Planning public spaces networks towards urban cohesion

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Introduction

The urban development of the 20th century last decades was characterized, by a strong growth of urbanization processes, often unplanned ones. This fact gave rise to several problems concerning the urban structure, namely, those related to territorial cohesion fragilities. Some of these problems involve, among others:

- The lack of physical and social connectivity in the urban structure;
- The loss of identity;
- Social exclusion and marginalization problems;
- Economical disparities.

Within these fragilities, spatial fragmentation is, in today's cities, one of the main problems involving serious consequences for urban cohesion. Once that it has direct implications on (1) urban mobility, restricting the way how people move in the cities and limiting the access to the uses / activities offered, (2) on natural structures, implying irreversible damages and (3) on the social and economical urban life, having direct implications in the implementation of services for people (hospitals, schools, etc.).

Therefore it is necessary to endow the urban planning and urban design processes with efficient instruments which can contribute to the mitigation of the named problems.

The study of public space has been developing in the direction of greater understanding of its potentialities as a structural element of cities. This fact has lead authors, such as Lynch (1960), Jacobs (1961), Portas (1968), Lefevre (1973), Borja (1977), to consider that "the city is the public space". So, the studies evolution has lead to consider that the public space plays an important role regarding formal, economical, social and environmental issues.

Therefore, the public space plays a key role in the urban structure and city life, becoming a privileged element in order to promote territorial cohesion. It thus becomes possible to think of public space as an element able to promote continuity and order the territory, but also with a natural ability to create and maintain strong local centrality, environmental quality, economic competitiveness and sense of citizenship (Borja, 2003).

Thus, it is fundamental to think on programming, planning and designing public spaces in a way that helps us to find solutions for the structural problems of the urban pattern, such as the lack of territorial cohesion in the cities, involving the issues of spatial fragmentation.

This study aims to reinforce the importance of knowing the public spaces genesis enabling programming, planning and designing public spaces in a logic of a integrated network, (and not only as isolated spaces), intending to contribute to the territorial cohesion of cities. The

present case study has focused on public spaces in the city of Lisbon, aiming to verify the existence and potentialities of a public spaces network, and to understand the added values associated to its planning in an integrated way.

Planning public spaces in a network logic

As mentioned before, it is considered that public spaces should be planned and designed as a systemic network, ie as elements of a large system, which is the city, where they establish relations of complementarity and interdependency.

To better understand what does a network of public spaces really means, or even to realize if we can indeed speak of the existence of a public spaces network, we need to investigate the concept of "network", itself.

The concept of network is not new, and several authors have applied and adapted it to different scientific fields. It is believed that the genesis of this concept relates to a continuous pattern in which strings and knots are attached (Fonseca, 2001). In the urban context, generally speaking, the "knots" are often associated to urban elements (facilities, services, buildings, etc.) and the "strings" to the road network, through which flows circulate (being roads, railroads, pedestrian, etc.).

However, if we take a closer look at it, we can consider that the urban network can be understood in of two dimensions: (1) a physical-formal, which consider the various urban elements, as well as the links and relations between them, and (2) a formal-functional, representing the population, as the user of urban functions, and the relations / interactions established (Hillier, 1984). These two dimensions can not be taken separately, as they establish strong complementarities between them, and also important relations with the social-cultural network of the city (Mandanipour, 1998).

In the study developed, it is considered that a network of public spaces is not composed only of each isolated space (a square, a garden, a street, etc.), but also by the links between the different public spaces and the complementarity relations established between them. It is these linkages and complementarity relations that influence how people experiences the spaces and also how they move within the city.

We can say that programming, planning and designing public spaces, taking into account this systemic network logic, is based on a "top down" approach, in contrast to approaches such as "bottom up", since the starting point of view is the city scale descending, afterwards, to the public space scale.

It is this kind of approach that makes it possible to promote territorial cohesion of urban space, having the planning of the public spaces network as one of the main tools. Knowing and understanding the characteristics of the city's public spaces network, it is possible to improve the relationships of continuity and complementarity between spaces; to generate regenerative social dynamics; or even to create dynamic functional logics.

It is important to stand out that planning and designing public spaces as part of a urban network brings out the possibility not only to restructure the existing spaces but also to develop new public spaces in the expansion urban areas (especially relevant in new developing areas) so that they can create cohesive cities, promoting urban sustainability.

The opportunities for urban cohesion

The concept of urban cohesion is strongly related to the notion of sustainability. Sustainability is, nowadays, generally well known and applied in several different situations. This concept is associated to the lasting management of time and space.

These concepts are linked not only to (1) environmental factors, involving the management of natural resources, reduction of carbon emissions and renewable energy, but also to (2) economic factors related to the city's economical and functional dynamization and to (3) social factors, seeking to promote social inclusion and to generate integrative dynamics. However, there is also another vector (4) physical / functional factors, ie, related to urban form, such as the continuity of space, seeking that all spaces are easily accessible; or permeability, promoting a better understanding of the area, and its functions, facilitating peoples circulation and allowing to establish the necessary links to the proper functioning of the urban network.

The process of programming, planning and designing public spaces of a city, as integrating elements of the urban network, has several added values associated, which strongly contribute to urban sustainability (in its four vectors).

Therefore, in order to contribute to urban cohesion, the planning of the public spaces network should be based on four types of indicators, which allow not only to study and evaluate the network features, but also to be the base line for the definition of guiding principles to act at the level of the existing structure. The four types of indicators mentioned are presented in the table below.

Table 1 – Indicators for programming planning and designing public spaces networks promoting urban cohesion

INDICATOR		INPUTS FOR PUBLIC SPACES NETWORKS
	MOBILITY / ACCESSIBILITY / CONNECTIVITY	Creation of mobility and accessibility conditions that endorse cohesive urban spaces, connecting the different public spaces and making possible the easy access to all the population. Promotion of the existing networks of flows (such as roads, pedestrian circulation, etc.) continuity, in order to allow easy access to the entire urban network, avoiding the creation of barriers.
	LAND USES / ACTIVITIES	Promotion of multifunctionality in the network of public spaces, ranging from commerce and services to facilities and entertainment / recreational activities. Promotion of functional complementarity between several public spaces in the city, always keeping the principle of proximity in mind. The development of socio-economical dynamics through the creation of new land uses and activities can also contribute to regenerate a space.
	SOCIAL DYNAMICS	Generation of social dynamics through the complementarity between public spaces and the activities available. These dynamics promote the arising of urban experience capable of regenerating a site or even minimize the phenomena of social exclusion and marginalization.
	COMFORT / SAFETY	Promotion of safety and comfort in the movements within the urban network. Promotion of security conditions in all modes of movements (road, pedestrian, cycling, rail, etc.). Promotion of comfort, especially at the level of circulation in green transport modes. Thus it is possible to contribute to the success of the socio-economic dynamics generated.

Source: Author's table and pictures

Through these indicators it is possible to evaluate the urban structure and plan / design the public spaces in a way that they can be part of a coherent and cohesive network.

In this project, the evaluation of the case study of Lisbon, is primarily made by considering the first two indicators, (Mobility / Accessibility / Connectivity and Land Uses/ Activities), paying special attention also to the implications that these two indicators have regarding social dynamics. No particular attention will be given to the last indicator, (Comfort / Safety), not because it is less important than the others, but only as matters of information availability, and also due to actual development stage of the investigation.

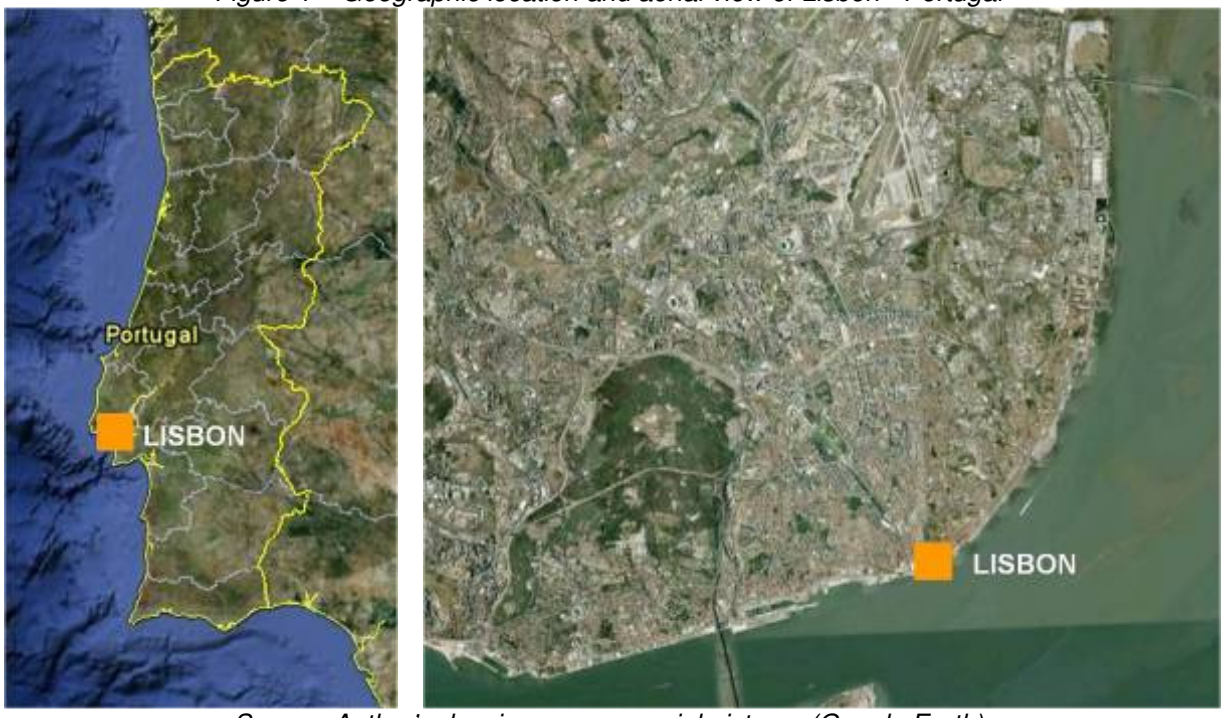
Lisbon city: Analysis of the public spaces network

The case study

This study was held in the city of Lisbon, by developing an evaluation process of the public spaces network based on the above named indicators (Mobility / Accessibility / Connectivity and Land Uses / Activities), and also based on the historical evolution of the public spaces in the city.

In an attempt to frame the case study of this work, it should be noted that Lisbon is the capital and the major city of Portugal, located in the coast line. This city has 564.657 inhabitants and 83,84 Km^2 (data from 2004). Lisbon as other capital cities, all over the world, have been growing and developing forming peripheral areas. Lisbon is also the head of the biggest metropolitan area in the country with 2.870 Km^2 and 2,8 million inhabitants.

Figure 1 – Geographic location and aerial view of Lisbon - Portugal



Source: Author's drawing up over aerial pictures (Google Earth)

The city of Lisbon was chosen for the development of this study because it was considered that it encompass a great wealth and variety of public spaces integrated in a fairly diversified

urban fabric. It is believed that these features will allow a better assessment of the public spaces network, including how can they structure the urban fabric, how do they connect among them and generate dynamics and flows.

The following items will describe in detail the methodology adopted in this study as well as the tools used, and results obtained. It is important to stand out that this study is still a work in progress and, therefore, the results and conclusions here presented are still preliminary, although they allow for some conclusions already, mainly regarding the potentialities of planning and designing public spaces in a network perspective.

Planning the public spaces network: Potentialities for urban cohesion

Aiming to start the analysis of the public spaces network, in the city of Lisbon, it was necessary to restrict the study area to a specific part of the city. The reason we chosed to restrict the study area lies in the fact that this is still a first approach to this kind of methodology, remaining the intention to further expand it to more areas of the city.

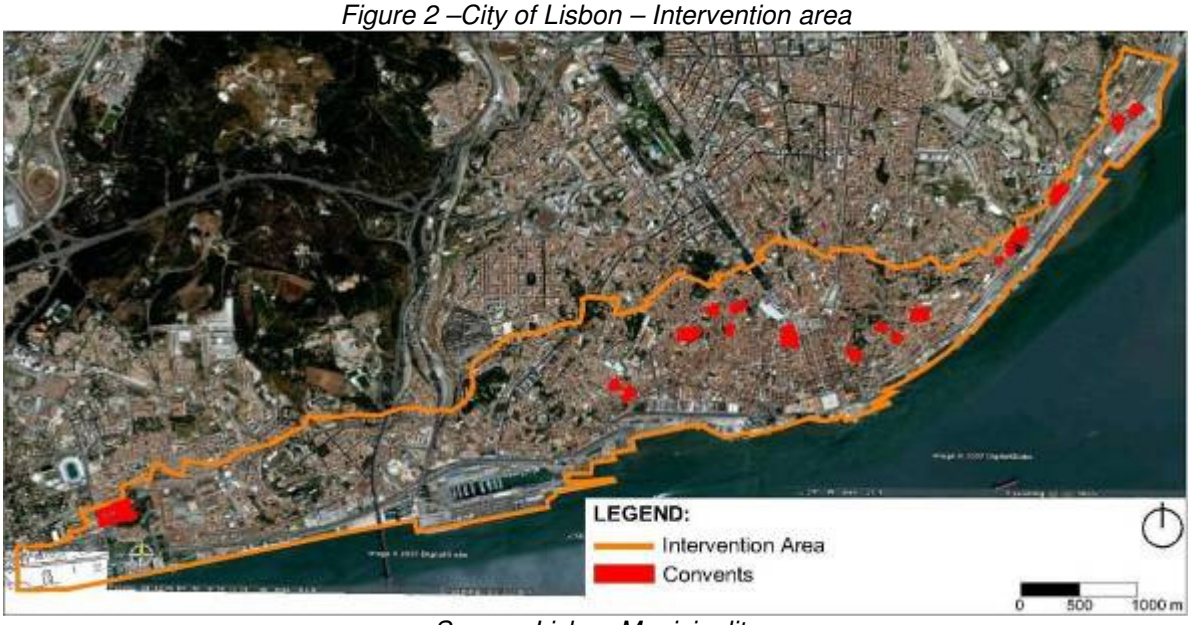
Thus, the intension was to choose a consolidated area, where the urban network had already undergone several changes throughout its development so it would be possible to understand the evolution of public spaces in the urban structure. By studying the evolution of the public spaces, in the city of Lisbon, over time, it becomes possible ascertain the existence of a network of public spaces, assessing the relations of complementarity and interdependency established and the way in which these influences urban life.

It was considered that the downtown area of the city (inherently linked to its waterfront) would be the best choice for the kind of analysis intended here. In this sense, a threshold for intervention was set. This limit was defined bearing in mind two assumptions:

- The first – the intention of considering the downtown area of the city, naturally more consolidated;
- The second – the limit of this central area is defined by the line of the city's convents.

The convents have marked the urban structure of Lisbon since an early stage. In the past, the religious orders were a great factor of development and deployed their buildings – convents – in areas of good accessibility and adjacent to the consolidated urban fabric. So, with the growth of the city, they mark the territory of the "ancient Lisbon" (downtown) and mark still the major axes of movement within this area of town. For this reason it was considered that the limit of the study area should be related to this line of convents. The following figure shows the intervention area for this study.

Figure 2 –City of Lisbon – Intervention area



Source: Lisbon Municipality

As noted above, in order to understand and evaluate the evolution of the urban structure (in the city of Lisbon), through time, and how public spaces are related to this structure, the study of the intervention area was developed in two different time periods (1858 and 2000).

The study of the evolution of public spaces in the structure of the city, in these two time periods also aims to confirm that indeed we can speak of a systemic network of public spaces. All this because, by understanding the role each public space plays in the network and verifying its permanency throughout the development and mutations of the urban pattern, it is possible to show that it makes sense to plan public spaces in a network logic, and not as isolated elements.

This study, of the evolution of public spaces, was based on the available cartographies for each of the above mentioned periods. The cartographies from 1858 (from Filipe Folque) were chosen for its relevance in the history of the city, and the one from 2000 (from Lisbon Municipality) for being the most up to date cartography available.

Aiming to analyze the network of public spaces, taking into account the indicators described, the public spaces which form part of the urban structure in the intervention area were identified for both time periods. It is important to stand out that there was a selection of three typologies of public spaces which are directly related to the indicators that will frame the evaluation of the network (Mobility / Accessibility /Connectivity and Land Uses / Activities). In the following table, these typologies, along with their sub-typologies, are identified for each time period, as well as the parameters used for their identification.

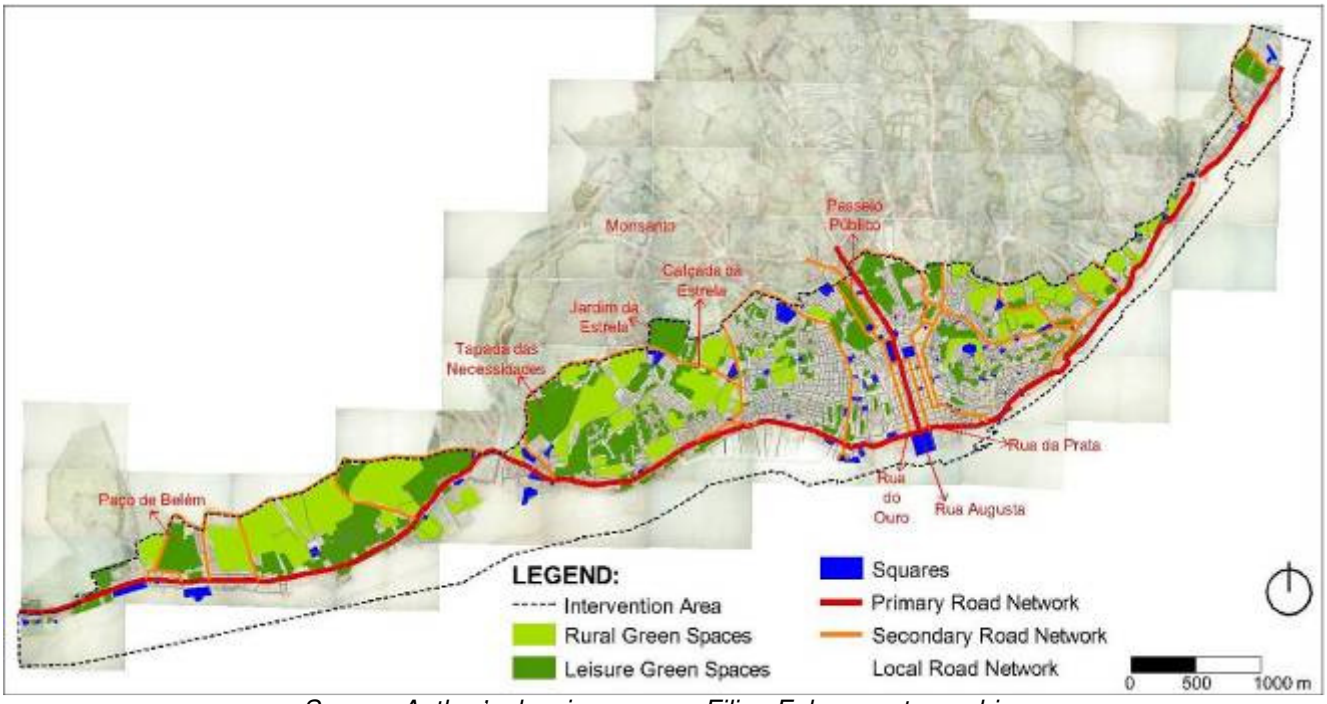
Table 2 – Identification parameters of the public spaces categories and sub-categories

TYPOLOGIES	SUB-TYPOLOGIES	IDENTIFICATION PARAMETERS
GREEN SPACES	Rural Green Areas	All green areas with rural characteristics and with Area ≥ 2000m^2.
	Leisure Green Areas	All green areas destined for leisure activities with Area ≥ 500m^2.
SQUARES	–	All the spaces that function morphologically as squares, ie, meeting places and confluence areas of circulation flows.
ROAD NETWORK	Primary Roads	Roads that ensure the distribution of the major circulation flows as well as guarantee the entrances and exits of the city.
	Secondary Roads	Roads which ensure the circulation and distribution of the inner city as well as the routing of flows to the primary distribution routes.
	Local Roads	Structuring streets in the neighbourhood, with some flow capacity, but where the main element is already the pedestrian.

Source: Author's table

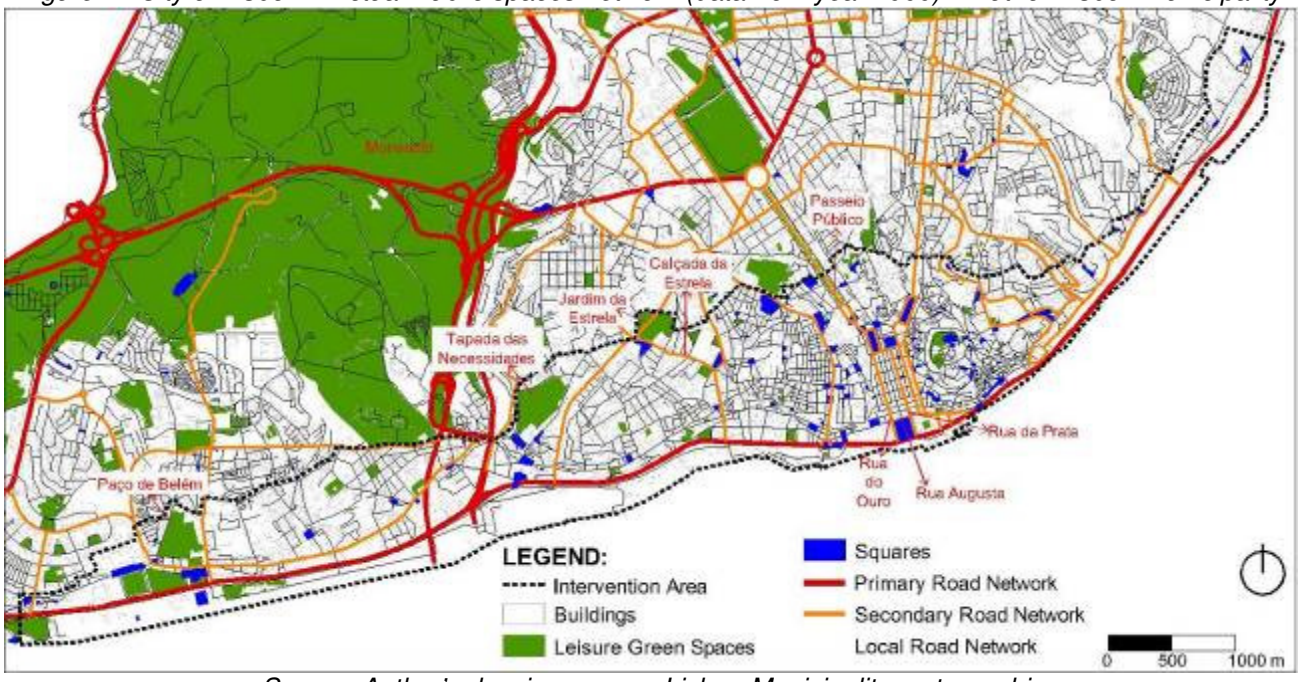
Given the parameters described, were then identified public spaces (for each time period), as part of an urban network. These networks of public spaces are presented in the following figures.

Figure 3 –City of Lisbon – Public spaces network in the year of 1858 – Author Filipe Folque



Source: Author's drawing up over Filipe Folque cartographies

Figure 4 –City of Lisbon – Actual Public spaces network (data from year 2000) – Author Lisbon Municipality



Source: Author's drawing up over Lisbon Municipality cartographies

Analyzing the evolution (from 1858 to 2000) of public spaces inserted into the intervention area, the most obvious conclusion is that the number of green areas has strongly decreased, and even disappeared completely the green areas with rural characteristics. The high population growth and the urbanization processes associated with urban development have resulted in the occupation of rural territory that existed in the urban environment, involving his removal from the city center. This is also, surely associated with the changes that have taken place concerning urban living, as the population lost its rural roots, becoming more and more urban, therefore, leaving no sense for some typologies, such as big farms and rural areas.

However, we see that, throughout the urban evolution, the big natural structures, like Monsanto, or the green areas with an important role in structuring the urban territory, like the Passeio Público (nowadays called Avenida da Liberdade), the Estrela Garden, the Tapada das Necessidades or the Paço of Belém were maintained.

It seems like almost the totality of squares were maintained, throughout the urban evolution, in this area of the city. Some squares suffered changes in their shape, some in their functions, assuming today, a role more connected to commercial activities than before. However, the structuring function that these places have on the urban fabric and urban life seem clear, assuming a central role the city's network of public spaces.

Concerning the road structure, several changes have been noticed, mainly regarding the hierarchy that some roads assume in the circulation scheme of the city, and also due to the motorization of the displacements which has developed exponentially since the appearance of the automobile. In spite of these changes, it can be seen that many of the main connections remained, and that these correspond, mostly to the roads that connect the most important public spaces in the city (gardens, squares, etc.).

It can also be seen that many of these roads represents themselves, some of the most important public spaces in Lisbon, for the functions they perform and for the connections they allow (Rua da Prata and Rua do Ouro, Av. Da Liberdade or Calçada da Estrela). Other example of this structuring axis is Rua Augusta which is now a pedestrian street and one of the most important public spaces in Lisbon's downtown.

The analysis also shows that the convent system of the Ancient Lisbon directly influence the network of public spaces in the city. This is a result of the occupation of the convents territories, which have been made over the years, having been mostly converted into squares and green areas which form the existing network of public spaces. It is also to highlight the ancient connections of the system of convents, which remains in the actual network of public spaces forming part of the city's road network, even some of them being now primary roads.

These facts lead us to believe that, although there are natural changes in the urban paradigm, those public spaces, that actually play a structuring role in the urban pattern do keep their functions, although they can suffer some changes in its shape, and they do integrate the city´s network of public spaces.

After clarifying the concept of a "public spaces network" it is necessary to develop a qualitative evaluation, so as to understand what are its strengths and weaknesses, in order to contribute for programming, planning and designing public spaces supported by the main goal of creating a cohesive and coherent urban structure.

Thus, analyzing the intervention area in what concerns the conditions of accessibility and connectivity it becomes visible that already exists a quite consolidated road network, which is structured enough to guarantee the access and circulation in the urban network, establishing good connections between the remaining typologies of public spaces. However, it comes out that connections concerting green transport modes still don't have, in some situations, the most appropriate conditions of comfort and security.

Concerning the land uses and activities, existing in today's network of public spaces, the main feature is multifunctionality, as in this network there are spaces of rest and leisure as much as spaces of commerce and services, or mere crossing spaces. These types of spaces also have strong relations of complementarity, not only among themselves but also with other urban functions, such as residential areas or facilities. It is also noted, in this network, that the urban functions, present in the public spaces, integrate a proximity logic, giving the local population an easy access to their daily activities.

The conditions of accessibility /connectivity and land use /activities that characterize this network of public spaces can generate strong social and economical dynamics in this area. Some areas in this part of the city have been the target of urban regeneration and rehabilitation processes, strongly associated to the generation of social and economical dynamics in public spaces. Thanks to the strong formal and functional consolidation of the network, these processes have had considerable success. Examples of this kind of processes are the Rehabilitation of the Baixa Pombalina, of Alfama, the Bairro Alto, São Bento, as well as the Proposal for the Revitalization of Baixa-Chiado.

Lastly, it is important to point some principles that can guide the integrated planning of the city's network of public spaces, having, as primary goal, the construction of a cohesive and coherent territory:

- Promote the formal continuity of the flows circulation (road network, pedestrian network, railroad network, cycling, etc.);
- Promote the continuity of important natural structures and ecologic corridors (waterlines, large green areas, etc.);
- Create relations of functional complementarity through the existing land uses / activities;
- Generate social dynamics that minimize phenomena of social exclusion and marginalization;
- Generate socio economical dynamics capable of regenerate a degraded area of the city.

Conclusions

Through the development of this study, it was possible to verify that the public spaces play a fundamental role in the urban structure, holding important urban functions, allowing for the interconnection and coherence of different spaces, and contributing to the urban cohesion and sustainability.

This study also clears up that the urban structures of the Ancient Lisbon, such as the convents and its links within the urban fabric, directly influence the network of public spaces in the city. Even, some of these links have today, the function of primary roads in the network of the city.

This is still an ongoing study. However, the results already obtained slows that, it makes sense to develop the network of public spaces as a whole and not the spaces, in themselves, as isolated elements. In this sense, processes of planning should be developed, as well as projects in which public spaces are considered as an integrant part of a whole, in the urban network.

The integrated planning of the public spaces network involves countless added values, associated, not only to restructuring existing spaces, but also to the construction of new public spaces, making it possible to integrate them in the existing network, so as to promote urban cohesion.

This way, the process of programming, planning and designing a public spaces network can represent a valuable instrument for the construction of cohesive and coherent urban spaces, presenting itself as an important tool for urban planning on a municipal level, once:

- Contributes to the connectivity between different areas of the city, establishing important links regarding the population movements and displacements, but also the urban functions and land uses.
- Allows the minimization of physical barriers that degrade the existing natural and ecological structures of the city.

> Enables the generation of socio-economical dynamics that, together with other measures, are able to contribute to the regeneration and rehabilitation of an area. These socio-economic dynamics may also help to minimize the phenomena of social exclusion and marginalization.

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