

STUDY TOUR: MICRO STUDY



Building the Olympic Games and World Cup

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RESEARCH SET-UP

Introduction

Sustainability is a big issue. The Brundtland Commission states a very popular definition: “Meeting the needs of the present generation without compromising the ability of future generations to meet their own needs.” This topic of interest is very relevant to major construction projects, and therefore stimulated us to conduct research within the theme of the study tour: “foundations for a sustainable future”. First the research goal and questions will be stated, then the cases will be introduced which will be studied during the study tour.

Research questions

The research set up question is:

How does Brazil develop his stadiums and venues in a sustainable way, so that these are well prepared for the World Cup and the Olympics Games?

We also subdivided the main question into the following research questions, in which we integrate the aspects of people, planet and profit of the sustainability concept.

1. How do the FIFA, IOC and academic literate define sustainability?
2. Planet: To what extent are carbon emissions and waste minimization part of the three projects?
3. Planet: To what extend is sustainable water use integrated in facility designs?
4. People: To what extend will stakeholders be able to participate in the design and construction plans of the studied projects

There will be elaborated on water because this topic is found important by the Brazilian Government. The use of materials is also chosen because it is important to know what the material use sustainable in a developing country is. Sustainable material can be more expensive in

the construction phase, but cheaper in the total life cycle. So whether this aspect is also an issue in Brazil will be investigated.

Manaus Arena

For the FIFA World Cup 2014 a new stadium will be built in Manaus. The old stadium of Manaus will be demolished and the new Manaus Arena will be constructed on the same location. The new Manaus Arena will be a stadium with many aspects from the Amazon and it will have a capacity of 60,000 viewers. The site will be transformed and will also have an area for sport and leisure in addition to a mall. The idea is to use it as a place that can combine leisure and sportive activities along the seven days of the week.

Maracanã

In September of 2010, the Maracanã Stadium will close its doors to begin a large-scale reconstruction in order to comply with FIFA recommendations for the World Cup. After the upgrade is complete, the new capacity of the stadium will be for 83,400 spectators. Other changes include the addition of extra catwalks to improve the evacuation time of the stadium, a new roof and a paint job.

T5 Bus Rapid Transit Project

The T5 Bus Rapid Transit corridor is interesting to visit because it is a sustainable way of implementing new infrastructure for the upcoming World Cup and the Olympics. It will make the city more accessible and the people that live in Rio de Janeiro will become more mobile. Both the environmental and the social aspect of this project are interesting. And it is, with its 28 km stretch, also a big infrastructure project which will have many different management difficulties.

ELABORATED RESEARCH QUESTIONS

Research question 1

The first research question is:

How do the FIFA, IOC and academic literature define sustainability?

This chapter summarizes the literature research this first question. First will be discussed in which way the FIFA and IOC define sustainability. The chapter then addresses the literature written about the specific attributes that the FIFA and IOC (and the Brazilian government) consider as important for sustainable venues. This chapter ends with elaborating on an example of a sustainable approach on stadium building in Europe and a comparison with the previous Olympic Games in London.

FIFA

“The FIFA World Cup™ in Brazil will bring long-lasting changes for the benefit of the entire country. Both the football community and the population as a whole will gain considerably from the hosting of the 2014 FIFA World Cup™ in Brazil in terms of the economy, transport, communication, public services and facilities, safety and the enhancement of sporting facilities.” (Salcedo, 2007)

Hosting the FIFA World Cup will have significant impact on the Host Cities and its community. The FIFA focuses mostly on the social part of sustainability. For the bidding process they only look at the country commitment, football facilities, general infrastructure, finance and legacy.

When looking at the content of the campaigns and events of the FIFA, the conclusion is that they do not explicitly address the planet (building green) and profit (fair profits and wealth creation) aspect of sustainability. But the FIFA is addressing some aspects of Planet. The world cup of 2010 must be carbon neutral.

IOC

The IOC has a more integrated vision on sustainability. They integrate many aspects of sustainability within the bidding processes for the Olympic Games. “The IOC’s role is: to encourage and support a responsible concern for environmental issues, to promote sustainable development in sport and to require that the Olympic Games are held accordingly; to promote a positive legacy from the Olympic Games to host cities and host countries.”

The Brazilian government (by all levels) has agreed on a sustainability plan that will focus on four areas.

1. *Water Conservation*

A new standard of water quality preservation for next generations will be set, particularly for the lakes system in the Barra Zone and Guanabara Bay.

2. *Renewable Energy*

Especially by implementing Brazilian state of the art hydrogen energy cells and generators in all venues.

3. *Carbon Neutral Games and Waste Management*

Emission generated by Games preparations and operations will be neutralized through the reforestation in strategic rain forest areas.

100% of solid waste generated during the Games preparations and operations, including construction, will be processed and recycled through a sustainable chain with direct social benefits to surrounding communities.

4. *Social Responsibility*

Participation of stakeholders and NGO’s.

A comprehensive set of management tools will be used to monitor, achieve and report on targets and compliance.

Literature review

For subsequent research questions, a working definition on sustainability is needed. Therefore, an elaboration on the aspects of sustainability discussed by the two organizations is needed. Because of time and resource constraints, we decided to look at the aspects only in a qualitative way. First we will discuss literature on the top priority of the FIFA and the fifth point that the Brazilian government and IOC agreed to focus on: social sustainability. As a next step, we will go in more detail about the other three points that the IOC and Brazilian government considers relevant: Water, Energy and Carbon Neutral Games/Waste Management.

Water conservation

Responsible usage of water is an important aspect within sustainable building. For example, many quantitative assessment methods like LEED (Leadership in Energy and Environmental Design) include the water consumption in their ranking methods. In general, Brazil has to deal with several kinds of water problems. The North-east faces problems with drought; the Amazon-region sometimes faces poor water quality. On the South-east coast, in the region of Rio de Janeiro, water quality and flooding are points of attention.

Entrop and Brouwers (2010), discuss three ways to deal with water in a sustainable way. They use the Triad principle to rank several degrees of water use: Trias Hydrica. It is important to distinguish freshwater and grey water. Having this in mind, we can describe the Trias Hydrica ranks water usage as follows:

1. First category consists of measures in buildings that prevent usage.
2. The next level consists of measures that use renewable water sources as much as possible (e.g. storm water for gardening and toilet flushing).
3. The last category uses fresh drinking water as efficient as possible (water saving toilets, showers, using water in a cascade form etc.).

We can conclude that the literature supports the relevance of responsible water consumption. We saw that there are several ways to prevent water usage, use sustainable water, or use water more efficient. For further research steps, we state that Trias Hydrica will be a good method to assess the water consumption at the case study projects in a qualitative way.

Energy

Energy is one of the most discussed topics when assessing the sustainability of the buildings. This aspect is so relevant since energy savings can lead to significant reduction of operational expenditures of a building. This aspect is often integrated in design requirements and building codes in many countries (Míguez et al, 2006).

The analytical framework of Triad approaches (Entrop & Brouwers, 2010) is also applicable to Energy usage. In fact, this tool that Entrop and Brouwers (2010) developed is complementary to the principle of Trias Energetica of Lynsen (1996). As for water usage, the framework is qualitative and ranks three classes for energy consumption:

1. Measures that prevent the building's energy need (e.g. better insulation, and orientation towards the sun, using diffused natural lightning. For more examples, Lockwood, 1996).
2. Use renewable energy resources as much as possible (e.g. active/passive solar or wind energy, store heating underground).
3. If renewable resources cannot fulfill the total demand of energy, fossil fuels should be the last resort. One should use these as efficient as possible. IT offers potential to control the energy usage more efficiently.

For Brazil, it's important to notice that the consumed energy is used for a different purpose than in the Netherlands. Instead of heating, Brazil uses energy to cool down live environments.

The website of Modular.org (year unknown) also stresses that besides preventing energy consumption or efficient use of energy during operations there is something that is also very important: energy consumption during construction (Cole & Rousseau, 1992).

Carbon neutral games and waste management; materials

There is a large amount of literature on carbon emissions. The actuality of this topic to World Football Championships is evident. Bright.nl namely states that a World Cup generates leads to carbon emissions that are estimated six times higher than during a “normal day” (Lemelereis, 2010). The relevance of waste management is indicated in academic literature as well (e.g. Bossink and Brouwers, 1996). They cite Pinto and Agopayan (1994) who state that construction industry in Brazil generates 20-30% construction waste (by weight, percentage of total amount of purchased construction materials). For our research, we combined carbon emissions during construction and waste management under the heading construction materials. For time constraints, we chose not to include carbon emissions due to transportation.

Entrop and Brouwers (2010) propose the Triad Hylica to assess the quality of construction materials. This is a suitable method for our research:

1. The first categorized step is to prevent the unnecessary use of materials such as smart and efficient designs of components and of buildings, and combinations of functions (e.g. H-profiles and hollow floors on component level).
2. If the first step is used optimally, designers should integrate local renewable materials in building materials. (e.g. wood and cork)
3. The last category consists of designs that use non-sustainable materials. These should be used as little as possible (e.g. high strength concrete, cascaded use of materials).

For the Trias Hylica, it is important to realize that re-use and recycling of materials like wood also generate processing and transportation energy (also see Thormark, 2005). Re-use of materials in an unsustainable way is therefore part of the third category.

The Trias Poreutica represents a three-step sustainable scheme for the transport between objects. Three classes of measures of the sustainability of transport are qualified by the Trias Poreutica.

1. Reduce the need for transport by placing different types of activities close to each other. The use of motorized transport has to be reduced.
2. Make use of sustainable transport methods. Public transport is the most sustainable way of transport, when walking or biking is not possible. When the energy necessary for transport can be generated in a sustainable way then this has the preference.
3. The third step is to make non-sustainable transport as efficient as possible without creating traffic jams or long diversions.

Modular.org provides a checklist for architects and contractors to assess the sustainability of materials. This checklist is in line with literature discussed previously. According to this checklist, sustainable materials (1) have low embodied energy, (2) are locally produced, (3) consist of recycled products, (4) reduce landfill and (5) do not contain high levels of VOC.

Social sustainability and major sports events

The importance of social sustainability is stressed in many of the FIFA's campaigns. A lot of different definitions of social sustainability are provided in the literature, for this project the definition of McKenzie is used:

“Social sustainability occurs when the formal and informal processes, systems, structures and relationships actively support the capacity of current and future generations to create healthy and liveable communities. Socially sustainable communities are equitable, diverse, connected and democratic and provide a good quality of life.” (McKenzie, Social Sustainability: Towards Some Definitions, 2004)

Sustainable stadiums in the Netherlands

There is an example of Dutch expertise that is being used by Brazil in developing their stadiums for the world cup of 2014. The Amsterdam Arena Advisory (of the soccer stadium of Ajax) is developing two projects for Brazil: Recife/Olinda and Porto Alegre, the hometown of soccer club Gremio (Insight Brazil).

Olympic Games of London 2012

Since the Olympic Games of 2012 are the predecessor of the Olympic Games in Rio 2016, it is interesting to investigate how London addresses sustainability.

How do they see sustainability?

The London 2012 Sustainability Plan was published in 2007. The London bid for the Olympic games of 2012 has a large focus on sustainability. They are many aspects of sustainability that are addressed.

How do they control the plans?

A commission was responsible for controlling the commitments made during the bid. The commission is now controlling for two years, with two more years to go till 2012. In May 2010, the commission raised their concern about the wider commitments that here made during of just after the bid. So it seems that the London bid was highly ambitious on sustainability terms, and much effort has to be made to fulfill these promises. This has to do with the whole process of bidding for a tournament. If you claim you will do a lot, you will have to prove that you can do realize it in the following years.

Connection with Rio 2016

London 2012 is the predecessor of Rio 2016. So the sustainability issues raised in London can be used by Brazil to make Rio 2016 more sustainable. The focus of Rio de Janeiro is on four basic tenets of sustainability (Lewis, 2009):

- water conservation
- renewable energy
- waste management
- social responsibility

Research question 2

The second research question is a part of planet, and is defined as:

To what extent are carbon emissions and waste minimization part of the three projects?

This research question addresses the use of sustainable construction materials on the three case studies we will visit in Brazil. This chapter discusses the information of the Maracanã, Manaus Arena and T5 Bus Rapid Transit Line. This will be related to the Trias Hylica from the Triad Approach (Entrop & Brouwers, 2010). Each paragraph concludes with a checklist with remaining questions or needs for observations.

Maracanã

On the 18th of June, the organization of the Copa 2014 (Football World Cup of 2014) released a press message that the tender documents of the architects and contractors were opened by NovaCap. ASS, Odebrecht and Andrade Guttierrez/ Via Engineering have submitted their bid and wait for the outcome. One cannot expect a publication of the tender documents before the official decision has been made. This is probably the reason why, there is not any design information available on the web sites of the bidding parties.

By using the three steps of the Trias Hylica, the following questions are relevant for this project:

1. For what purpose can the stadium be used? (other than football games)
2. Can the spaces in the stadium be redesigned in a flexible way? If so, how do they minimize new large scaled renovations in future?
3. How does the contractor ensure minimal use of materials?
4. Which renewable materials does the contractor use for the roof, bleachers and other spaces?
5. Does the paint for this project contain toxic compounds?
6. Where does the contractor produce or buy its construction materials?
7. What does the contractor do with waste materials?

Manaus Arena (Vivaldão Lima)

The environmental assessment for the new stadium stated that the project planned mitigation measures to preserve vegetation, to keep a constant ground water level, and to prevent erosion of soil. Further, the Green Goal Programme wants designers to focus on water quality, socioeconomic equality, and historical and archaeological scenic areas of influence on the venture. The information on the internet indicates that the focus on sustainability is mostly on water and energy usage. There are also plans for a sustainable use of construction materials, but these are not available online. Looking at this situation, the best option is to create questions for the checklist using the Trias Hylica:

1. Can the spaces in the stadium be redesigned in a flexible way? If so, how do they minimize new large scaled renovations or expansions in future?
2. How does the contractor ensure minimal use of materials?
3. Which renewable materials does the contractor use?
4. Where does the contractor produce or buy its construction materials?

5. What does the contractor do with waste materials from the demolishing project and new build project?

Bus Rapid Transit Line in Rio

For this project, we chose not to look at the waste and materials used for construction (like the asphalt production), to study the effects of the ground plan for the carbon emission in operational state. The reason behind this is that we will attend a presentation about the BRT system, during which materials usage probably won't be discussed in detail. When considering the Trias Poreutica, it's important to look at the distance between the different facilities like. The main hotel area lies about 30km distance from most of the venues. Exceptions are the athletics', cycling, rowing and flat-water canoe areas. These are located at respectively 10, 10 and 5km distance. The Olympic Village will be located closely to media centres (<5 km) and 20-40 km from the different Game areas. Exceptions are indoor sports; these are located at ~5km distance.

Related to the trace of the BRT, it is also important to look at the existing venues in Rio de Janeiro. According to the approved plans, there will be 34 official venues, of which 9 will be new and permanent, and 7 totally temporary (Rio 2016 Local Organising Committee, 2010). Permanent structures like the Olympic Training Centre (Barra) and the X Park (Diadorao are regarded as important legacy for the city. The temporary venues will be constructed on public areas, mainly on the Copacabana Boulevard. Within the four venues zones, there are five clusters. Each of them concentrates several types of sport and celebration areas. This is operationally and logistically efficient.

We combined the information above and the Trias Poreutica method to create a set of relevant questions:

1. How do the clusters minimize the necessary travelled distance during the Games? And, was it possible to create fewer clusters?
2. Are there any non motorized alternatives to the BRT and motorways that connect venue zones or clusters?
3. What kind of green fuels does the BRT use, and, did you also consider other fuels (e.g. batteries, or regenerative brakes)?
4. How does the daily timetable for the BRT assure an efficient use of the system? (so to minimize redundant or empty bus rides)

Conclusion

The literature and online research resulted in general descriptions for each project. Since all the projects are in very different phases of development, the availability of relevant information also varies a lot. There is hardly any design information on the Maracanã available online. This has to do with the still going bidding procedure. There is more information about the Manaus Arena, the project which is already in construction state. Unfortunately, the designs mainly focus on sustainable water and energy use, not on materials. The BRT is a totally different project. We chose to focus on the carbon emissions during operational state only.

After the site visits and company presentations, all projects were assessed using the Trias Hydrica and Trias Poreutica. Such an assessment has not been created yet, because we consider the amount of information too little to make a valid assessment.

Research question 3

The third research question is also a part of planet, and is defined as:

To what extent is sustainable water use integrated in facility designs?

The second sustainable aspect to elaborate is water use. The water use is an important aspect within sustainable buildings. Current water use is often not sustainable. Only 7% is used for cooking and drinking, which is the major part that needed potable water. Most of the high quality water is used for non-potable purposes. Reducing the amount of potable water helps to reduce carbon emission. To rank the sustainable measures for the build environment in terms of water, the Trias Hydrica is used (Entrop & Brouwers, 2010):

4. First category consists of measures in buildings that prevent usage.
5. The next level consists of measures that use renewable water sources as much as possible (e.g. storm water for gardening and toilet flushing).
6. The last category uses fresh drinking water as efficient as possible (water saving toilets, showers, using water in a cascade form etc.).

First the role of the FIFA and the IOC is considered about their vision of water use as terms of sustainability. After that the projects Manaus Arena, Maracanã and Bus Rapid Transit (T5) are considered regarding their water usage. Finally the measures in the projects are linked to the Trias Hydrica and the FIFA and IOC requirements.

Role of the FIFA and the IOC

Rio 2016 (IOC)

In order to have a sustainable Olympic Games, the Rio 2016 Sustainability Management Plan (SMP) (Municipality of Rio de Janeiro, 2008) is made. This plan has a goal: "Green Games for a Blue Planet", and has three main pillars: Planet, People and Profit. The PPP approach is very common, and it is no surprise that Rio de Janeiro uses it.

The Trias Hydrica is explained in research question 1. There are three categories: first prevent, then using renewable sources and as last use it more efficient. Looking at the water conservation and treatment actions in the SMP, it is interesting to see in which categories they are. The first action is a category three action. The second action is a category two action. The third and fourth actions are not categorized by the Trias Hydrica. So it seems that Rio de Janeiro is suggesting second and third category measures in their water conservation and treatment actions. It will be interesting to research why they did not make measures to prevent water usage in the Maracanã stadium.

FIFA World Cup 2014

Information about the sustainable aspect of the bid for the FIFA World Cup 2014 is very limited. So, there is little information available about the water use. For the FIFA world cup of 2010, there are some measures to decrease the water usage. These are (Black, 2008):

1. Use grey water to water the pitches
2. Planting indigenous trees and plants (require less water)
3. Harvesting rainwater
4. Using water saving devices (e.g. flow regulators and dry urinals)

It will be interesting to research whether the FIFA demand water management actions for the Manaus arena and the Maracanã stadium.

Projects

Manaus Arena

Inspired by the fascinating diversity and forms of the Amazon Rainforest the Manaus Arena will be developed in a sustainable way. Manaus is one of the two green host cities of the FIFA World Cup 2014. To become a green host city of the FIFA World Cup 2014 water plays an important role.

During the visit of the Manaus arena, the following questions will be asked:

1. The cold ground water is used for pre-cooling the air; it is used for more purposes? If yes, which?
2. In what way is fresh drinking water used as efficient as possible (e.g. using cascade form)?
3. Which measures are made to prevent fresh water usage?

Maracanã

The Maracanã stadium is an old stadium, and will be renovated. No big modifications will be made during the renovation (only roof extension and a paint job). In the period the stadium is build (1950), no (much) attention was paid on environmental issues. For example, the LEED (Leadership in Energy and Environmental Design) began just in 1993. This means that it is likely that there is less technology used regarding the sustainable water usage. In fact we cannot make any hard conclusions, because very few information is available.

The following questions will be asked during the visit of this project

1. In what way is fresh drinking water used as efficient as possible (e.g. using cascade form)?
2. Which measures are made to prevent fresh water usage?
3. For which purposes is rain water used?

Bus Rapid Transit (T5)

This project is not relevant for this research question about water usage.

Conclusion

To rank the sustainable measures in terms of water the Trias Hydrica is used. Because the Bus Rapid Transit uses no water and too little information is available for the Maracanã, these projects are not measured with Trias Hydrica. The Manaus Arena mostly uses measures from the second

category of the Trias Hydrica, which includes the measures that use renewable water sources as much as possible. During our visits questions about measures made to prevent water use and if they use fresh water as efficient as possible will be asked.

Research question 4

The fourth research question is a part of people, and is defined as:

To what extent will stakeholders be able to participate in the redevelopment processes of the studied projects?

One of the aspects that have to be taken into account when organizing a mega sport event is the social aspect. When the interests and stakes of the local community are taken into account the social sustainability of the project is ensured. A lot of different definitions of social sustainability are provided in the literature, for this research the definition of McKenzie is used:

“Social sustainability occurs when the formal and informal processes, systems, structures and relationships actively support the capacity of current and future generations to create healthy and liveable communities. Socially sustainable communities are equitable, diverse, connected and democratic and provide a good quality of life.” (McKenzie, Social Sustainability: Towards Some Definitions, 2004)

The focus for this research question will be on the democratic and governmental aspects of the definition. McKenzie describes this aspect as follows: “The community provides democratic processes and open and accountable governance structures” (McKenzie, Social Sustainability: Towards Some Definitions, 2004). For the classification of the participation of stakeholders we will use the participation ladder of Arnstein. Arnstein divides the participation into eight different categories, from manipulation till citizen control. In the conclusion an indication of the level of participation will be given by one of the levels that Arnstein has identified. (Arnstein, 1969)

This research question will focus on to what extent stakeholders were able to participate in the construction processes regarding the construction of the Manaus Arena and the Maracanã stadium for the World Championship 2014 and the Olympic Summer Games 2016 and the development of the T5 Bus Rapid Transport Project.

Role of the FIFA and the IOC

The reputation of the FIFA is not very good when regarding the participation of stakeholders in redevelopment processes. The redevelopment process for stadiums for the World Championship in South Africa was done according to the wishes of the FIFA, and the requirements of local stakeholders were completely neglected.

The IOC is more open to stakeholder participation. They have developed an Integrated Stakeholder Engagement plan to ensure the identification, participation, capacity building and dialogue with stakeholders.

What is the participation in the construction process in general in Brazil?

To learn about the participation of citizens in Brazil, the history of the country has to be investigated. Brazil was one of the most unequal countries in the world. After the colonial period, it was the last country in the Western Hemisphere to abolish slavery (in 1888), and saw only intermittent democracy in the 20th century, with dictatorships from 1937–1945 and 1964–1985. But while certain rights are part of a basic language used by even the extremely poor and marginalized, traditional national democratic citizenship is failing to have meaning for the poor. This is also the case for participation in construction processes, the poor people lack the knowledge and the facilities to participate in these processes.

When compulsory acquisition of land is required, well-established policies and procedures will be followed. Current legislation supported by the 1988 Federal Constitution empowers the City Government to appropriate privately-owned properties to meet urban planning objectives.

Participation process for the Manaus Arena

For the construction of the new Manaus Arena the location was no problem, because the new stadium will be built at the location of Estádio Vivaldo Lima, the old Manaus stadium. However there seems to be some resistance to demolish the old stadium.

During the visit of this project, the following questions will be asked:

1. What possibilities did local citizens have to participate in the construction and redevelopment process?
2. Did citizen or local authorities disagree with the project?
3. According to newspaper the MNP wanted to keep the old stadium, who decided that the stadium had to be demolished and what influence did the FIFA had?

Participation process for the Maracanã stadium

For the renovation of the Maracanã stadium it is hard to judge the participation of stakeholders, because the Maracanã stadium will only be renovated.

During the visit of this project, the following question will be asked:

1. What possibilities did local citizens have to participate in the redevelopment process?

T5 Rapid Transport System

The realization of these Transport lines also anticipates the relocation of some legal and illegal dwellings and acquisition of land to support these infrastructure works. “Where relocation of people is required, particularly those in less advantaged communities subject to regeneration projects, opportunities will be provided to relocate to new social housing that will significantly improve their living standards”, according to documents that are provided by the IOC.

The following questions will be asked:

1. What possibilities did local citizens have to participate in the redevelopment process?
2. Is it right that families had to be relocated for the project, and if so, how was this done?
3. Where the people that live in Favelas, who are technically illegal land owners, treated in the same way as legal land owners?
4. Did citizen or local authorities disagree with the project?

CONCLUSION

From the information available it seems that the level of participation is not high. The role of the FIFA and the IOC in the participation process is quite different from each other. Where the FIFA tends to keep clear control, the IOC tries to involve also local stakeholders in the process. It is however unclear what the level of participation is, just that the requirements of the IOC regarding the venues are quite high and that this is more important than participation of local stakeholders. From the general participation in construction processes in Brazil it can be concluded that a clear legislative way to participate or obstruct the construction process seems to be missing. The process pays a lot of attention to the environment but social conditions appear to be less important. The specific participation in the construction and redevelopment processes of the Manaus Arena, the Maracanã stadium and the T5 Rapid Transport System are quite hard to judge because the processes are just started. Although the demolishing of the old Vivaldao stadium appears to give resistance from the local authorities, the demolishing is still in progress. In what way citizens are participating in the relocation because of the Olympic Park and the T5 Rapid Transport System is not clear, although the IOC says it is according to the international standards.

All together it can be concluded that the level of participation for local stakeholders is not high. An indication of the level of participation on the participation ladder of Arnstein is, with the information available, quite difficult to make. There will also be the difference with the poor people living in the Favelas and the middle class of the society. The best indication on the ladder of participation would be between nonparticipation and tokenism, that is the level of therapy and informing. Once more, this level of participation is hard to judge from the other side of the world.

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