to the growth of private motorization that includes a motorcycle boom.

This paper addresses the transformations in transport under way for Rio de Janeiro to deliver the 2016 edition of the Olympic Games that will remain as one of the main legacies of the event. Once fully implemented, the transport infrastructure for hosting the Games is expected to increase the share of daily trips made by mass transit from 18% to 63% (PMRJ, 2014).

We start the paper by addressing the push of the 2016 Olympics for the city to deliver a bus-based citywide transport revolution. We focus our work in describing bus improvements from regulation and control to the implementation of BRS (Bus Rapid Service) lanes and the four BRT (Bus Rapid Transit) corridors (TransOeste and TransCarioca – on going, TransOlimpica and TransBrasil – under construction). We address benefits in terms of travel time and to the environment that resulted from the optimization of services and the renewal of the bus fleet. We also report measures to improve the quality of service and safety of the bus transit system as well as important challenges that still lie ahead.

2. Rio de Janeiro's Olympic bidding: the issue of mobility

The Olympic Games are the largest sport event in the world and the most complex in terms of infrastructure, logistics and operations. They may add up to 2 million journeys per day on the everyday metropolitan journeys (IOC, 2008). Thus, transport plays a key role in the selection of any city to host the Games.

Before being selected to host the 2016 Games, Rio de Janeiro failed in two previous bidding attempts: 2004 and 2012. On both occasions, one of the main reasons for not qualifying derived from former transport plans heavily based on implementing new heavy rail (metro) lines and motorways.

In the 2012 bidding process, that took place in 2004, Rio scored relatively low when compared with other applicant cities on general infrastructure and transport. Rio's history of difficulties in implementing heavy rail and urban motorways associated to the very high cost of the projects, put in doubt attaining this goal in only seven years (IOC, 2004).

The transport plan for hosting the 2007 Pan American Games comprised two new lines for the metro, one to connect southern zones of the city and the other towards the international airport (adding respectively 16 km and 38 km to the network). The plan also included the construction of a light rail transit system connecting the international and domestic airports to the west zone of the city (Rio Pan 2007, 2002). But rail projects were put on hold and none of them were implemented for the Pan American Games (Silvestre, 2012).

In its third and successful attempt to host the Olympic Games, Rio de Janeiro changed the focus of its transit supply strategy from rail to bus, with BRT corridors featuring as the main innovation. The backbone of the transport plan included the implementation of an integrated high capacity and performance bus based transit network fully integrated to existing boat and heavy rail systems.

3. A multimodal transportation network for the 2016 Olympic Games

Rio de Janeiro 2016's Olympic transport plan, once fully implemented, shall produce a "High Performance Transport Ring"

connecting the four main zones of the city that will be also hosting the different venues and being home to participants and visitors, as depicted in Fig. 1 (COB, 2009; IOC, 2009a). At the core of the plan are BRT corridors complemented by permanent bus lanes, some of them already implemented and called BRS, plus bus priority lanes that will be in place only during the Games (IOC, 2009b).

Rail investments consist of extending one metro line in 16 km plus renovating the fleet and stations of the existing suburban rail system (COB, 2009). The plan also comprises the implementation of additional 300 km of bike paths integrated to other modes and to zones that are home to venues and visitors (IOC, 2013).

Despite modifications, the nature of the Olympic transport plan remains the same. The original three BRT corridors totalling 72 km evolved to four, which will totalize 154 km and are likely to benefit almost 1.5 million passengers per day. A LRT (Light Rail Transit) corridor currently under construction was also added to the plan. Once fully implemented, Rio shall have a world-class transit system and expects the share of daily city trips made by mass transit to increase from 18% to 63% (PMRJ, 2014). The 2016 Olympics pushed the city to deliver a very important legacy, i.e. a revolution in way people move.

Several actors play a key role in planning, delivering and operating the transportation system. The municipality is in charge of planning, controlling and regulating. Constructions are executed by private companies under contracts awarded through biddings. Rio's bus and rail transit system is run by several private operators. The key private actors are Fetranspor, Rio Ônibus and BRT Rio (bus system); VLT Carioca (LRT); Metro Rio (metro); and Supervia (train).

3.1. Bus Rapid Services

BRS is a new concept of bus priority that emerged in Rio de Janeiro, in 2011, to qualify and increase productivity of conventional bus lines and demonstrate that improvements to bus transit can go beyond BRT. BRS comprises a set of measures to improve operations including: (i) dedicated curbside single or double bus lanes, (ii) staggering of bus stations, (iii) passenger information systems and (iv) an electronic surveillance system that controls the access of private vehicles to the bus lanes by imposing an automatic actuation for infringing vehicles identified by two consecutive cameras (Fetranspor, 2013b). These measures, that differentiate BRS from a conventional curbside bus lane, are essential to ensure its proper performance.

Staggering of bus stations is the main factor in providing gains in operating speed. Previously bus drivers should stop at any point along the itinerary. Information at the shelters details routes, destinations and landmarks for each bus line and a special visual identity was created for the BRS (Fetranspor, 2013b).

BRS already reduced travel time from 10 to 50% (Fetranspor, 2013b) thus enabling reductions in bus fleet and emissions. It also improved general traffic conditions along the roads where it was deployed. Enhancements derived from BRS implementation had direct impact on users' satisfaction: 63% rate the system as good or excellent (Fetranspor, 2013b). Currently, Rio de Janeiro has 14 BRS corridors operating in the city center and south zone, totalling 45 km and benefiting more than 2.5 million passengers daily (BRT Centre of Excellence, EMBARQ, IEA, & SIBRT, 2015).

3.2. Bus Rapid Transit

BRT corridors compose the backbone of the Rio de Janeiro's high performance transport ring planned to the 2016 Olympic Games. Two of them (TransOeste and TransCarioca) are already in operation, while TransOlimpica and TransBrasil are under construction. A general satisfaction survey conducted earlier this year

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