BUSES & VANS - Assessing Public Transport Competition in Rio de Janeiro – Brazil

Ronaldo Balassiano; Marilita G.C. Braga

Transport Engineering Group - Federal University of Rio de Janeiro (PET/COPPE/UFRJ)

Abstract

Public transport systems play an important role in urban centres by determining to the population the available accessibility levels on their daily trips. In Brazilian cities as a consequence of the low level of services provided by conventional transport services one could see the expansion of paratransit operation in busy corridors. More recently, low capacity vehicles such as vans began to compete with conventional buses on the main routes. The service is considered a viable transport alternative to many users as well as a means of expanding the transport market to independent operators. The main objective of this paper is to assess the impacts of competition between buses (regulated market) and vans (paratransit) in Rio de Janeiro. The potential role played by low capacity vehicles such as vans to transport passengers in developing countries' cities is also analysed.

1 - Introduction

Paratransit options are available in many cities of developed and developing countries. Although some legal services exist, most of them operate illegally. These illegal services develop on heavy urban routes where curbside conflicts may occur. Bus systems are generally the main target of paratransit operations. As passengers congregate at the curb, waiting for a bus, paratransit operators interlope on the scheduled service and passengers will probably board the vehicle that comes first.

Many authors have presented and discussed a wide range of paratransit services and their comparative benefits and drawbacks. The paratransit sector ranges from one-person "rickshaws" to 25-passenger minibuses. In the USA the most common options found are shared-ride taxis, "jitneys" and commercial vans. Systems in developing countries are quite diverse and include "matatus" in Nairobi, "por puesto minibuses" in Caracas, "jeepneys" in Manila, three wheel "bajays" in Jakarta, "tuk-tuks" and "silor-leks" in Bangkok among many others (Cervero, 1997; Tanaboriboon and Agad, 1990; Tanaboriboon and Madrona, 1990; Armstrong-Wright, 1986).

Paratransit services are in most cases loosely regulated and run by owner-operated vehicles. The services run on semi-fixed routes with some deviations to respond to the user needs. According to Banister and Macket (1990) when paratransit services are operated by small vehicles they provide clear advantages over bigger buses: less time to board and alight passengers; higher frequency; and fewer stops along the route.

In the case of Brazilian cities, until recently, old buses had been the most common types of paratransit competing with scheduled bus services along busy routes. Since the mid 90's van services have

become very popular in most cities, especially on longer distance routes where an available seat during the whole trip is an essential attribute to any user.

The main objective of this paper is to assess the impacts of competition between buses (regulated market) and van services (illegal paratransit) in Rio de Janeiro. The potential role played by low capacity vehicles such as vans to transport passengers in developing countries' cities is also considered. Based on two recent field surveys carried out in the city, the paper will focus on the analysis of buses and vans competition in the main corridors of the metropolitan region. The quality of services provided and the share of the market between vans and buses in one important link will also be assessed. Section two provides an overview of public transport operation in Rio. Section 3 presents the evolution of paratransit operations in the city. In section 4 van services operation is analysed and includes the characterisation of the service and its operation, the users' assessment of these services and aspects of the competition between vans and buses. Finally section 5 presents the main conclusions of the paper.

2 – Public Transport Operation in Rio – An Overview

Rio de Janeiro is one of Brazil's biggest cities. It has an area of 1,171 km^2 and the Metropolitan Region comprises 5,610 km^2. It is located in the most prosperous region of the country – the Southeast. The population in the Metropolitan Region is currently around 10.4 million inhabitants. Approximately 5.7 million live in the city of Rio. The city's regulated transport system is very complex including buses, the underground system, the suburban train, the ferry boat and one remaining tram route. As mentioned before, paratransit services (vans) are also operating on the busy corridors of the metropolitan area.

During the 90's, one could see the deterioration of the rail-based systems (the underground, and the suburban train). The railway network in the Metropolitan Region is 740 km long, from which only 143km are operated within the municipality of Rio de Janeiro. Of the total length, 400km are electrified. In 1998 a total of 53 million passengers were transported in the system, its lowest recording ever. Table 1 shows the evolution of passengers transported in the period of 1995-1998. Assuming a total of 260 working days per calendar year (allowing for weekends and holidays) one can estimate an average of 204 thousand passengers transported daily by suburban trains in 1998. This figure was around 1 million passengers per day in the early 80's. The main explanation for the deterioration of the railway's service and loss of patronage in the period is the lack of investment in the sector. Operational problems and lack of reliability are also reasons that could contribute to justify the decline in patronage. The suburban train operation was under federal administration until 1993 when it was transferred to the Rio de Janeiro State administration. In July 1998 the system was

privatised. The new operator is currently investing in the system and it is expected to reach the1995 patronage level by the year 2000. To reach the 1 million passengers per day patronage some authors consider that at least some 5 to 6 years will be necessary, assuming massive investment (as requested in the privatisation procedure) in the system will continue to occur (Leal et al, 1998).

TABLE 1

Transported Passengers by Train – Rio de Janeiro – 1995 - 1998

Year	Transported Passengers (million)	Trips / Head (*)
1995	136	13
1996	89	9
1997	75	7
1998	53	5

Source: Rio de Janeiro State Transport Secretary.

(*) Based on the population of the Metropolitan Region in 1996 and assuming a 1% average annual growth in the period 1995-1998.

The underground system operation has also deteriorated during this period but after privatisation in 1997 it is beginning to recover patronage. Rio's underground system is currently composed of two main routes (Lines 1 and 2). The total length of Line 1 is 13km while Line 2 is 22km long (operating within the municipality of Rio). Table 2 shows the total number of transported passengers in the period 1995-1998.

TABLE 2

Transported Passengers by Underground – Rio de Janeiro – 1995-1998

Year	Transported Passengers (million)	Trips / Head (*)
1995	100	18
1996	93	17
1997	71	13
1998	84	15

Source: Rio de Janeiro State Transport Secretary.

(*) Based on the population of the city of Rio in 1996 and assuming a 1% average annual growth in the period 1995-1998.

From tables 1 and 2 it is clear that rail-based systems are far from contributing to passenger transport satisfaction. In the case of the railway system the period after privatisation is not long enough to allow any perceived improvement in operation. As mentioned before, some time will still be necessary for

results to be achieved. As for the underground system, although some recovery could be identified, there is still room for improvement. The network was expanded in the period 1997-1998 and a passenger volume higher to that observed in 1995 (100 million passenger trips) should be attained. Rail-based systems operators will need to count on some kind of integration with road based systems if more passengers are to be carried by rail in the near future.

The bus network is currently the main means of motorised public transport coping with more than 90% of total daily passenger trips. It is important to highlight that buses operating within the city of Rio are regulated by the municipality transport authority while those bus routes linking the city of Rio de Janeiro to other municipalities in the Metropolitan Region are under the state transport authority regulation. Table 3 presents the modal split for urban public transport in the Metropolitan Region including all modes.

TABLE 3

Transported Passengers – Rio de Janeiro – 1995-1999

	Transported Passengers (million) (Total and Percentage)			
Means	1995	1996	1997	1998
Suburban Train	136 (6.2)	89 (4.2)	75 (3.7)	53 (2.6)
Underground	100 (4.5)	93 (4.4)	71 (3.5)	84 (4.1)
Ferry Boat	24 (1.1)	23 (1.1)	21 (1.1)	21 (1.1)
Bus (*)	1948 (88.2)	1925 (90.3)	1882 (91.7)	1885 (92.2)
Total	2208 (100.0)	2050 (100.0)	2050 (100.0)	2045 (100.0)

Source: Rio de Janeiro State Transport Secretary (train, underground and ferry); Brazilian National Transport Association for Public Transport (ANTP) – Monthly Statistical Digest.
(*) Estimated by the author based on monthly data (4 months information).

As shown in table 3 total transported passengers in the period are steadily decreasing. In the case of buses although less passengers are being carried each year, their share in the public transport market (regulated) has increased in that period from 88.2% to 92.2%. Although bus operators claim that paratransit operation is the main responsible for the loss of their captive market, it must be taken into account that among other possible reasons justifying this decline is the rapid increase of the private car fleet in the last years. From 1985 until 1995 the private car fleet of the Metropolitan Region was expanding at an average annual rate of 4.5%. Since then this rate has doubled to almost 9.0%. Table 4 shows the evolution of the fleet of registered vehicles in the municipality and Metropolitan Region of Rio de Janeiro in the period of 1995-1998. Finally it must also be considered that ferryboat operation is expected to improve after privatisation of the service in 1998. New equipment will be incorporated

to operation in the next two years increasing the system capacity. The new private group currently operating the service comprises among others bus operators that found important to diversify their share in the public transport market.

TABLE 4

Vehicles Registered in Rio de Janeiro – 1995-1998

	Vehicles (thousand)			
	1995	1996	1997 (*)	1998 (*)
Municipality Only	1236	1396	1453	1599
Metropolitan Region (Includes all municipalities)	1728	1951	2031	2234

Source: DETRAN (Rio de Janeiro Transport Department).

(*) Estimated by the author based on data from DETRAN.

From table 4 it can be noticed that car ownership in Rio de Janeiro is increasing fast. Lower inflation rates in the country since 1994 together with credit facilities to buy a new car have boosted car sales in the country. New car manufactures are coming to the country such as Renault and Peugeot and the ones already in the country are expanding their production. Car ownership in terms of vehicles per 100 population in Rio is almost 30% higher in 1998 compared to 1995 figures. Car ownership was around 22 cars/100 pop. in the city of Rio in 1995 and has reached 28 cars/100 pop. in 1998. A recent survey carried out in the city has shown that in the case of high income population districts such as Barra da Tijuca the level of car ownership has reached the incredible figure of 80 cars/100 pop. The district is one of those most suffering form the impacts of traffic congestion in the city.

Thus, it seems clear that not only the public transport service deterioration was responsible for the expansion of paratransit services. The low level of bus services especially in long distance routes linking the city centre to far districts and other municipalities (low frequency services during inter peak periods and overloaded vehicles during the peak period) has motivated paratransit operation and the expansion of van services. According to Balassiano (1996) and NTU (1998) other possible reasons for the fast development of van services could include: tax import reductions in the country allowing imported vehicles to be priced similar to national ones (most vans are assembled in Asia); the voluntary redundancy programmes co-ordinated by the federal and the state government (many civil servants have been motivated to leave their jobs and run their own private business in the last 5 years); the user need for a more diversified road transport (until 1995 the only differentiated road services available were a few buses with air-conditioning and some minibus services).

This scenario was very favourable to stimulate van operation along bus corridors especially during peak periods of the day. Those users not pleased with the low level of available bus services supported the operation. The next section will focus on the evolution of paratransit systems operation in the city and the move from an old bus fleet to a brand new van fleet operation.

3 – The Development of Paratransit in Rio

Paratransit has long been in operation in many metropolitan regions of the world. The operation of these systems occur in developed and also in developing country's cities. The Brazilian city of Rio de Janeiro is not an exception and paratransit has been operating for many decades.

The bus supply on routes linking distant districts to the city centre and also on links between other municipalities in the Metropolitan Region and the city centre does not match the demand. Buses are generally overcrowded during peak periods on these longer routes while during inter-peak periods of the day services are not efficient (low frequency services). This scenario has motivated illegal operators to ply bus routes increasing the supply of seats especially during peak periods.

It is interesting to observe that until the 90's paratransit operation was almost stable. The service was operated on specific bus routes only (those longer routes) by buses with generally more than 10 years old run by independent operators without any formal entrepreneurial organisation or co-ordination. Maintenance standards of these vehicles was always low. There was no reliable estimate of the total number of vehicles operating these services in Rio but it was supposed to be lower than 600 vehicles in the beginning of the 90's (approximately 10% of the conventional bus fleet of the municipality of Rio).

Traditional operation of these vehicles consisted of one (a maximum of two) trip per peak period of the day. In the morning a district-centre trip was operated and vice-versa in the evening peak period. These buses operated based on a pre-determined initial bus stop and passengers could board the vehicle at specific bus stops close to the initial one. Services operated were semi-express.

There were also some volkswagen microbus services ("kombi") operating short distance routes where buses could not run. These routes generally comprised narrow or steep roads, inadequate to bus operation. Some of these services are currently regulated by the transport authority and serve low income communities. These services are classified as complementary services.

Since the 90's, this scenario has changed with the expansion of van services. Possible reasons supporting van services operation were previously referred to in section 2. Many users were attracted to van services.

4 – Van Services

Paratransit such as vans have been operating in Brazilian cities since the mid 90's. Initially these services were contracted out by companies, schools etc. to run special services (carrying workers in their daily work trips; carrying tourist groups in sight-seeing trips; carrying children in their school trips; etc). Van operators then identified a market niche not catered in most bus routes. The reduced supply of seats during peak periods of the day allowed these operators to ply the bus routes. The increased supply was well accepted by those users travelling on long distance routes. An available free seat in a comfortable vehicle and at an affordable fare (similar or slightly higher to the bus fare) have pushed many bus users to transfer to vans.

Some municipalities in the country have regulated van operations but in the case of Rio de Janeiro this has not happened. Vans are allowed to carry passengers on contracted out services only. They can not board and/or alight passengers along bus routes. The competition with buses along most routes is considered illegal by transport authorities. It must be stressed that in the municipality core where van services have to compete with high frequency and quality bus services the expansion of vans was very limited.

On a broad overview van services in the Metropolitan Region can be split in 4 important links: the operation within the municipality, where bus service is good in almost all districts; the link between the city centre and the so called "West Zone" region – in the suburbs, comprising a group of districts within the municipality of Rio (distances to the city centre can range from 40 to 80 km on average); the link between the city centre and the "Niteroi-São Gonçalo" region, comprising a group of municipalities in the Metropolitan Region (distances similar to the previous link); and finally the link between the centre and the so called "Baixada Fluminense" region, also comprising a group of municipalities in the Metropolitan Region (distances to the city centre are also similar). In section 4.1 the main characteristics of van services operation in Rio are presented. Section 4.2 presents van services assessment based on a field survey carried out in Rio. Finally section 4.3 will focus on the competition of vans and buses in the "Baixada Fluminense" link, also based on another field survey carried out in the end of 1998 (Araujo et al, 1998).

4.1 – The Service Characteristics

Vans operation, differently to bus services, is not organised on an entrepreneurial basis. The service is provided by independent operators, most of them belonging to route associations as this is an imposition of the municipality to those willing to operate contracted out or special services. Some operators own more than one vehicle and rent them to other drivers generally on a daily based rent. Meanwhile most vehicles are owner-operated.

The average age of the fleet is currently around 3 years old, very similar to that of conventional buses. Most of the vehicles are imported from Asian manufacturers counting on a network of dealers offering commercial and servicing support. The vehicle acquisition is generally supported by commercial bank loans on a 4 year period basis. There is huge competition among different van dealers due to the similar characteristics of these vehicles.

The fare charged by vans is higher than that charged by buses. The flat bus fare charged within the municipality is currently around US$0.40 and vans can charge between 2 and 3 times this fare according to the distance travelled. In the case of the Metropolitan Region where bus fares are not flat and higher than that charged within the municipality, van services charge almost the same fares. Vans are not allowed to operate along conventional bus corridors. Both the municipality and the state transport authorities have a special regulation for vans when operating contracted out services.

A survey was carried out with some van operators of the "Baixada Fluminense" corridor during a three month period in the end of 1998. The "Baixada Fluminense" comprises 9 municipalities and a total estimated population of 2.7 million inhabitants (CIDE, 1998). The distance travelled between these municipalities and the city centre is on average around 40-80 km. Total travel time varies according to the period of the day but is never less than 50-60 minutes.

The survey has shown that there are 950 operators affiliated to route associations. A total of 19 route associations where identified in this corridor operating 32 different routes. These route associations own or rent some garages at the city centre used as van terminals. Some three other route associations were also identified operating routes to the centre but without a garage to keep and organise van departures and arrivals. Every day, of the total of 950 operators, almost 780 are operating their vehicles. There are also some operators on this link that do not belong to any route association. According to those affiliated these figures could increase some 5% to 10% due to the existence of independent operators on this route. Those independent ones operate only during peak periods of the day diverting to other services during inter-peak periods. Most vehicles in the route associations are owner-operated (67.5%); some of them are rented vehicles (24.5%) where operators pay a daily rent

to the owner of the vehicle. Finally 8.5% of these vehicles are operated on behalf of the owner and the operator gets a daily or monthly stipend. Most vehicles were acquired with the support of bank loans (87.1%) and only 12.9% of the vehicles were bought without a bank loan support.

Most operators are aged between 26 and 35 (43.6%). Other categories are as follows: between 18-25 (15.8%); 36-45 (25.5%); 46-55 (13.9%); over 55 (1.2%). On average drivers have a driving license for more than 10 years, showing that they have previous experience on driving vehicles (not necessarily vans). All of them have a driving license allowing them to drive vehicles with capacity to carry up to 15 passengers. The majority of them have concluded secondary school (48.5%) while 43.0% have completed the primary school only. A few of them (5.5%) are graduated and 3.0% have not concluded their university studies. Among all interviewee, 57% are married. Only 15.2% of the operators have no dependent (wife, children of other member of the family to support) while the majority have one or more dependent.

Some operators (31,5%) had previously worked as professional drivers (buses and lorries). Previous employment positions also include: commerce – 7.3%; car maintenance – 3.6%; military force – 3.6%; taxi driver – 3.6%; bank assistant – 3.6%; clerk – 3.6% and others – 38.8%. Only 7.3% of the interviewees are retired and working as van drivers to improve their wage.

Route associations have established general rules that must be followed for all affiliates. These rules establish vehicle maintenance standards, departure time from van terminals in the city centre and other general aspects related to the quality of services provided. During peak periods the service headway is never higher than 10-15 minutes. During inter-peak periods of the day, operators generally wait until 8 passengers have gathered to depart from terminals. In general services operated are semi-express with few or no stops between origin and destination. The route associations count on platform staff to support the operation. Some of them also rely on a group of controllers responsible for general information such as roads where traffic congestion is severe or areas where police enforcement is taking place (allowing them to deviate in both cases). Drivers are generally equipped with mobile phones or pagers.

4.2 – The Assessment of Van Services

A field survey was carried out in the city in 1997 to characterise the van user and his assessment of the service provided. For more details see also Balassiano and Braga (1998). The main reasons leading those users to travel by van were also identified. The questionnaire survey was carried out by one interviewer, during a two and a half month period. Users were interviewed at random at boarding stops in the city centre. During the survey 253 respondents answered the questions. In the specific

case of the questions dealing with the perception of the level of service provided, the attitudinal scale technique was adopted. The attributes selected (comfort, travel time, safety, etc.) were evaluated by respondents and a mark in the range 0-10 was obtained for each attribute.

Among all respondents 57% were female. Most users were between 18 and 45 years old, with 46,6% (118 respondents) in the age group 18-30 and 45,5% (115 respondents) in the age group 30-45. Only one respondent was over 65 while 1,2% of the respondents were under 18. One possible explanation to this fact is that those over 65 and students going to or coming from school travel free on the conventional bus service. The majority of the respondents have completed the secondary school or have reached the university level (44.3% and 38.3% respectively). Those respondents earning less than 5 minimum wages (around US$390.00) were 33%, while 41% earn between 5 and 10 minimum wages (US$390.00-US$780.00). It is clear that the largest group of passengers travelling by van earn less than 10 minimum wages.

Another aspect identified during the survey was that most users were working at the commerce or involved on general services activities (almost 71% of all respondents). This high figure was expected as most services activities are concentrated in the city centre where the survey was carried out. Almost all respondents - 243 (94.6%) – were travelling on work trips. The questionnaire survey showed that most users travelled previously by bus (171 respondents - almost 64% of answers). Only 6.7% stated travelling previously by car. Those travelling on non-regular or special buses were 16.4%. Most users travel by van on all working days (74.7%). This can be an indication that those travelling by van are frequent users of the service and possibly captive ones.

The main reasons mentioned by users to travel by van were: the speed of the service (24.0%) and the comfort provided (14.2%). Respondents were allowed to give more than one reason for travelling and a total of 437 responses were achieved. It is interesting to observe that the great majority of other answers (apart from speed and comfort) were related to the poor level of services found in other means of public transport systems.

As previously mentioned passengers were asked to assess the quality of service provided by vans. An average mark (0-10) was obtained considering all respondents answers based on the bi-polar scale. Table 5 shows the average mark and the standard deviation for each attribute of the trip considered in the assessment.

TABLE 5

Van Services – User Assessment

Attribute	Average (Standard Deviation)
Comfort	7.91 (2.01)
Safety	6.86 (2.24)
Travel time	7.65 (1.76)
Waiting time	7.08 (2.53)
Fare	5.52 (2.08)
Vehicle maintenance	8.08 (1.94)
Driver behaviour	7.23 (2.56)

From table 5 it is noticeable that van users considered the level of service provided quite good. Apart from the fare level, generally higher if compared to other public transport systems, almost all attributes were assessed with average marks higher than 7.0 (safety was the only attribute with an average mark lower than 7.0). Although van fares are higher than those charged by other means of transport, the level of service provided (including comfort, safety, etc.) could be considered the main reason to justify the popularity of vans in Rio de Janeiro. The next section will present some aspects of vans and buses competition on an important link of the Metropolitan Region.

4.3 – Buses & Vans Competition

Van services are currently paralleling bus routes operating in the municipality and also on links between different municipalities of the Metropolitan Region and the city centre. There is competition on the road between buses (regulated) and vans (illegal paratransit). Van services are interloping at the bus stops to board and alight passengers. Most of the competition is between vans and buses due to the high level of bus use in Rio (responsible for more than 90% of public transport passengers – see table 3).

Bus operators are trying to ban van services operation in Rio arguing that this type of service is not only illegal but also that this type of vehicle is not safe to board and alight passengers along bus routes. Although official enforcement exists, it is not enough to halt van interloping at bus stops of busy corridors. According to Klein et al (1997) once operators become part of the status quo, it is not easy for the transport authority to shut them down.

The operators of the bus system are reacting to on the road competition by diversifying the services provided. In the beginning of the 90's only standard buses were operating on the main links between the city centre and other municipalities of the Metropolitan Region. In the case of bus routes running

within the city of Rio a few special buses were available (inter-city type buses with air- conditioning) and also a reduced minibus fleet was operating on some routes. Table 6 shows the evolution of the fleet composition operating in the city of Rio for selected years. Figures presented are for 1993 where van services were not operating and for 1997 and 1998 after van services expansion.

TABLE 6

Bus Fleet – Rio de Janeiro Municipality (selected years)

	1993	**1997**	**1998**
Conventional Bus	5802	6404	6602
Conventional Bus with air-conditioning	------	-----	16
Special Bus	204	196	177
Special Bus with air-conditioning	81	168	169
Minibus	48	139	239
Minibus with air-conditioning	-------	-----	135
Total	6135	6907	7338

Source: Private Bus Operators Association.

From table 6 one can see that besides the expansion of the conventional bus fleet, new services have been introduced – conventional and minibus services with air-conditioning. These services charge higher fares than those charged on conventional bus routes (twice in the case of conventional buses with air-conditioning and three times in the case of minibuses). In the case of bus routes operating on the link between other municipalities and the city centre, the same pattern of diversified services can be found. One specific operator has increased his minibus fleet from only 4 vehicles in 1994 to 25 modern vehicles in 1998. The minibus fleet represent almost 15% of the operator's fleet and are equipped with air-conditioning and a television set. It is also interesting to highlight that similar competition has occurred in the whole country boosting the minibus production as seen in table 7.

TABLE 7

Minibus Production – Brazil

Year	Minibus Production
1994	208
1995	340
1996	416
1997	1143

Source: NTU – Urban Transport Brazilian Association.

Bus operators believe that, as there is no regulation imposing maintenance standards to van services, by operating diversified bus services only a few van operators would be left in the near future. This expected scenario will possibly not jeopardise bus operation. Although these operators claim that van services are responsible for the loss of more than 15% of their previous ridership, a more cautious assessment will possibly point at a 5% to 7% share of passengers transported by vans if one compares buses and vans. The survey carried out with van route associations (detailed in section 4.1) showed that on most routes this was the most consistent figure. Table 8 shows an estimate of total passengers carried monthly in the link between three different municipalities of the "Baixada Fluminense" region and the city centre. Total bus and van fleets operating on these links are also presented.

TABLE 8

Monthly Transported Passengers – Buses & Vans – Selected Links

Municipality	Bus Passengers (*) (thousand)	Bus Fleet (vehicles)	Van Passengers (*) (thousand)	Van Fleet (vehicles)
Nova Iguaçu	4,700.0 (94.2%)	484	291.0 (5.8%)	222
Duque de Caxias	3,800.0 (93.1%)	385	282.0 (6.9%)	166
Guapimirim	47.0 (94.4%)	11	2.8 (5.6%)	2

(*) Estimated by the author based on Araujo et al (1998) and Private Bus Operators data. Figures between brackets are percentage of total passengers carried in the route.

The estimate is that all over the Metropolitan Region an average of 310 thousand passengers are carried by vans every day (Leal et al, 1998). The same estimate considers an average of 6,200 vans operating in the Metropolitan Region. This figure is similar to the regulated conventional bus fleet operating in the municipality of Rio. Assuming as correct the figures of private bus operators, where around 7 million passenger trips are realised every day, vans are sharing less than 5% of the total in the Metropolitan Region. This figure can vary according to the specific corridor considered (see previous table). It must also be considered that with the deterioration of rail-based services, the

previous estimate shows that van services are currently carrying more passengers than suburban trains. Another important aspect to be taken into account is that van services are still attracting a lot of new users and is considered a reliable and high quality service when compared to bus services.

5 - Conclusions

The expansion of van services in many Brazilian cities has shown that there is scope for diversifying the supply of public road transport. Although in the majority of cities where van services have expanded, the operation paralleling bus routes is illegal, a significant number of users have been attracted to the system. Bus operators have reacted to van services expansion through service diversification. New vehicles and new services are currently available to all users, despite a higher fare charged on these new developed services.

In the specific case of Rio de Janeiro, the estimate is that van services are currently responsible for carrying 5% of all public road transport (taxis are not considered here). Some Brazilian cities have opted to regulate the operation of low capacity vehicles and on a preliminary assessment, there are promising results in terms of increasing efficiency of the transport system. In the case of the city of Porto Alegre (in the South region of Brazil) low capacity vehicles are running services on a complementary basis to conventional public transport operation.

Van users, in general, have approved the services, especially considering some advantages when compared to bus operation (higher frequency; reduced travel times; improved comfort; etc.). It is imperative to transport authorities to follow up the service expansion to guarantee the integration of low capacity vehicles operation to the conventional ones. According to Cervero (1997) paratransit (such as vans) have also the potential to attract car users that would be otherwise contributing to traffic congestion and pollution if driving alone.

In the case of Rio de Janeiro, although some curbside conflicts may occur, benefits to users were generated by the supply of a diversified service. Aspects related to the vehicle maintenance and to user safety should be dealt with priority independent to the existent regulatory framework. The recovery of efficiency levels expected to the rail-based systems operating in the city could lead to a redistribution of demand among different transport systems. It is possible that with the expected increase in demand on rail-based systems in the following years some passengers would possibly transfer from bus and van services to train or underground services. The ferryboat system is also expected to recover part of the lost demand along the last decade.

It is mandatory that both the municipality and the state transport authorities, responsible for the co-ordination and integration of the whole transport system, promote travel demand management (TDM) strategies aiming at improving the system efficiency in the Metropolitan Region. Low capacity systems such as vans can effectively contribute to improve the public transport system operation and competition with the bus system will not necessarily be detrimental to user satisfaction.

6 - Bibliography

Araujo, A.M. et al (1998) Transporte Alternativo na Ligação Baixada Fluminense – Rio. Monografia na Disciplina Laboratório de Transporte Público, PET/COPPE/UFRJ, Rio de Janeiro.

Armstrong-Wright, A. (1986) Urban Transport Systems- Guideline for Examining Options. World Bank Technical Paper Number 52, Urban Transport Series, Washington, D.C.

Balassiano, R. (1996) Transporte por Vans - O que Considerar no Processo de Regulamentação? Revista Transportes, Vol. 4, Nos 1 e 2, pp. 87-105.

Balassiano, R., Braga, M.G.C. (1998) How to Integrate Van Services to a Conventional Public Transport System. Urban Transport Policy – A Sustainable Development Tool, Proceedings of the International Conference CODATU VIII, Cape Town, 21-25 September, pp. 1043-1049.

Banister, D., Mackett, R.L. (1990) The Minibus: Theory and Experience, and their Implications. Transport Reviews, Vol. 10, No 3, pp. 189-214.

Cervero, R. (1997) Paratransit in America. Praeger, Westport.

CIDE (1998) Indicadores Econômicos do Rio de Janeiro. Anuário Estatístico – 1998, Rio de Janeiro.

Klein, D.B. et al (1997) Curb Rights – A Foundation for Free Enterprise in Urban Transit. Brookings Institution Press, Washington, D.C.

Leal, J.E. et al (1998) Estimativa de Potencial de Crescimento de Demanda para os Trens Urbanos do Rio de Janeiro. Estudo realizado para MPE Consultoria, Relatório Final, Rio de Janeiro, maio.

NTU/ANTP (1998) Transporte Informal. Pesquisa Nacional / NTU, Encontro Técnico.

Tanaboriboon, Y., Agad, V.B. (1990) Bangkok's Indispensible Mode of Public Transport. In Land Transport and Development - International Conference, Dunkirk, 18-22 June, pp. 341-346.

Tanaboriboon, Y., Madrona, L.G. (1990) Silor Leks: A Novel Solution to the Mobility Problems in the Developing Countries - A Case Study in Bangkok. In Land Transport and Development - International Conference, Dunkirk, 18-22 June, pp. 347-352.

CURRICULUM VITAE

RONALDO BALASSIANO

- Civil Engineer – 1977
  Federal University of Rio de Janeiro

- MSc in Transport Engineering - 1980
  COPPE - Federal University of Rio de Janeiro

- MSc in Energy and Environmental Planning - 1991
  COPPE - Federal University of Rio de Janeiro

- PhD in Transport Engineering - 1995
  University of Westminster - London

- Reader in Transport Planning
  Transport Engineering Group – PET
  COPPE – Federal University of Rio de Janeiro

- Executive Secretary of ANPET
  (Brazilian Association for Transport Research and Teaching)

- **CNT/ANPET Academic Prize – 1996**

  (Prize Awarded to the Best 10 Brazilian Transport Papers in the year)

- **CNT/ANPET Academic Prize – 1997**

  (Prize Awarded to the Best 10 Brazilian Transport Papers in the year)

MARILITA G. C. BRAGA

- Civil Engineering – 1973
  Mauá Engineering Institute – São Paulo

- MSc in Transport Engineering - 1979
  COPPE - Federal University of Rio de Janeiro

- PhD in Transport Engineering - 1989
  Imperial College of Science, Technology and Medicine - University of London - England

- Reader in Traffic Engineering
  Transport Engineering Group – PET
  COPPE – Federal University of Rio de Janeiro

- Head of the Transportation Engineering Group – 1995-1997
  COPPE - Federal University of Rio de Janeiro

- Vice-Head of the Transportation Engineering Group – 1997-1999
  COPPE – Federal University of Rio de Janeiro

- **Planning Director of COPPE/UFRJ**

  (Co-ordination of the Engineering Post-Graduation Programmes –
  Federal University of Rio de Janeiro)

- **CNT/ANPET Academic Prize – 1998**

  (Prize Awarded to the Best 10 Brazilian Transport Papers in the year)

POSTAL ADDRESS:

PET/COPPE/UFRJ
Cidade Universitária - Centro de Tecnologia - Bloco H - Sala 106
Ilha do Fundão - Rio de Janeiro - Brazil
Caixa Postal 68512
CEP: 21945-970

tel: (55) (21) 5604697
fax: (55) (21) 2906626
e-mail: ronaldo@pet.coppe.ufrj.br
e-mail: marilita@pet.coppe.ufrj.br