

Urban transport policies in Brazil: The creation of a discriminatory mobility system

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1. Objectives and approach

This paper analyses current urban mobility conditions in Brazil and the possibilities for change towards a more equitable mobility system. Traditional transport studies, which were originally integrated within field of engineering area, have been limited to analysing vehicle congestion levels as an argument to support proposals for road investments (TRB, 1994; TTI, 1996). Conversely, this paper takes a social and political approach, inspired by fundamental works on the use of time and space (Hagerstrand, 1970, 1987; Illich, 1974; Whitelegg, 1997) and more recent literature on mobility and social rights (Lucas, 2012; Gutiérrez, 2012; Blanco et al., 2014; Miralles-Guasch and Cebollada, 2009). The analysis also uses the “mobility metabolism” methodology (Vasconcellos, 2005, 2010) that investigates the main mobility consumptions (space, time and energy) and their negative externalities on exclusion, pollution and road safety. Such conditions concern the different roles people play while circulating in urban areas and the social and political characteristics of different social groups, their needs and interests.

2. Current social and mobility conditions

2.1. Urban and population growth

Intense urban growth occurred in Brazil after WWII and resulted in the creation of several large cities and metropolitan areas. Between 1950 and 2010, the urban population increased from 18.7 million to 160.9 million (80% of the total population), making Brazil an urbanized society (IBGE, 2005 and 2010). The population of the nine largest metropolises increased by 48 million from 7.9 million to 56.4 million and this increasing population and large availability of land caused a large physical sprawl. This process was uncontrolled in most cases, due to lack of proper land use regulation and means to exert control. In larger areas, as the poor people arriving had no alternatives other than living (legally or illegally) in peripheral areas, most were forced to travel long distances on a daily basis. This had a significant impact on the public transport supply and quality: the radius of the metropolises increased by up to five times (Vasconcellos, 2013). Such a process also generated large social differences in living conditions. In addition to

differences in the quality of the living space there were large differences in the quality of life and access to public services. The Brazilian Urban Welfare Index (IBEU) (Ribeiro and Ribeiro, 2013), which measures topics such as housing, sewage collection, environmental quality, public services, infrastructure and mobility (as access to work), revealed in 2013 large differences among the selected metropolises and also inside each one. Such differences are not related only to income but also to race, education and employment: high quality areas are inhabited by “white” people with higher income and educational level while low-quality areas are occupied by “non-white people” with lower incomes and educational level (Ribeiro, 2016). Such diversity translates into large differences in respect to mobility and access to the city, as will be discussed in the following sections.

The urban road system generally developed in a radial pattern due to outward building expansion. Low-income citizens settled in peripheral areas, with irregular pavements and road systems; in several cases this was in hilly areas which are constantly subject to landslides caused by heavy rain in the summer months. High-income groups occupied central areas with much greater provision of public services. In large cities, wealthy suburbs developed into gated communities, whose inhabitants became dependent on cars as a means of transportation.

2.2. Mobility in large cities

In 2013, 214 million trips were made daily by people living in cities with over 60,000 inhabitants, an average daily mobility rate of 1.74 per capita. This figure is typical of developing countries and is around half that found in developed nations. Non-motorised journeys made up 40.2% of total trips, with journeys on foot comprising the largest share while cycling accounted for just 4%. Private transport stood at 30.6% and public transport accounted for 29.2% of all trips (ANTP, 2013).

There has been a shifting trend in modal share over recent decades with a clear decline in the use of non-motorised means. In contrast, the use of private transport (cars and motorcycles) surpassed public transport in 2005 and has since continued its upward trend. Figs. 1 and 2 illustrate the relationship between modal share and income and the change in modal split in Brazil's largest metropolitan area, São Paulo (referred to throughout as “RMSP”). It is evident that the number of non-motorised journeys falls as income levels rise, while journeys by

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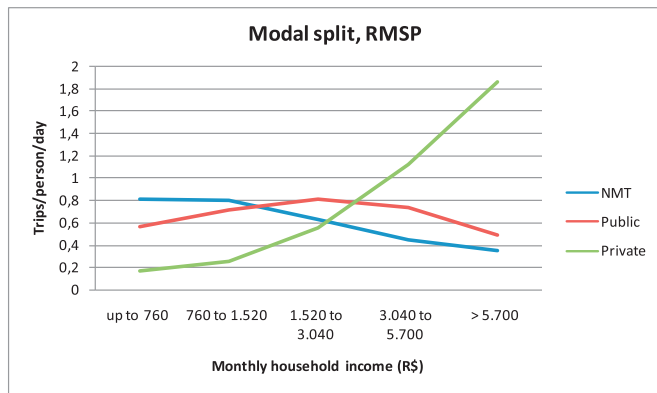


Fig. 1. Modal split of journeys according to income level, RMSP, 2007.
Source: CMSP (2008).

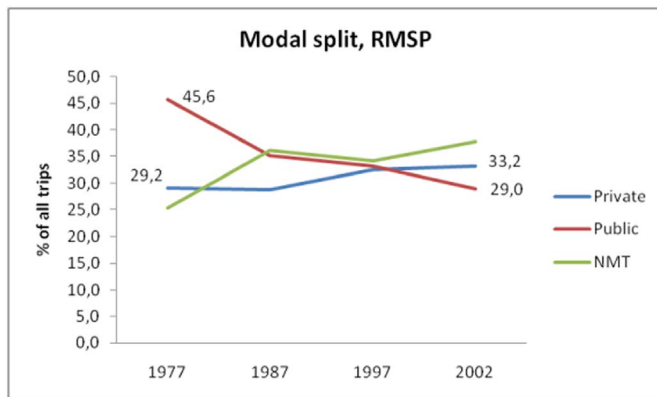


Fig. 2. Modal split of journeys, RMSP, 1997–2002.
Source: CMSP (2008).

public transport increase up to the middle income range and then decrease (Fig. 1). There is an increase in the number of private car journeys in line with income levels across the entire income range.

The share of journeys by public transport decreased from 45.6 in 1997 to 29% in 2002, while the corresponding value for cars increased from 29.2% to 32.2% (Fig. 2).

Immobility is also a crucial aspect: a large number of people do not leave the house on a typical day: in São Paulo and Rio de Janeiro it varies from 55% and 54% in the very poor households to 26% and 33% in wealthy households (Table 1).

Although some people do not need or want to travel, immobility is generally related to social and economic factors. In Rio de Janeiro, a survey in low-income areas showed that the main factors were employment status and the demographic structure of impoverished populations: immobility among professionals and students is just 20%, rising to 80% for homemakers and non-workers (Motte-Baumvol and

Table 1

Level of immobility in large metropolitan areas.

Sources: CMSP (2008) (São Paulo); SPRJ (2005) (Rio de Janeiro).

Income group	% immobility	
	S. Paulo (1997)	Rio de Janeiro (2005)
1 (very poor)	55	54
2	46	46
3	38	41
4	30	36
5 (wealthy)	26 ^a	33

^a Average of the two wealthiest groups.

Table 2

Average travel time by public and private motorised-modes in three Brazilian metropolises.

Source: CMSP (2008), São Paulo; SPRJ (2005), Rio de Janeiro; Oficina Consultores (2012), Salvador.

Motorised mode	Minutes/trip		
	São Paulo 2012	Rio Janeiro 2011	Salvador 2012
Public transport	67	42	62
Private motorised vehicles	31	33	40

Nassi, 2012).

Table 2 proves that travel time is significantly longer on public transport than by private means. Therefore, low-income citizens spend longer on essential journeys such as commuting to/from work. Longer journey times are not only a result of lower bus speeds but also of people living far away from their work places.

2.3. Environmental and road safety conditions

Environmental pollution has become a serious problem due to the combined effects of increased car use and poor quality diesel in buses. This has led to high emissions of particulate matter and high pollution levels, which frequently exceed the recommended World Health Organization limits. Studies indicate that approximately 8000 people die prematurely each year in the São Paulo metropolitan area due to traffic-related pollution. This surpasses road fatalities, AIDS and breast cancer (Vormittag et al., 2015).

There has been a steady increase in greenhouse gas emissions (GHG) since 2000. In 2013, emissions of local pollutants from private vehicles in cities with over 60,000 inhabitants accounted for 78% of total emissions, while GHG emissions made up 65% of the total emissions (ANTP, 2013).

Car-generated congestion is a severe problem in large cities and this is down to both the environmental impact and the decline in public transport efficiency. Reduced speed limits for buses from 18 to 12 km/h had a compounding effect on their operability, and required more buses on the roads (to keep to proposed schedules). These increased operational costs and excess traffic mean up to 25% higher fares, of which poor people with no other means of transportation bear the brunt (IPEA/ANTP, 1998).

Traffic safety conditions progressively worsened between 1960 and 1990, generating some of the highest road accident rates among developing countries. In the city of São Paulo alone, 3000 people died in road accidents per year in the 1970s (as opposed to 200 fatalities in large cities in the developed countries). The fact that most fatalities were pedestrians reveals the underlying violence that pervades the daily transportation experience. From the 1990s onwards, the number of fatalities fell significantly thanks to intense traffic management activity. However, motorcycle fatalities saw exponential growth and surpassed car fatalities (CET, 2014).

Fig. 3 shows the trend in traffic fatalities per transport mode in Brazil, revealing a sharp increase in fatalities involving motorised vehicles, particularly motorcycles.

2.4. Negative externalities of the “mobility metabolism” across income levels

Current mobility statistics reveal a high level of inequality across the income range. Fig. 4 illustrates the large differences in mobility consumption (road space and energy) and the negative impacts on mobility (emissions and traffic accidents) among the five household income levels in São Paulo (Vasconcellos, 2005). High-income groups use eight times more road space and nine times more energy than that of low-income groups. Furthermore, high-income groups emit fourteen times more local pollutants and are responsible for fifteen times more

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