Mega events and urban requalification

The case of Lisbon and the Olympic Games

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Abstract

Hosting mega events is directly related to the urban requalification of the host cities. For the success of the event is necessary to fulfill the event requirements with the development objectives of the city. In the Olympic Games case, the event's increase of dimension led to a way to implement and accelerate host cities' planned urban interventions and also a way to ensure a sustainable legacy to them. Two of the most important aspects for hosting these events are the choice of areas to build the new venues and the selected mobility strategies to ensure transports for all the people involved. Barcelona'92 and London2012 were two of the most successful editions, the first one for being used as a way of rehabilitation of several areas of the city and the second one because of the innovative transport strategies adopted.

In case of a Lisbon's candidature to host the Games, *Centro Desportivo Nacional do Jamor*, *Estádio Universitário de Lisboa* and *Parque das Nações* would play a fundamental role, mainly due to the already existent sports venues. The construction of new venues can be done in many ways, clustering them with the identified existing ones or spreading them by multiple city areas. A multicriteria analysis is one way to find out which one is the best solution, paying special attention to the chosen criteria and the most relevant ones. In this evaluation, the option to build the new venues in the *Estádio Universitário de Lisboa* proved to be the best one.

Key-words:
Olympic Games, Urban requalification, Olympic city, Lisbon, Mega events, Multicriteria analysis.

"The more you know about the Olympics, the less it is about sport."

Bob Perry, Design Director of Olympic Projects of Sydey2000, at *Scott Carver Pty, Ltd.*

PART I: Introduction – Definitions and objectives

A mega event is a hard concept to define due to the different subjects it involves and to the lack of existing investigation on the matter. In one hand, all mega events are different, not only depending on its type, but also on the host city characteristics. In the other hand, there are a few standard features that distinguish them from the other smaller events. In summary, mega events are short term activities, related to sports, culture, economics, politics or tourism, which demand an exceptional organization, implying a lot of entities and media coverage, with a high volume of participants and visitors, leading to important impacts on the host city and leaving a legacy to retain in the future. The biggest mega events in the world are the Olympic Games and the World's Fair. What differentiates these from the other events, from the urban point of view, is the permanent nature of the impacts on the host city, which require sophisticated urban plans for the future development of it. The biggest existing dilemma is to ensure that those plans guarantee the event requirements while meeting, at the same time, the needs of the host city population.

The lasting impacts left by the event in the host cities are called the legacies. According to Malfas, Theodoraki & Houlihan (2004), those impacts can be divided into four types. The socio-economic impacts are the ones which increase the local economy and the community social status, like the ticket, broadcasting rights and sponsorship revenues, but mostly the increase of tourism attractiveness which brings opportunities to create investments and commercial activities. The socio-cultural impacts are related to the interest encouragement to practice certain activity, enhancing the population lifestyle. Physical impacts are the result of the new venues built or the rehabilitation of the existing ones, like the sport venues for the Olympic Games, the accommodation venues of the participants or the transport infrastructure improvements. The political impacts are the business relations and contracts between the private companies hired and the local government that last for future projects.

The relevance of this theme is directly related to those impacts. In the specific case of Lisbon hosting the Olympic Games, it is also important to understand that the city and the country hosted recently two of the biggest international events, namely the 1998 World's Fair and the 2004 UEFA European Championship, whose venues are still in good operating conditions, but might not be in a few years.

The main objective of this paper is to select one or more areas of Lisbon that might allocate the needed Olympic venues, having in consideration its urban integration and its mobility system. Also, it is intended to identify the areas that need requalification and its potential to be an Olympic space, selecting the ones whose characteristics are better suitable for the organization of the Olympic Games. Besides, it is desired to understand the requirements needed to host the Games, the evolution of its dimension and how the host cities organized its strategies.

This paper is structured within four parts. The first one is an introduction to the theme and an explanation of the main objectives. The second one is a literature review of the important matters for the development of the case study, using the editions of Barcelona'92 and London2012 as main examples. The third is a description of the case study for Lisbon, including the used methodology to accomplish the designed objectives, explaining how the theoretical concepts can be applied to the city and elaborating and evaluating two possible models for the construction of the new venues needed to host the Olympic Games. The last part is the conclusion, which includes the analysis and discussion of the results and the further developments for this theme and the specific case study.

PART II: Literature Review – Olympic Movement at the Olympic city

The modern institution of the Olympic Games is the International Olympic Committee (IOC) and was founded in 1894 by Pierre de Coubertin, inspired by the ancient Olympic Games, and with the objective of bringing sports to all communities. For that purpose, the IOC published the Olympic Charter, which is the document that describes the fundamental principles of the Olympic Movement and defines it as "*a philosophy of life, exalting and combining (…) the qualities of body, will and mind. (…) [It] seeks to create a way of life based on the (…) social responsibility and respect for universal fundamental ethical principles*". The role of civil engineering and urbanism is "*to create, where needed, simple, functional and economical sports facilities*", promoting "*a positive legacy from the Olympic Games to the host cities and host countries*", in a way "*to encourage and support a responsible concern for environmental issues*". Besides the IOC, the Olympic Movement is composed by the International Federations, which administrate one or several sports at world level, the National Olympic Committees, which develop and promote the Olympic Movement at their countries, the Organizing Committees of the Olympic Games (OCOGs), responsible for the organization of the Games, and other national associations, teams, athletes, judges, referees and officials (IOC, 2013).

The first Olympic Games were held in Athens in 1896. Edition by edition, the host cities gave their contribute to the evolution of the mega event until it reached its current scale with over 25 sports and thousands of athletes from more than 200 nations. Liao & Pitts (2006, cited by Pedranti, 2012) divide the history of Olympic urbanism in four eras. The first one is *the origins of the Olympic urbanism*, from 1896 to 1904, a period when there was no legacy remaining from the Games due to its yet small dimension. After that there was the period of *the dominance of the Olympic Stadium*, from 1908 to 1928, when the Olympic Stadium became a symbol of the event and the main legacy from it. From 1932 to 1956 took place *the rise of the Olympic quarter*, when in 1932, at Los Angeles, was built the first Olympic Village to accommodate all the athletes and team officials participating in the Games. In the end of this period, in 1952, also emerges the first Olympic Park, at Helsinki, clustering a group of venues at the same place and for the first time, with the purpose of hosting the Games. From then on, the urban objectives of hosting the Olympic Games started exceeding the needs for sports and began *the age of urban transformation* (1960-2012). The cities started to opt for the rehabilitation of the existing sports and non sports venues and began to built or renovate other infrastructures to improve the success of the event, like highways, stations, railways, airports, ports, monuments, museums, institutes, water distribution systems, garbage collection systems, among others. During this period, the media attention suffered a high increase, becoming one of the most important matters of the Olympic Games, mainly because of its role spreading the event worldwide.

This evolution of the event has been encouraged by the IOC. However, it raises a lot of concerns about the economic aspects of the commercialization of sport but also about the sustainability of the urban interventions needed to host it. Therefore, urban planners, engineers and architects are more and more important for the elaboration of the plans for sports and accommodation venues and for the expansion of transport infrastructures (Malfas, Theodoraki & Houlihan, 2004). One of the most important subjects of Olympic Games' organization is the Olympic venues' spatial distribution in the city and also the availability of areas to build the inexistent ones. This distribution is influenced, among others, by the availability of space, the location of the existent venues and the future use of the new ones, and it is essential to other decision makings related to the accommodation and transportation

plans. In one hand, if the venues are clustered in one or two places, the needs for transportation are easier to fulfill, but the capacity of its infrastructures has to be higher. That was what happened in London2012, when to compensate the centralization of venues, the city invested in innovative transport strategies to reduce the traffic and improve the public transport capacities. Also, the accommodation plan becomes harder because the entire offer has to be concentrated in those places' surroundings. In the other hand, if the venues are scattered around the city, there is the need for more available transport routes but with a lower capacity required, and the accommodation plan can be spread across the city.

One way to classify the Olympic venues is accordingly to its existence, i.e., if they are new or already existent in the city. The existing ones can be one of two types: the ones that only need small adaptations, or the ones that need new permanent works. One of the factors that led to Barcelona'92 winning the candidature was the 27 already existent sports venues, allowing the investment in other important subjects. The new venues can be permanent or temporary. The former are built to fulfill the city necessities and have to be planned with a sustainable legacy. The latter are demolished at the end of the event, to avoid becoming *"White Elephants"* since there is no legacy for them (Bovy, 2014). London2012 was the edition with more temporary venues, locating them in historical places of the city. Other way to classify the venues is accordingly to its function. The venues can be sports venues, subdivided into competition or training venues, or non sports venues, like the accommodation and transportation facilities, the International Broadcast (IBC), the Main Press (MPC) and the accreditation Centers, or other facilities related to medical, safety or catering services.

The concept of Olympic Village was created by Pierre de Coubertin to ensure the accommodation of all the athletes, officials and other team members at one place (IOC, 2013). This is one of the most important aspects that the OCOG has to take care of because of its dimension and because its location has a high influence in the transportation plan. If the village is located far away from the sports venues, the transportation plans have to be more efficient. Also, in order to guarantee a correct development of the host city and a sustainable legacy to the buildings, this village must be a part of its development plans. Locating it near the sports venues is a commonly adopted measure, since it contributes for an easier future interconnection between the residential and sports venues (IOC, 2012). The Barcelona'92 Olympic Village become, after the event one of the best touristic places in the world, combining the residential use with recreation, sports and tourism. When there are competition venues far away from the city, it is also necessary to create a smaller village near it for those sports' athletes. Also, for the accommodation of the media members there is the option to build a Media Village. Sometimes the OCOG opts for it, but other times the solution is to include these members' accommodation in hotels, residences or campsites as a part of the accommodation plans. In the Games of Barcelona92' there were two media villages, but in London2012 there was none.

The main transportation challenge the OCOGs have to face is to fulfill the Games' extra supply, maintaining, at the same time, the operability of the usual mobility of the city. Bovy (2014) states that, doing that, the OCOGs have to provide high security systems for all traffic operations while promoting environmental quality and a more sustainable mobility legacy. To ensure the efficiency of the Olympic road traffic are usually defined temporary networks, the Olympic Route Network (ORN) and the Olympic Lane Network (OLN), that prioritize the Olympic traffic over the regular one, reserving roads and lanes for it, with priority in crossings and traffic lights (Bovy, 2007).

PART III: Case study – Lisbon as a potential Olympic city

1. Methodology

The analysis of Lisbon's area as a potential Olympic city has to be from the general to the particular. This means that the methodology has to start by identifying the existing sports venues all over the city and country that are better suitable for the purpose of the Olympic Games. With the existing venues selection, it is possible to identify which ones are missing, list them, and calculate the dimension of the area needed for their construction. After identifying those venues, it is necessary to understand which ones are clustered with each other and which ones are scattered throughout the city, in order to identify the main sports centers which will be considered as Olympic clusters and find out what kind of Olympic city model better suits Lisbon. Thereafter, there is the option to build the new venues all around the city or concentrate them in one of those sports centers. In this paper are modeled two options to centralize the new venues in two of the existing sports centers. To evaluate the advantages and disadvantages of each model and compare them to each other it is built a partial multicriteria analysis model from a qualitative point of view, i.e., without a method for global evaluation to convert the performance of the models to a score. That way it is only possible to identify the most important criteria, and the models' performance on it, and compare the two options from a general point of view.

2. Lisbon's Olympic city model

As the capital of Portugal, Lisbon and its metropolitan area is the main focus of population, facilities, services and activities of the country. Therefore, it is the most obvious city in Portugal to host the Olympic Games. However, it is a much smaller and less populated city than the ones which have been hosting the Olympic Games, meaning that all the eventual construction works have to be very carefully planned to ensure a sustainable legacy. The identification of the existing, under construction or planned sports venues to be used at the Olympics was based on the following set of criteria:

- Their dimension, i.e., their surface and field areas and capacities;
- Their location regarding the city center and the other sports venues in order to cluster them;
- The main national and international events they have hosted;
- The venues outside the city that are unique in the country for certain sports;
- Their possibility of rehabilitation rather than the option to build new venues;
- The available space around the venue to expand them or build temporary facilities.

The selection of the viable sports venues, represented in Figure 1, resulted in the identification of four main venue clusters. The most complete one is the *Centro Desportivo Nacional do Jamor* (CDNJ) which is the most important national sports complex, embracing an area of 204 ha for a lot of high performance sport activities but also for recreation and leisure. It is located in the suburbs of Lisbon, in *Oeiras*, 11km away from the city center. What sets it apart from many other sport centers is its environmental integration, including a huge forested area, the Jamor River and also the proximity to the Tagus River. The second identified sports center is the *Parque Florestal de Monsanto* (PFM), the biggest forest area of Lisbon, occupying 10% of the municipality. The third, is the *Estádio Universitário*

de Lisboa (EUL), located in the center of the city, near to the biggest university campus of Lisbon, and devoted specially to university sports. Although the *Parque das Nações* (PN) is not really a sports center, it is considered the last cluster because of its multipurpose facilities. The area is largely the result of the big urban requalification done to host the 1998 World's Fair, becoming the main economic center of the city where the most prestigious national and multinational companies are located.

The only types of sports venues not identified in Figure 1 are a Velodrome and a BMX Track. Although these kinds of venues exist, or are under construction in the country, namely in *Aveiro*, its long distance to Lisbon might not be feasible for the Olympic Games. Furthermore, the respective sports have no specific requirements indicating that an outside city location is more suitable for those venues. Additionally, since some of the regarded halls may not afford viable expansions it is also considered the need to build an extra grand hall. Apart from these venues, there are also two identified facilities with a current inappropriate location whose reallocation will be considered as well. They are the *Clube Português de Tiro a Chumbo* and the *Sociedade Hípica Portuguesa*. The former is an outdoor shooting range, located in a forest area, whose activity has been polluting the forest soils and causing noise nuisance issues. The latter is an equestrian center located in the center of the city and occupying an area designed for more appropriate purposes. The only non sports venues that will be included in the approach of the following intervention models are the Olympic Village, the IBC and the MPC. The remaining housing needs are considered to be included in the accommodation plan.

The next two intervention models presented below are two options to locate the new needed venues in different sports centers. They both follow an approach of centralization, trying to concentrate those new venues next to the already existent ones: the first model in CDNJ, and the second one in EUL. However, another option to locate these new venues, and following a decentralized approach, is to spread them across the city, across the existing clusters or even creating a new cluster. Besides the construction of the new venues it is also important to notice that a lot of the existing suggested venues also need important rehabilitation works to be able to host the Games with the required conditions.

1. *Estádio do Dragão;* ***2.*** *Estádio Municipal de Braga;* ***3.*** *Estádio do Algarve;* ***4.*** *Centro Náutico de Montemor-o-Velho;* ***5.*** *Clube Naval de Cascais;* ***6.*** *Ribagolfe;* ***7.*** *Pavilhão dos Desportos "Cidade de Almada";* ***8.*** *Pavilhão Multiusos de Odivelas;* ***9.*** *Coliseu dos Recreios;* ***10.*** *Travessia António Bessone Basto;* ***A. Centro Desportivo Nacional do Jamor:*** *- Estádio de Honra; - Centro de Treino de Râguebi; - Centro de Treino de Ténis; - Complexo de Piscinas; - Pavilhão Multiusos de Oeiras; - Carreira de Tiro; - Pista de Atividades Náuticas; - Centro de Treino de Tiro com Arco; - Pista de Crosse;* ***B. Parque Florestal de Monsanto:*** *- Estádio da Luz; - Pavilhão Fidelidade; Clube Português de Tiro a Chumbo; - Mountain Bike special circuits; - UCI Road World Championship 2001 Circuit;* ***C. Estádio Universitário de Lisboa:*** *- Estádio José Alvalade; - Estádio Eng. Vasco Pinto de Magalhães; - Complexo de Piscinas; - Pavilhão João Rocha; - Sociedade Hípica Portuguesa; - Praça de Touros do Campo Pequeno;* ***D. Parque das Nações:*** *- MEO Arena; - Parque de Exposições da Feira Internacional de Lisboa; - Lisbon Long Distance Triathlon Circuit; - Maratona de Lisboa; - Parque da Bela Vista.*

Figure 1: Proposed Olympic city map for the existing venues of Lisbon and Portugal.

3. Model 1: *CDNJ's empowerment* as an Olympic Park

The CDNJ is the best indicated sports center to become an Olympic Park, mostly due to its dimension, its expansion possibilities and its sports venues quantity and quality. Additionally, this sports center is located in a natural area, which is its greatest strength, having the opportunity to conciliate sports with nature and becoming a quality Olympic Park internationally recognized. This nature factor has also disadvantages, since it constraints a lot the building interventions. The biggest weakness of the area is the lack of public transports and accesses to the sports center, the latter mainly because of the physical barriers created by highways, roads and rivers, around and inside it. The major interventions suggested to build the new venues and rehabilitate the sports center area are:

- The implementation of the measures listed in the *Plano de Gestão e Ordenamento Estratégico do CDNJ – 2014*, which include the rehabilitation and expansion of some of the existing venues, the construction of a new football venue, the rehabilitation of the banks of Jamor River and the creation of medical and administrative services. These interventions can be done in order to fulfill the Olympic Games requirements regarding the sports center mobility and the support services needed;

- The construction of the Olympic Village taking advantage of the already planned Urban Development Operation of *Alto da Boa Viagem* and Detailed Plan of *Margem Direita do Rio Jamor,* which together include the construction of residential, commerce and service buildings, hotels, a dock and a railway and funicular station in more than 60 ha of land. Additionally, these interventions represent an opportunity to increase the city interaction with the Tagus River;

- The overtake of the physical barrier of the A5 highway, allowing the creation of a urban park linking the north of CDNJ with the area of the Detailed Plan of *Área de Serviços Norte de Linda-a-Velha* and the *Quinta dos Grilos* (for IBC and the MPC) and also the *Serra de Carnaxide*;

- The construction of the new sports venues (the *Pavilhão Multiusos de Oeiras*, the velodrome, the BMX track and the equestrian center) between the CDNJ and the *Serra de Carnaxide*, implying the demolition of the residential area of *Quinta da Gandarela*. The construction of the shooting field can be done either in this area or near the *Carreira de Tiro*, in the forest area.

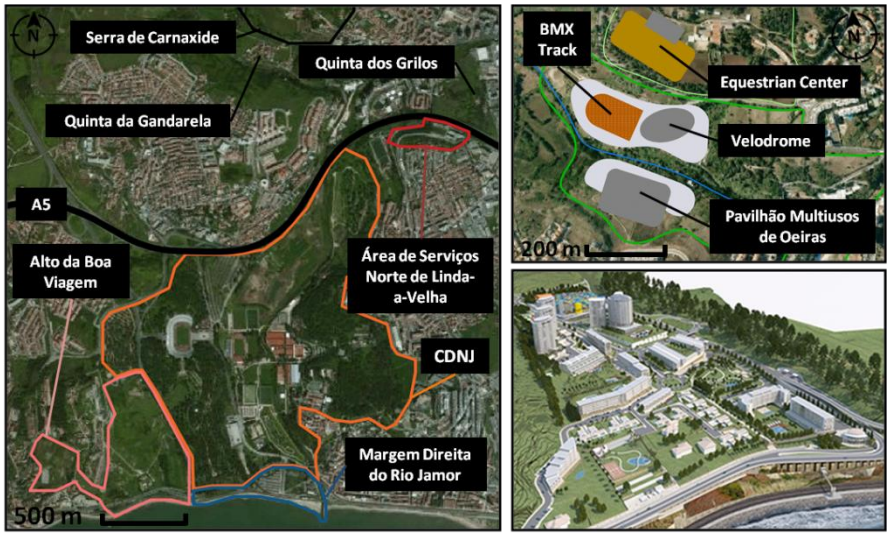

Figure 2: Intervention areas: CDNJ, *Alto da Boa Viagem, Margem Direita do Rio Jamor, Quinta dos Grilos* and *Quinta da Gandarela* (left); Suggested locations for the sports venues (top right); 3D visualization of the *Alto da Boa Viagem* Urban Development Operation[1] (bottom right).

4. Model 2: Renovation of the *EUL* and its vicinity

This second model represents an option to complement the Olympic Park functions of CDNJ with the construction of the new venues in EUL, at the center of the city, increasing the quality and adding new valences to this sports center. This central and already consolidated area has only a few locations available for the construction works but has the advantage to be in an area with a lot of accessibilities and offers regarding the public and private transport. Its biggest weaknesses are related to the lack of quality of the existent sports venues, which introduces an opportunity to rehabilitate them. Also, the benefits the existing green areas could bring to this zone are reduced because of the intense road traffic around them. The major interventions suggested in this model, represented in Figure 3, are:

- Inside the EUL area, the demolition of *Pavilhão Nº1, Pavilhão Nº2* and *Polidesportivo 1* to build the needed grand hall, the demolition of the *Pavilhão Nº3* and the set of dilapidated buildings next to it to build the BMX track and the construction of the velodrome at the site of the existent parking lot to the south of the *Academia de Golfe*;

- Since the area is in the center of the city, it makes no sense to build the shooting field and the equestrian center near it. Therefore, its construction is considered to be at the places of model 1;

- The demolition of *Sociedade Hípica Portuguesa* to build the IBC and the MPC;

- The reorganization of the road traffic accesses in order to reduce the traffic around the *Alameda da Universidade* and *Jardim do Campo Grande* to take advantage of the benefits of these green areas and link them with the new gardens around the new venues;

- The construction of the Olympic Village using around 90 ha of the *Alto do Lumiar* Urban Zoning Plan, which foresees the creation of a residential area for 60.000 inhabitants whose objectives seek the city expansion to its border districts and the elimination of the existing social segregation. This area is within 3 km by car from the EUL and is part of the major plans of expansion of Lisbon.

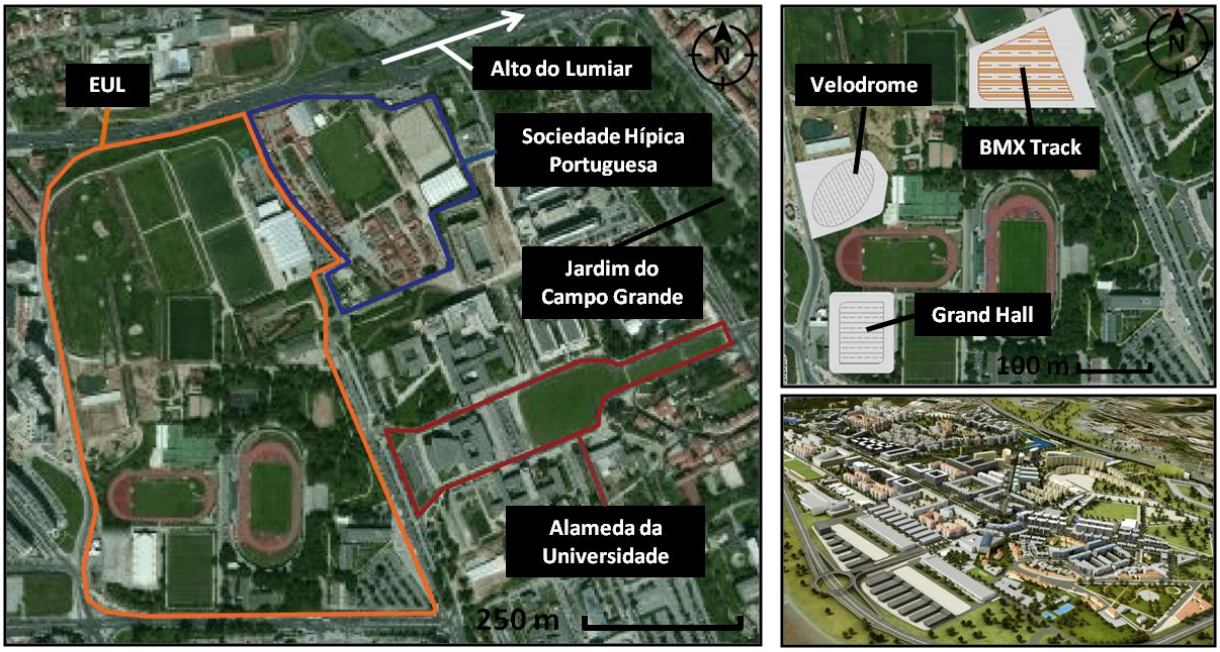

Figure 3: Intervention areas: EUL, *Sociedade Hípica Portuguesa* and *Alameda da Universidade* (left); Suggested locations for the sports venues at EUL (top right); 3D visualization of the *Alto do Lumiar* Urban Zoning Plan[2] (bottom right).

5. Multicriteria analysis for model's evaluation

The following partial multicriteria analysis is based in five points of view and twenty criteria, shown in the impact matrix of Table 1. The first point of view, Olympic Games, is the main subject of the theme, and includes six criteria that, despite being related to the remaining points of view, have special relevance only during the Games delivery. They are representative of the event's potential success. The second, the Urbanism point of view, relates the suggested interventions with the objectives and existing characteristics of the area. The four criteria of this point of view are meant to conclude about the integration of the new venues and interventions in the existing urban areas and plans. The point of view of the Mobility, with six criteria, represents the performance of the public and private transport infrastructures around the sports centers and also of their accesses and ease of internal mobility. The fourth point of view, Sports and venues, evaluates the importance and functions that the new venues can bring to the sports centers. Its two criteria are directly related to the advantages and disadvantages that the new venues represent for the sports complexes, helping to understand if they will have a sustainable legacy or if it is better to explore other options, like temporary venues. The last point of view is of Social aspects, and its two criteria deal with the social benefits that the interventions can bring regarding the social cohesion and the creation of employment.

The models' performance in each criteria is rated from 1 to 4, being 1 a negative score, 2 a medium score and 3 and 4 positive scores, wherein 4 is an excellent performance. Generally speaking, it is possible to observe in Table 1 that the second model has a better performance than the first one.

Table 1: Impact matrix of the models' performance (● model 1; ● model 2)

Points of view	Criteria	1	2	3	4
1. Olympic Games	**1.1** Location regarding the Olympic Village		●		●
	1.2 Olympic spaces' sealing ring		●		●
	1.3 OLN and ORN implementation		●	●	
	1.4 Location regarding the airport			●	●
	1.5 Sites supply for cultural events		●	●	
	1.6 Touristic areas supply			●●	
2. Urbanism	**2.1** Consistency with the Spatial Planning Instruments		●		●
	2.2 Urban space integration			●	●
	2.3 Land use risks	●	●		
	2.4 Environmental constraints		●		●
3. Mobility	**3.1** Public transport supply			●	●
	3.2 Links to the main national public transportation network		●	●	
	3.3 Road accessibility			●	●
	3.4 Consistency with the public transport expansion plans		●		●
	3.5 Mobility in the sports center			●	●
	3.6 Sports center access			●	●
4. Sports and venues	**4.1** Consistency with the sports center's strategic objectives		●		●
	4.2 Consistency with the sports center's needs		●		●
5. Social aspects	**5.1** Social Cohesion	●	●		
	5.2 Employment creation			●	●

PART IV: Conclusions – Results discussion and further developments

The second suggested model, regarding the construction of the new venues in a central area of the city, in EUL, revealed to be a better option for the future of Lisbon than the first one, in CDNJ, mostly because of its interaction with the rest of the city. From the point of view of the Olympic Games, the models showed a similar performance and the point of view of Sports and venues was the only one where the first model had a better performance than the second one. Using a decentralized approach for the construction of the venues can be a way to take advantage of the potential of the two, or even the four sports areas, locating the venues at the sports center where they fit better. It is also important to highlight that all the sports areas have a determinant role in the event's hosting. CDNJ is the one with better characteristics to be an Olympic Park, while EUL represents a good opportunity to link the event with the tourism and sport in the city. PN is the best place to host the cultural activities during the event and PFM has an important role providing nature activities and interactions for the visitors.

This study is only an introduction, from the civil engineering and urbanism point of view, for the possibility of Lisbon hosting the Olympic Games and regarding only the city characteristics and the existing venues. One of the further developments needed for its conclusion is the analysis of the new venues legacy, in order to understand their potential to increase the Lisbon population lifestyle and therefore their contributions to the city and local and national sports community. Also, the viability of the suggested interventions has to be better studied, as well as the strategies to adopt to reconcile the delivery of the Olympic Games with the usual functioning of the city, especially around EUL and PN, which are located in the center of Lisbon. Another really important feature to develop in the future is related with the financial aspects. This case study was developed without taking care of the economic situation of the country and the costs of the interventions. Thereby, an extent of the study is its financial analysis and the way interventions must be done to minimize its costs. One way of smoothing the financial impacts is to build and rehabilitate the venues with time gaps, focusing first on the actual needs of the city and building the planned sport venues thinking in hosting the Games. The rehabilitation of the existing venues must be one of the principles of a Lisbon's candidature, since it has a small population and there is no need to build more sports venues of the kind that already exist.

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