# STRATEGIES FOR TRANSPORT DURING SPORTS MEGA-EVENTS AND THEIR DEGREE OF IMPORTANCE

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## ABSTRACT

Brazil and Rio de Janeiro were selected to host the 2014 World Football Cup and the 2018 Olympic Games, as well as other world-class sports events to be held in the country in forthcoming years. Considering the potential impacts involving such mega-events and the well-known restraints on planning and the infrastructure existing in Brazilian cities, it is essential to study this topic to guarantee the success of such events. Moreover, for them to give the population a legacy. One of the most sensitive elements in the organisation and success of any mega-event concerns the transport sector, which is why the most suitable mobility strategies to be adopted must be determined. Accordingly, a procedure is developed to hierarchise such strategies with technical backing and in line with how possible users perceive such events. Based on the review of international literature, available mega-event transportation strategies were first verified and established in line with those most often adopted and compatible with the Brazilian reality. This set of strategies organised as a questionnaire was then submitted to a sample of more than 300 users that rated them in order of importance. This sample includes dwellers in different areas in the Rio de Janeiro Metropolitan Region (RMRJ). The strategies indicated as most important are based on integration, reinforcement of the largest capacity public transport and on measures adopted to discourage car use, confirming the concept defended by best international practices.

*Key words: Mega-event, sports mega-event, transport strategies and transport planning.*

# INTRODUCTION

Planning a mega-event must provide for and address the impacts caused by it, in line with the population's quality of life and the environment. Accordingly, it must incorporate the institutional character with widespread participation of society in order to optimise the benefits expected by it and legitimise the event as an integral part of local concerns. The plan submitted for a mega-event must include the different urban networks, including transport, according to an integrated and interdisciplinary view (Costa, 2009).

The physical legacy of a mega-event can originate from sports venues and accommodation that are built or remodelled and from new or improved transport systems and other infrastructures of the host city and region (Guala & Turco, 2009).

Brazil and more specifically Rio de Janeiro will host world-class sports mega-events in the next few years, in the hope of enjoying the possible benefits arising there from. However, in order to achieve this, a major effort must be made in the planning and operation of the traffic and transport in the host cities.

The purpose of this article is to establish the importance given by the users to a group of strategies adopted for transport in sports mega-events, taken from consulted literature and using the Rio de Janeiro Metropolitan Region as a case study.

Considering the tourist attractions of Rio de Janeiro, the experience gained from the 2007 Pan American Games and having been elected the 2016 Olympic Games venue, it is justifiable to study the population's behaviour since its inclusion in the decision-making process plays a key role in the performance of any mega-event. Turco (1998) and Waitt (2003) claim that, if no attention and consideration is given to the residents' opinion, this may well jeopardise the support of the population. And the opinion of Rio de Janeiro dwellers and the procedure used in this article could act as a basis for other Brazilian cities, namely those that will host the 2014 World Football Cup, and other countries in similar conditions as our own.

# MEGAEVENTS AND THEIR IMPACTS

Today's mega-events are one of the most frequent and spectacular expressions of the entertainment industry. Various agents are involved, including thousands of volunteers, spectators and residents, interfering in everyday local activities in economic, environmental and social terms.

According to France & Roche (1998), the creation of mega-events today is regarded as an opportunity to regenerate cities. These authors state that the main instruments and vehicles of policies to transform the cities, whose image is degraded, are those that

create tourist attractions, namely, for example, holding major art exhibitions and organising sports evens or thematic cycles of cultural activities.

Roche (1994) tells how studies and planning generally accomplished before the events tend to focus on the economic and social benefits that the event in question may originate. However, according to Higham (1999), there is a growing number of academic studies on the negative or ambivalent effects from an economic and social viewpoint. Most of such criticism is centred on the process of choosing the city for the event, and in the author's opinion, this could divert part of the economic and social benefits of the community to gratify the interests of sponsors and organisers who very often have little idea of the local reality.

Ritchie & Smith (1991) say that a centre or region that hosts a world mega-event and attracts global attention is affected both positively and negatively in many aspects. However, according to Barbosa & Zouain (2003), in the case of sports mega-events, the direct and indirect effects – caused by the spending by spectators, sports teams and visiting journalists – are considered to be the largest generators of benefits for the local economy.

Figure 1 shows the stakeholders involved in organising a mega-event, representing various disciplines and jurisdictions that play an active role in administration and organisation.

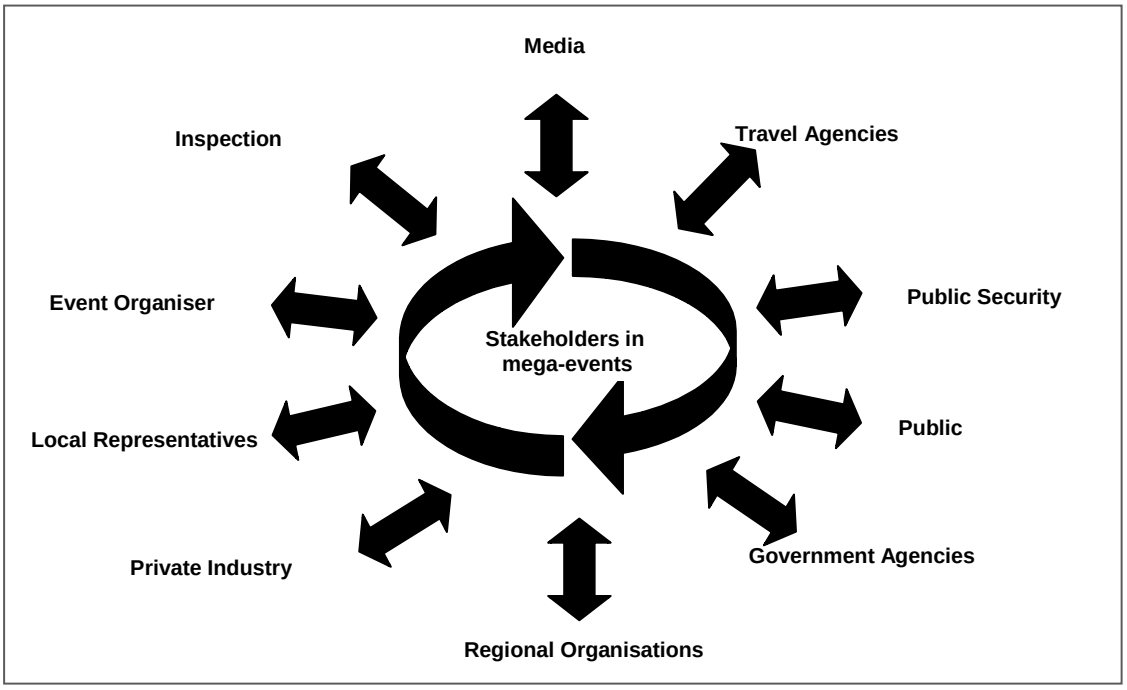


Figure 1 – Stakeholders in organising mega-events
Source: Adapted - FHWA (2003)

For the success of any mega-event, the host population, public administration and event organisers must work together. With regard to the population, its support and involvement are of the utmost importance since they contribute to extending the

longevity of the benefits generated by hosting the mega-event. For the public administration a sports event of mega proportions could contribute to solving certain problems, as an opportunity to build technical capacity and enhance its planning and decision-making processes. However, it may also compromise public funds and even exacerbate the level of social inequality, depending on the spatial distribution of the investments.

## Sports Mega-event

Silva (2008) suggests a hypothetical and general model of sports mega-event relations structured on causes (events) and effects (legacies). This technical support is shown in Figure 2, under the name of a Sports Mega-event Relational Model. This model shows that transport is directly linked to the regeneration of cities and consequently to the public policies, as part of the legacies left by the event.

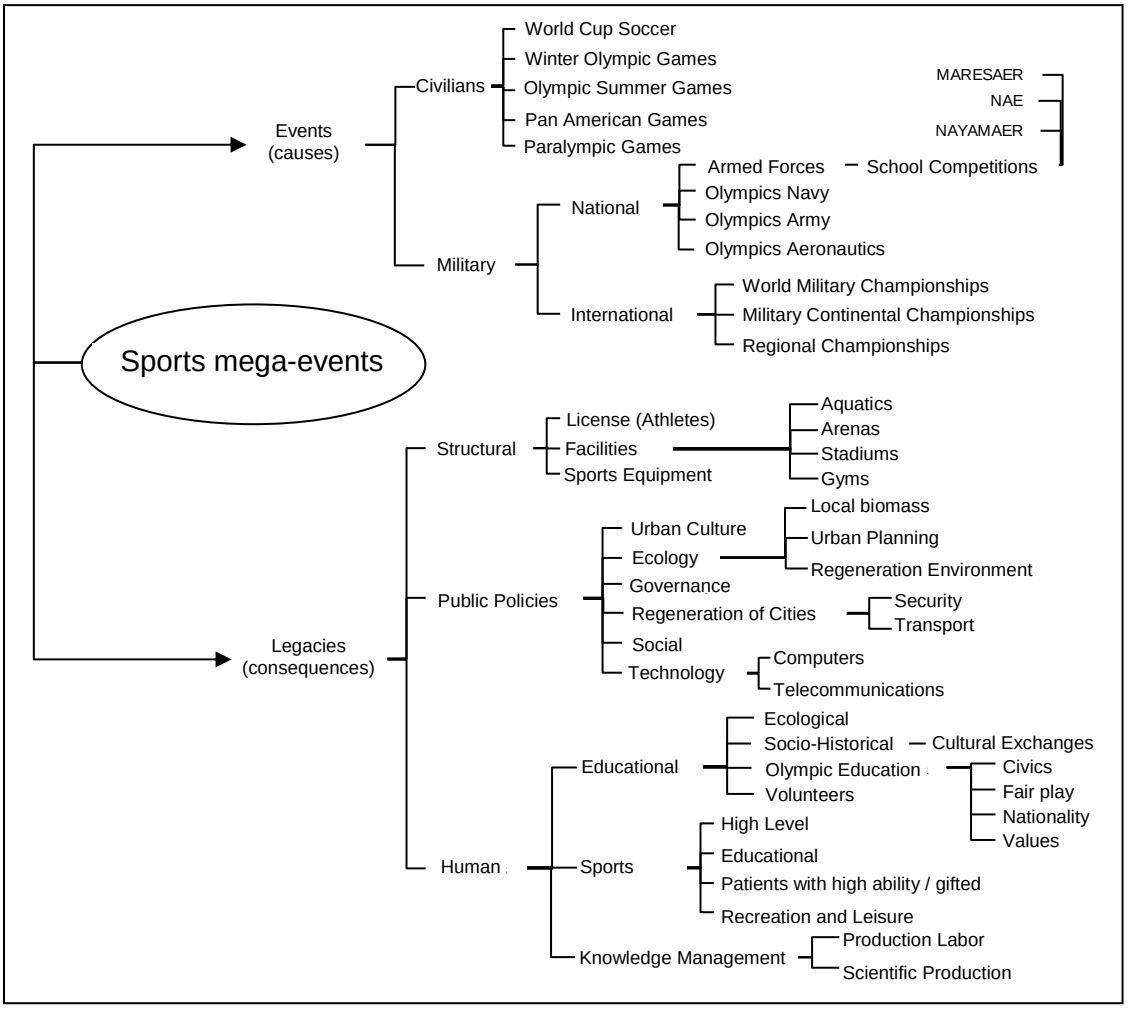


Figure 2 – Relational Model of Sports Mega-events
Source: Silva (2008)

The bibliographic review shows that the planning and operation in sports mega-events need to minimise possible impacts and direct them to sustainable development. Most authors agree that it is necessary to measure the impact of events in their follow-up, control and treatment (Getz, 1997; Dwyer *et al*., 2000; Gnoth & Anwar, 2000; Breen *et al*., 2001; Bowdin *et al.*, 2001; Jones, 2001; Wood, 2006). As well as use proper transport strategies.

Muñoz (2006) states that Olympic urbanism has actually transformed the profile of host cities and had a strong impact on the post-Olympic Games evolution of the entire socio-economic space. The experience of Barcelona and other cities is useful when explaining these processes and suggesting some lessons to be learned for the strategic role of the Olympic Games infrastructure in urban development. First of all, emphasis is on adopting long-term projects in the planning process. Secondly, emphasis must be given to relations management between the new urban areas and pre-existing city.

Mega-events are events that normally cause long-term impacts, favourable or otherwise, on the communities in the host cities (Mihalik & Cummings, 1995; Mihalik & Simonette, 1998). Ritchie & Aitken (1984) classified such impacts in the following six areas: economy, tourism/commercial, physical, sociocultural, psychological and political.

Kim *et al*. (2006) say that the congested traffic seems to be the major problem during mega-events, which worsens during those of longer duration such as the World Football Cup and Olympic Games. He gives the example of a city in which the public authorities subsidised systematic measures and practices, such as informing the residents of traffic flows, creating a local radio channel to broadcast the status of the highways and encourage the use of public transport.

The road to success in managing mega-events is based on measures (FHWA, 2004), as follows:

1. Achieve interaction and participation of the agencies involved.
2. Predict the impacts caused by the event on local and regional travel.
3. Develop an integrated transport plan.
4. Assure implementation of a traffic management plan.
5. Set up a team to organise traffic management that can maintain ongoing communication between the agencies.
6. Continuous follow-up of traffic on the days of the event and keep the protocol to change the traffic management plan, adapting it to real-time conditions.

7. Use successful examples of event management and translate them in lessons for future planning and operations.

## Effects on traffic and on transport, planning and operation

Impacts tend to occur on the overall urban environment. Emphasis is given to those that may hamper accessibility to the area, assuming that the events may create a number of extra trips incompatible with the capacity of the road and transport system. And these events – even temporarily – are what literature calls Traffic Generator Poles (TGP) (Portugal & Goldner, 2003).

TGPs are "different kinds of venues or facilities that have activities in common on a size and scale that can have a strong attraction for the population, produce a significant traffic contingent, need large spaces for parking, loading and unloading, embus and debus, which consequently causes potential impacts (Ibero-American Network for Studies of Travel Generator Poles, http://redpgv.coppe.ufrj.br).

DENATRAN (2001) (Brazilian National Traffic Department) states that control of implementing such poles is essential in order to minimise or eliminate undesirable impacts on the transport systems and traffic in their area of influence. Sports mega-events are included in this same issue, whose effects on transport must be foreseen and addressed within a broader and strategic planning process.

According to Chiavenato (2000), strategic planning can be developed in six stages: defining the objectives; external environmental analysis; internal organisational analysis; formulating strategic alternatives and choosing the strategies; preparing the planning; and implementation by tactical and operational means. Contursi (2000), on the other hand, suggests the following stages: planning and creating the event; defining its direction; estimating costs; identification with the local community; confirming the target public; integration with point of purchase; fiscal authorisations; creating and making promotional material; hiring human resources; promotional support, publicity and sponsorship.

It is worth mentioning that not every passenger is a visitor and, therefore, transport for the tourist industry – tour excursions – is a sub-product of the transport activity. Without prior knowledge of the importance of tourism for the transport sector, the planner and decision-makers very often restrict their objectives to solely meet the requirements of their own sector, ignoring the overall impact that regulation or investment in infrastructure can have on other activities, namely commerce and tourism (Forsyth, 2001; Pender, 2001; Wheatcroft, 1994). This shows the complexity involved in guaranteeing good transport for such mega-events, justifying a procedure to determine the best strategies to be adopted in the sector.

# PROPOSED PROCEDURE

The proposed procedure intends to hierarchise the strategies for transport in sports mega-events, in accordance with the perception of its potential users. Accordingly, to guarantee a technical basis in this process, this hierarchisation was structured according to three filters of knowledge and validation, which gradually extend the foundations and deepen the adopted approach. The first consists of reviewing international literature and available practices relating to the Olympic Games, World Football Cup and Pan-American Games. The second refers to undertaking a pilot study and the third to exploratory research (Figure 3).

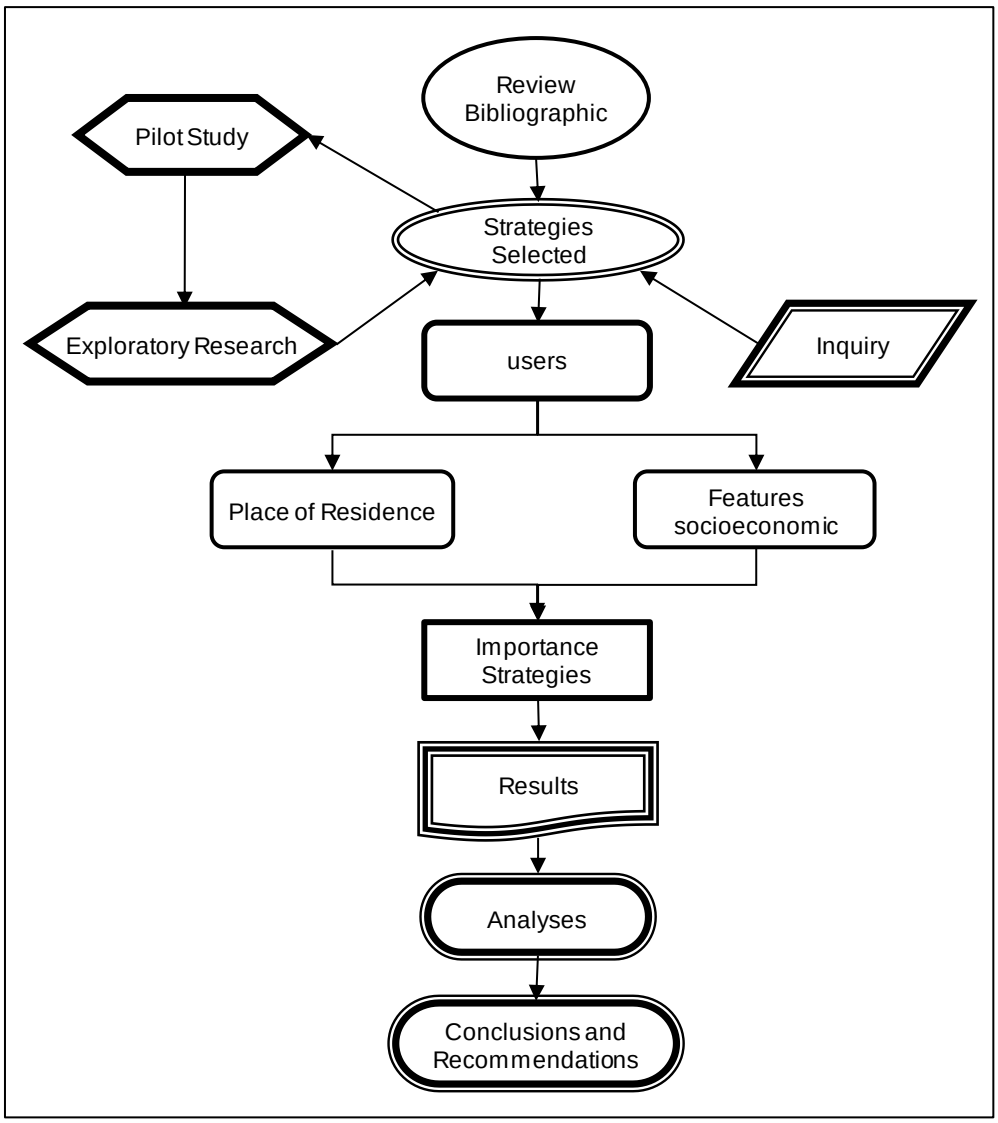


Figure 3 – Procedural flowchart

In this sense it is necessary to investigate the strategies adopted in other cities that have already organised large-scale sports events. The idea of this investigation is to establish strategies that were most often adopted in the world and from them determine

those most compatible with local specificities. Such strategies must then be submitted to potential users to confirm the importance they attribute to them, according to their perception, and to two levels of investigation and depth: the pilot study and exploratory research.

**Pilot Study**

In the pilot study the inquiry was restricted to a small group to assess the method of applying the questionnaire adopted and to adapt the strategies suggested in the bibliographic review.

The first group of strategies adopted in the pilot study was based on the examination of international literature and experiences of the Olympic Games in Peking, Athens and Sydney; Pan-American Games in Rio de Janeiro and Santo Domingo, and the World Football Cups in Germany and Japan/South Korea.

At this stage two groups were consulted on the importance of the strategies. One with 25 users represented by graduate students from the Federal University of Rio de Janeiro (UFRJ), whose socio-economic level tends to be compatible with what is required to watch sports events, such as those investigated herein. The other group consisted of 33 transport engineering post-graduate students from UFRJ, who could reflect the view of professionals with some level of know-how and specialisation on the subject of transport.

As a result of the inquiry, it was found that in relation to graduate students and specialists, “Transport integration” and the “Metro-railway system” were the most relevant strategies. The less indicated strategies, however, for the graduate students were those referring to “Extension and upgrade of the international airport”, “Private car restriction” and “New technologies”. For the specialists the “Highways” substituted the “Private car restriction”.

It was found that there was very little difference in the opinions of both groups, which made them presume that the next step of the exploratory research could focus on the users, with a larger sample.

Table I shows the set of strategies found in the literature and used in the pilot study and exploratory research, to which strategies were added considering not only new bibliographic references but also suggestions from the pilot study.

Table I – Strategies considered in the research stages

| **Pilot Study** | **Exploratory Research** |
|---|---|
| Marketing | Disseminating traffic circulation* |
| | Raising the population's consciousness* |
| | Rescheduling timetables*** |
| Exclusive bus routes | Exclusive bus routes |
| Transport integration | Transport integration |
| Mobility management | Mobility management |
| Private car restriction | Private car restriction |
| Inspection | Inspection |
| Exclusive lanes | Exclusive lanes |
| Alternative routes | Alternative routes |
| Extension and upgrade of international airport | Extension and upgrade of international airport |
| Metro-railway system | Metro-railway system |
| Highways | Highways |
| | New parking areas*** |
| | Traffic light control system** |
| New technologies | New technologies |

Source: Brandão *et al* (2008) / FHWA (2003)*/ Vianna (2000)**/Portugal (2005)***

## Exploratory Research

The purpose of this research is to explore or examine a problem or situation to provide criteria and further understanding. This type of research may be used to identify alternative courses of action, develop hypotheses or obtain criteria to develop an approach to the problem (Malhotra, 2006).

At this stage users' opinions on the importance of the strategies were verified in accordance with their perception and the area where they live. The sample was distributed in the different areas comprising the Rio de Janeiro Metropolitan Region, in accordance with Lago (2000), in order to find whether user perceptions on the importance of the strategies vary spatially, thereby allowing more suitable actions to be suggested for each place. This region was divided into five areas: *South Zone , Suburb 1, Suburb 2, Downtown and vicinity,* and *West Zone;* also included in the exploratory research were *Other Municipalities* in the State (Niterói, Nilópolis, Mesquita, São João de Meriti, Nova Iguaçu, Queimados, Belford Roxo, Paty do Alferes, São Gonçalo, Duque de Caxias and Magé) (see Figure 4).

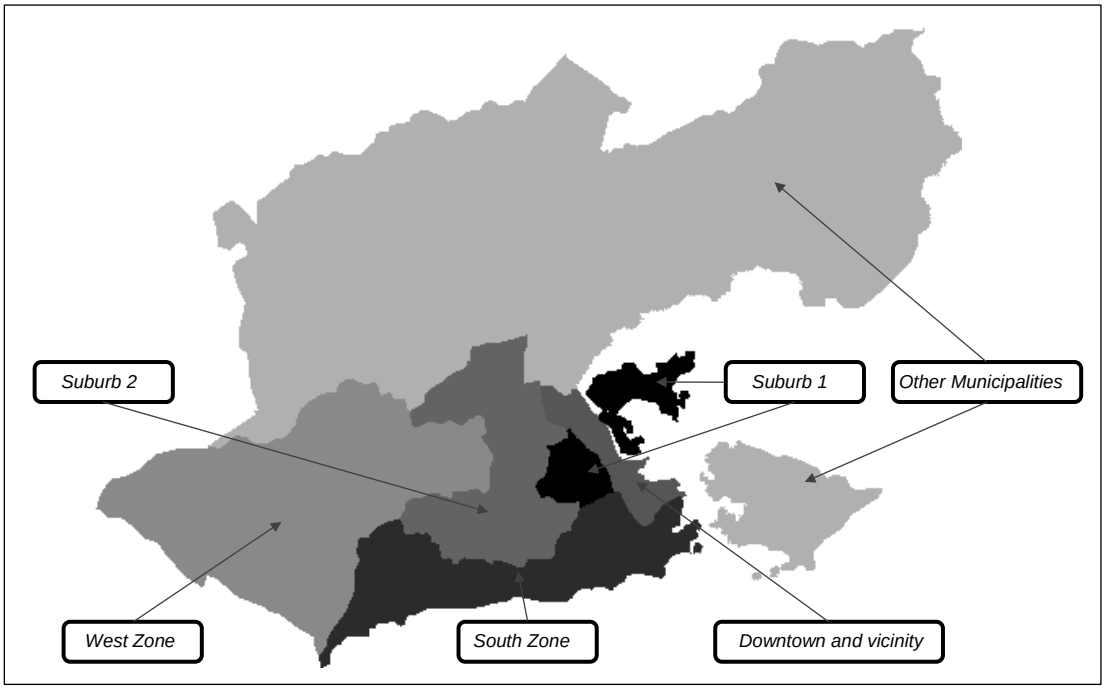


Figure 4 – Surveyed areas
Source: Lago (2000)

The questionnaires were submitted to a group of 328 dwellers in the Rio de Janeiro Metropolitan Region with characteristics and home address that would indicate potential users of sports mega-events. The sample has the same number of men and women in the 18-28 age group, either university under-graduate or post-graduate students.

The interviewees rated the strategies considered in the survey in order of importance from 1 (most important) to 16 (least important) (Costa, 2009). These values were processed and the calculated averages transformed in a new scale from 0 to 100 (or percentages), using the procedure proposed by Stutz (Pons & Bey, 1991; Portugal & Araújo, 2008), defined in equation 1:

$$\Omega = \text{MODULE}\ (A_Y - A_*)/(A^* - A_*) \cdot 100 \qquad (1)$$

Where $\Omega$ = performance relating to importance ratings (in %); $A_Y$ = rating of importance attributed by the interviewee; $A_*$ = lowest rating (16); $A^*$ = highest rating (1).

Based on these elements, the strategies were then rated according to their importance.

## RESULTS AND ANALYSES

As already mentioned, the results obtained from the survey refer to the degree of importance regarding the strategies for transport in sports mega-events, as perceived by the potential users consulted. They were also organised according to the different

areas of the city and to the socio-economic characteristics of the users, especially with regard to car ownership.

Figure 5 shows the behaviour of the degree of importance of the strategies for each area, while the average value attributed by the entire sample is represented in the grey background in the graph in decreasing order in terms of the strategy's importance. In some areas it was found that there were differences of opinion defined by the vertical distances between the symbols and between them and the media either upward or down.

The “transport integration” strategy plays a decisive role, highlighted as the most important, which was also the result in the Pilot Study, in addition to a practically unanimous convergence between the areas. Another strategy where there is convergence between all areas is that of “Exclusive bus routes” to the event's venue. However, a better assessment was give to “Mobility Management” and “Rescheduling timetables”.

In *Other Municipalities*, it is emphasised that the strategies “Disseminating traffic circulation” and “Raising the population's consciousness” for using public transport are shown to be way above average, indicating that for dwellers in that area, perhaps because of the distance to the more central locations and risks of traffic jams, having prior knowledge of the traffic conditions can be crucial to taking a decision on what kind of transport they use.

In the *South Zone*, similar behaviour is found regarding the strategies “Traffic control systems” and “New technologies”, both more closely associated with the performance of road traffic and particularly car circulation - perhaps because this area presents problems of traffic jams and a relatively high rate of car owners among the interviewees. However *Downtown and vicinity* emphasises “Mobility management” and “Rescheduling the timetables” strategies, also probably due to frequent traffic jams.

The strategy “Extension and upgrade of the international airport”, although fundamental for the success of the event, is not highly rated. Perhaps because this strategy focuses on the international public and farther from the everyday life of the interviewed user.

The “Metro-railway system” was relatively less rated in *Other Municipalities,* although they have a railway network at their disposal. One reason may be that this modality does not yet offer quality service and capacity expected by their population. The metro is also far from these users, most of whom, according to the interviewees, choose to go by bus each day, and therefore remove the metro-railway system from their range of preferred options.

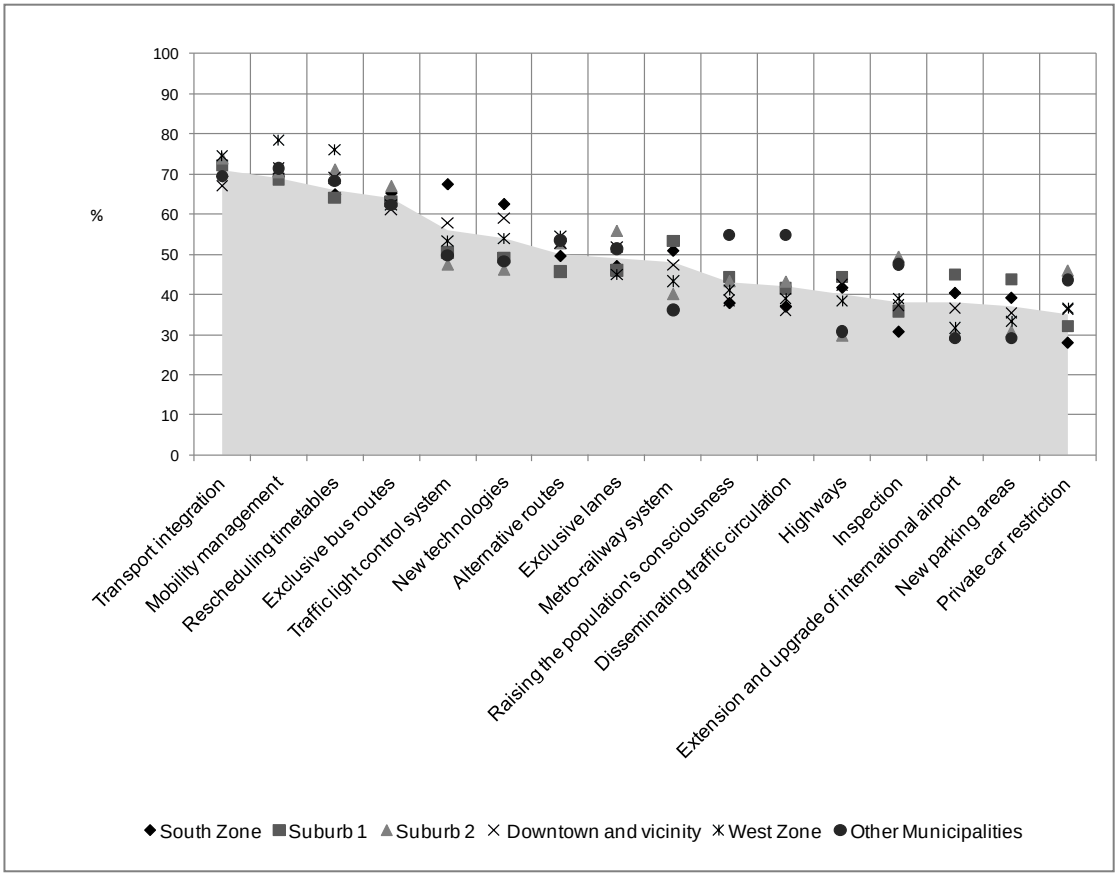


Figure 5 – Importance in total samples

Figure 6 shows the ratings attributed to each strategy, according to the group of users who are car owners (found in the top part of the graph) and to the group that do not have a car (in the bottom part). In addition, and to facilitate the comparative analysis, the total average of the sample for both groups is shown in grey in the graph's background.

Three strategies are above the sample average in the group of car owners. The strategy “Exclusive bus routes” shows the greatest difference, which may indicate the interviewees' intention and concern in having an alternative with certain convenience and comfort. Another more emphasised strategy is “Traffic control system”, which may help optimise the circulation of vehicles, particularly cars. And the “New technologies” including the upgrade of the traffic light system is also directly linked to the needs of car users.

The group of those who do not own a car demonstrates behaviour closer to that observed in the entire sample. The strategy “Metro-railway system” is slightly higher than average, which refers to extending and renovating the metro and train routes. The large majority of this group uses public transport on a daily basis, which may reinforce the need to upgrade this system.

The “Transport integration” strategy is highlighted as the most important in the group that do not own a car, while the least important was the “Private car restriction”. This

resistance to restrictive policies, even by those who do not have cars and who will apparently not be affected by them, may represent a collective behaviour that prioritises proactive rather than punitive actions. Or perhaps they believe that these policies will not be successful from recent experiences involving defects in their planning and implementation.

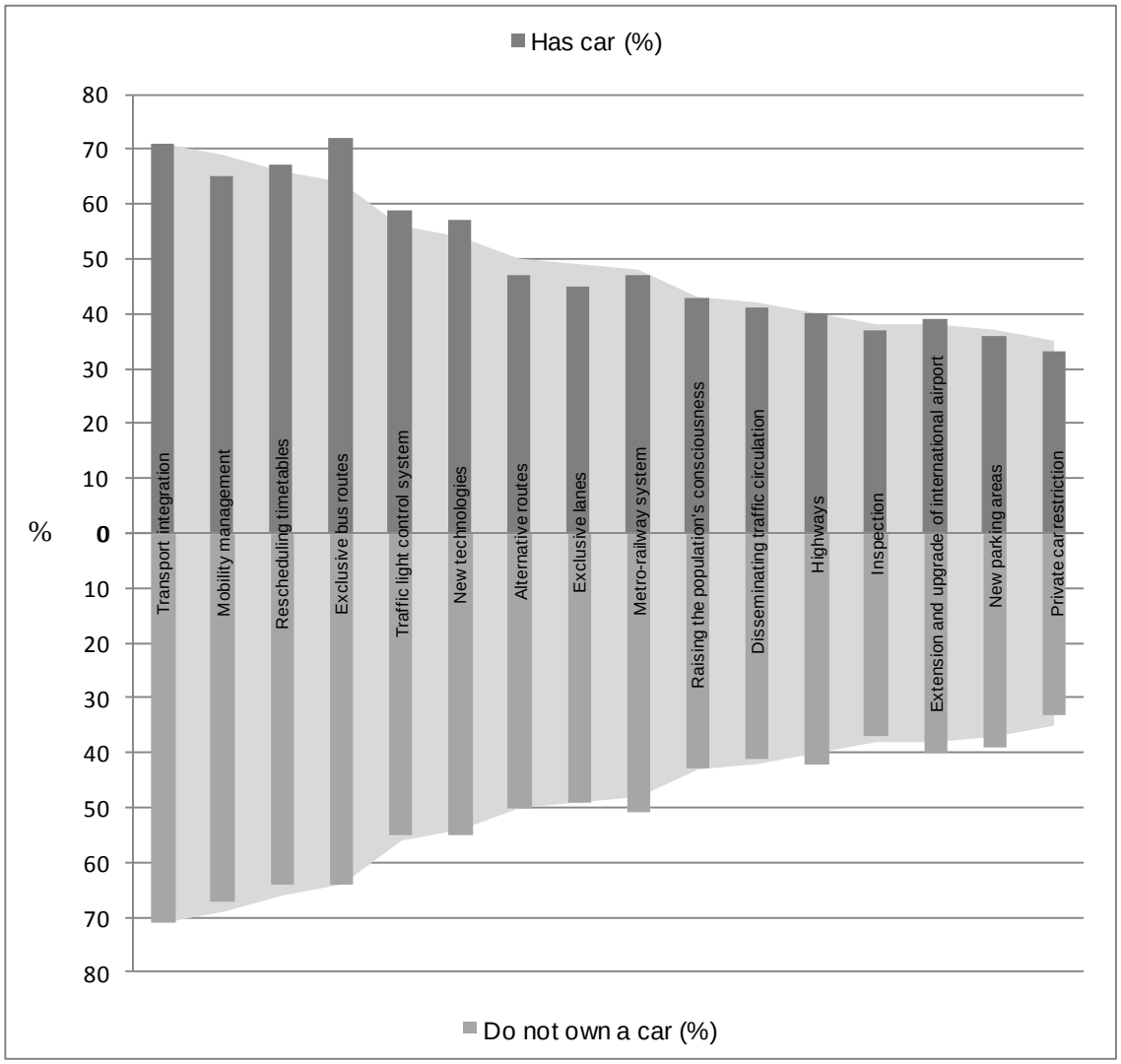


Figure 6 – Average of the total sample comparing the totals of car owners and who do not own a car

Figure 7 shows the main modalities of habitual users and those who do not have cars. It is found that in the total sample 57% go by bus each day, 24% by car and 19% by metro, while in the case of a mega-event the modal distribution expected would be 58% by metro, 23% by bus and 19% by car. In other words, there is a propensity for users to change to the metro from bus and car travel, whose demand would almost treble. Confirmation of this modal change is fundamental for investments to guarantee an increase in the capacity of the rail systems to meet this extra demand and to improve its quality service as an alternative attraction to its users.

The intention of the group of car owners to use buses during a mega-event has almost halved. The same occurs with regard to the car user, showing a propensity to change from road travel (car and bus) to those with greater social productivity, such as the metro. It is worth mentioning that those without a car are willing to change to this modality of "getting a lift" in the case of the mega-event (from 1% to 6%), which shows signs of taking measures that encourage the use of solidary transport.

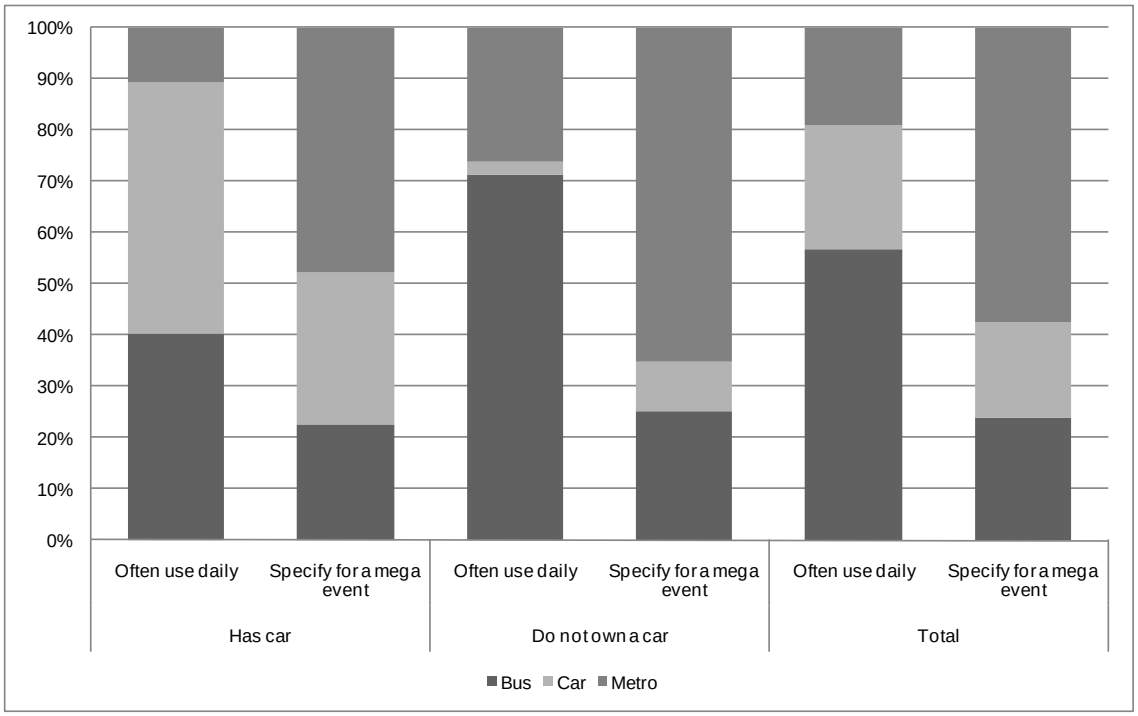


Figure 7 – Comparison between car owners and those who do not own a car and transport modalities

According to the results given in the earlier figures referring to the locational areas and sub-groups (who have or do not have a car), it is noted that the "Transport integration" strategy is preferred by the users interviewed in the two stages of the study in all areas of the city.

# CONCLUSION

In the next few years Brazil has the duty to host world-class sports mega-events, which means that it is desirable to verify the population's perception in relation to one of the sectors that has most influence on the performance and fluidity of the event. Transport is part of the population's everyday life and, however temporary they may be, interferences occur during this period. And so that both the public visiting the mega-event and the resident population have good transport, assuring the success of the project and a legacy for the city, it is necessary to consider planning as a key issue.

In this article, the opinion survey results allowed us to hierarchise the strategies with regard to the importance perceived by the users, either at the aggregate or detailed

level according to certain socio-economic and locational segments. It was therefore possible to establish the need for measures focusing on solidary transport for car users. It is also confirmed that it is relevant to have different strategies for certain areas of the metropolis.

It was found that the procedure proved feasible and the resulting hierarchisation apparently consistent. The strategies indicated as most important are based on integration, reinforcement of the public transport with most capacity and measures to discourage (but not restrict) car use, which confirms the concept defended by best international practices.

According to PDTU (2003), the Rio de Janeiro Metropolitan Region consists of 20 counties and 11.8 million inhabitants, generating 12.5 million motorised trips, of which 2.1 million are by car and only around 730,000 trips a day using the metro, rail and ferry services. The survey showed that during a mega-event there is a tendency to intensify the use of public transport, particularly the metro-railway, due to the preference for the strategy referring to their integration. In the project for the 2016 Olympic Games investment is expected to be R$ 10 billion to modernise the entire metro-railway system, BRT construction (Bus Rapid Transit) and new metro lines, in addition to refurbishing stations and wagon procurement. Measures pointing to the preferences proposed by the users consulted in this study and which somehow coincidentally accompany those recommended by the population of the São Paulo Metropolitan Region (ANTP, 2010): an increase in the train and metro lines and building or extending more bus corridors, followed at a second level by traffic surveillance and building more streets and, lastly, measures to restrict the use of private cars.

Users' defence of integration and the premise that it tends to be successful when the transport system is based on high capacity modalities, especially on rails (Litman, 2008), suggests the need to invest in that means of transport. Especially in rail travel, since it still has an idle infrastructure, whereas road corridors are congested, with high accident rates and consequent deseconomies.

The procedure used for hierarchising the strategies has certain limitations with regard to applying the study, since it was carried out with citizens who do not have technical know-how, which could minimise the difficulty of interpretation and a certain difficulty in perceiving and distinguishing the differences between the strategies. Nor does it consider the visitors' perception and need for transport, which should be included.

It is recommended that new surveys be undertaken with a higher number of users, involving representatives of other stakeholders and using other methodological approaches to obtain parameters of comparison, noting the consistency and compatibility with the rating of importance established. These approaches may be used in other cities, considering the local specificities.

Lastly, we must seize this opportunity in which Brazil and its cities seek to upgrade their transport systems to build a participatory, transparent process based on know-how and with technical backing, which furthers integration between government spheres and the desired partnerships. It is hoped that it is possible to guarantee the use of society's resources in line with public interest. Building this process, which must extend to ongoing transport planning, will be another legacy that will contribute to retrieving the exercise of citizenship and the Brazilians' belief that it is possible to change and be able to dream.

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