MAFALDA TEIXEIRA DE SAMPAYO

DAVID M.S. RODRIGUES

PAPERS

INFRASTRUCTURE AND THE CITY – CHANGING URBAN DYNAMICS, HERITAGE AND 'MODI OPERANDI'

The Persistence of Public Space: Downtown Lisbon

1 INTRODUCTION

Several researchers highlight the persistence of public space: (Lavedan, 1926, p. 1: 91) (Kostof, 1992, p. 130) (Chueca Goitia, 1992, p. 32) (Sampayo, 2003, p. 44) (Larkham, 2004, p. 22). Lavedan called it *"law of permanence of the plan"*. Chueca Goitia reuses the expression applied by Lavedan reinforcing this phenomenon of perseverance of public space. According to Chueca Goitia: *"Urban planners' evolution of cities over time revealed that although the building suffers transformations and is replaced over the years, normally the plan remains unchanged or suffers very few correction."*[1] (Chueca Goitia, 1992, p. 32).

Kostof also highlighted the "recycling" of urban spaces: *"The persistence of open space is one factor. A large public monument of one period with an open usable space may become a public square in another period, regardless of the shifts in the urban fabric during the interi."* (Kostof, 1992, p. 130). With regard to Kostof's observation, note the permanence of the main open spaces of Lisbon in the second half of the 1nth century, after the destruction of the city by the 1755 earthquake: the *Comércio* square and the *D. Pedro IV* square (*Rossio*). Although they were geometrzsed, with the post-earthquake plan, they have occupied roughly the same "ground" for hundreds of years (Rossio exists as a place to be since the Roman period, whe(it was the circus are) and *Terreiro do Paço* has stood out since 1511, when D. Manuel moved his residence from São Jorge Castle to near the river), as theorzsed by Lavedan.

Therefore, when building the current city, one must be sensitive to the memories of the places and their experiences. Borja warns that the death of the city is related mainly with public space and considers paramount the assessment of urban policies as a way to understand how to avoid this death. He also considers that a major factor in avoiding the city's death is the analysis of urban plans in terms of the consideration that the public spaces deserve in them (Borja, 1998, p. 2).

In order to prove the persistence of public space we have centred our study in the Lisbon post-earthquake project. We analysed how the city has evolved since the late medieval plan through the eighteenth-century city, by identifying the characteristics of public space that remained present.

2 METHODOLOGY

This research is carried oun using a method of interpreting the urban form in which the significant structural features of the urban area under study are grasped and analysed (18th century Lisbon). To assess the method, we studied the layouts of Lisbon using three distinct approaches: urban history, urban design and the quantitative assessment of urban form.

The research is based on a comparative analysis of twenty-five drawings of the renovation process of Lisbon after the 1755 earthquake (including maps on the situation before the earthquake), concerned with the observation of public space to understand the urban design.

In the analysis of the urban form of the various drawings, computer aided design software – (CAD, was used to measure the public space. All measurements were recorded on Excel tables in order to carry out a comparative analysis of the drawings. The interpretation of the drawings followed two interconnected methods: an urban analysis and a mathematical analysis (Marat-Mendes; Sampayo; Rodrigues, 2011).

The urban form was interpretee ih two phases: it required a collection of primary sources and a comparative analysis of the collected cartography.

The consultation at the archives was essential as it allowed us to classify the existing maps and note the existence of duplicated maps, as we already had the opportunity to show (Sampayo; Rodrigues, 2009).

The organisation of the fieldwork and preparation to read the urban form has the following steps:

- Survey of primary and secondary sources;
- Research process in the archives;
- Consultation of cartography catalogues;
- Inventory and cataloguing process of maps;
- Vectorzsation of maps in AutoCAD;
- Standardzsation of scales;
- Interpretive drawings of urban form;
- Quantification of the elements of urban form;

3 PUBLIC SPACE

Public spaces have existed since the start of cities or urban areas. Studies on their form and function have always kept busy those who study urban form. However, the term "public space" is recent and polysemic. It appeared in France in the late 1970s: *"The term public spac, itsel, seems to appear for the first time in an administrative document in 1977, as part of a process of public intervention in old neighbourhoods, regrouping in the same category, green spaces, pedestrian streets, squares, enhancement of the urban landscape and street furniture, but will be taken up on numerous documents and will be increasingly successfu."*[2] (Ascher, 1998, p. 172).

The concept of public space, besides having several meanings, has evolved over time, depending on people, periods and mentalities. We can even say that since the early days public spaces have been an immediate reflection of societies' values: *"But even now, the public place is the canvas on which political and social change is painte."* (Kostof, 1992, p. 124).

Merlin and Choay define public space as part of the non-built public domain, associated wito public uses (Merlin and Choay, 2010, pp. 317-319). Public space is constituted by the property and the allocation of its use.

As we know, for Lynch (1960) the structure of urban space is determined by five visual elements: paths, edges, neighbourhoods or districts, nodes and landmarks: *The contents of the city images so far studied, which are referable to physical forms, can be conveniently classified into five types of elements: paths, edges, districts, nodes, and landmark."* (Lynch, 1960, p. 46).

Within the visual elements of the shape of the city, those that are clearly differentiating are the streets and squares, i.e. those that define the public space. Thus, *"when public spaces structure the urban fabric and the mesh they must also be seen as elements of an organising network of urban territory that establishes hierarchies and spatial and functional connections that enable us to orientate ourselves and interpret the cities; they reach yet another dimension, which has to do with their symbolic and reverential valu."*[3] (Seixas *et al.*, 1997, p. 60).

Some people elect the square as the main element in the hierarchical structure of public spaces. Estévez Encarnacion (1990) states that although the street is the main element of organisation if a city, the square is the main space, because it is the place of intersection of the urban system and main "node" of the city: *"urban space is divided into two categories: public space and private space. Public space is a place for collective use, which constitutes the internal axes of the city: streets, squares, green spaces... The street is the first element of organisation of the city, but the main place is occupied by the square because it is the place of intersection between the urban system and the main "node" of the cit."*[4] (Estévez Encarnacion, 1990, p. 6).

Borja argues that public space should have some formal qualities such as the continuity of urban design and the faculty of arranging itself, the generosity of forms, of image, of its materials and the adaptability to various uses through the ages (Borja, 1998, p. 3). His texts reflect concerns about intervention in public spaces in today's cities.

Another key idea in the writings of Borja (1998) is that the public space is able to articulate the various scales of the town, the neighbourhood, the city, and even the metropolitan area.

Borja considers the existence of public spaces in major urban projects as a key factor of the creating capacity of the city. At least for three main reasons (Borja, 1998, pp. 18-19):

- Public space is a very effective means of facilitating the multifunctionality of urban projects; it allows diversity of uses in space and adaptability to time.
- The public space is, in itself, the mechanism to ensure the relational quality of an urban project, both for residents and for othee citizens. This relational potential must obviously be confirmed by the urban design and verified by use.
- Public space is a possible answer to the challenge of articulating the neighbourhood (a more or less homogeneous urban set), the city-agglomeration and metrop olitan region. The continuity of the main axes of public space is a condition of visibility and accessibility for each of the urban fragments and a key factor for city integration.

From the foregoing it is clear that public spaces correspond to spaces of movement and spaces of permanence in a city or urban area.

Planners group these spaces into two broad morphotypological categories: linear public spaces and non-linear public spaces. The first correspond to circulation spaces such as streets, lanes, etc., and the latter to spaces in which you stay such as squares, churchyards, etc. (Seixas *et al.*, 1997, p. 55) (Pereira, 1996, pp. 26 - 27).

In the next sectioh we will analyse non-linear public spaces in maps with regard to Lisbon's reconstruction plan.

4 QUANTITATIVE ASSESSMENT OF SPACES OF PERMANENCE IN LISBON'E POST-EARTHQUAKE PLAN

Immediately after the earthquake, Manuel da Maia selected a group of engineers to submit proposals for the renewal of the lower part of Lisbon. These proposals were delivered in 1756. They are plans 1, 2, 3, 4 and 6 stored either at the City Museum, or at the Bureau of Archaeological Studies of Military Engineering. One of the proposals was chosen (it is believed that the one of [1758][5] matches the design of plan 5 by Eugénio dos Santos, as stated by Manuel da Maia in his dissertation (Aires, 1910, p. 50)) and was processed during the second half of the 18th century, as evidenced by the maps examined in this investigation. (FIGURE 1 & 2)

After having gathered all the maps concerning the development of the project dur-

ing the second half of the 18th century, we proceeded with the analysis of public space through the spaces of permanence recorded on these maps.

Twenty-three spaces of permanence represented in 12 urban drawings in 11 maps[6] were analysed: 1. Situation before the earthquake (extracted from the [1758] plan). 2. Situation before the earthquake (survey by Manuel da Maia7 which served as a basis for the 1756 proposals). 3. Plan 1 (1756). 4. Plan 2 (1756). 5. Plan 3 (1756). 6. Plan 4 (1756). 7. Plan 6 (1756). 8. Plan [1758]. 9. The 1770 plan. 10. Plan [1777]; Plan [January 1786]. 11. The September 1786 plan. (FIGURE 3)

The quantification of the different areas of permanence on the several renewal plan, required a normalzsation of the different scales found in the maps. Using buildings that were not affected by the earthquake (Convent of São Francisco, Lisbon Cathedral, the church of St. Cristovão and the church of Carmo) it was possible to calculate correcting factors for each drawing.

After the exercise to standardzse the scales it was possible to measure the areas of the different spaces of permanence. Table 1 shows the areas of the spaces of permanence in the maps listed above.

The analysis of Table 1 indicates that most places of permanence in the late medieval city (1 and 2 on the table under analysis) are weighted in several projects submitted between 1756 and 1786. The project thah omits more spaces in view of the late medieval cit, is the [1758] project (no. 8 on the table under analysis). This is justified by the lower number of churches proposed in this project and the consequent absence of churchyards. However, it is in the [1758] project and the [January 1786] project that we find the highest number of places of permanence, 82,765 m^2 for the [1758] project and 88,199 m^2 for the [January 1786] project.

The spaces of permanence if the late medieval city without continuity in project proposals for the period 1756 to 1786 are: Largo do Pelourinho, Largo do Magalhães, Largo da Portagem, Largo do Aljubre, Largo do Poço and Praça da Palha). These spaces have a common denominator – they are small. In the plan of the situation before the earthquake (extracted from the [1758] plan) these spaces vary in area from 196 m^2 to 976 m^2. In the other plan of the situation before the earthquake (survey Manuel da Maia, which served as a basis for the 1756 proposals), the permanence spaces range from 150 m^2 to 832 m^2.

As we continue to analyse Table 1, it is noticeable that the quantification of the areas of spaces of permanence in the two plans pertaining to the situation before the earthquake (no. 1 and 2 on the table under analysis) are in most cases similar. We only noted significant differences in the areas of larger spaces: the Terreiro do Paço, Rossio and Praça das Arrematações (squares). Still observing the table under analysis in a global manner we note: the great divergence of areas between the main squares (Terreiro do Paço, Rossio and Praça das Arrematações) and the remaining spaces of permanence; the variability in size of areas of the spaces of permanence and the verification that most of the spaces of permanence have areas less than 2000 m^2.

It is also possible to establish relationships between the maps under analysis via the measurements of the areas of permanence of the projects. The proximity of areas of spaces of permanence between the situation before the earthquake and plans 1 and 2 (no. 1, 2, 3 and 4 on the table under analysis) can be observed. This is justified by the closeness of urban design of the first proposals of the plan with the late medieval city.

It is also essential to highlight the proximity of the areas of large squares (Terreiro do Paço and Rossio) on the maps relating to the late medieval city and in the project shown in the September 1786 plan. This proximity shows an understanding of the old city by the 18th century engineers.

5 CONCLUSION

We proceeded with the validation of the persistence of public space by reading the map regarding the reconstruction of Lisbon post-earthquake (1756–1786) and proved that many of the spaces of permanence (squares and churchyards) come from the late medieval city.

We observed that in the different suggestions for projects, the spaces of permanence have continuity and some of them present areas similar to those of the spaces of permanence of the late medieval city.

Our conclusion is that public spaces are the most characterising elements in the city due to their resistance to change and their strong persistence over time.

NOTES

1
Translation by the author. Original language version in Portuguese.

2
Ibidem.

3
Ibidem.

4
Ibidem.

5
There are some uncertainties regarding certain dates relating to the process of reconstruction of Lisbon post-earthquake. When there are no facts justifying the date of origin of the map under study, square brackets [ ] are used. Possibly the Eugénio dos Santos and Carlos Mardel's map dates back to 1758 and is related to the 12th June Plan of that year.

6
Two urban drawings were extracted from the [1758] map.

7
It is possible that the map of the situation before the earthquake, courtesy of Manuel Maia to the engineers who helped in the Lisbon post-earthquake plan, is a copy of the survey delivered by him to D. João V in 1718. According to Viterbo D. João V commissioned in 1713 the plan of "both cities west and east of Lisbon." This work was developed in five years (1713–1718) (VITERBO, 1904. 126).

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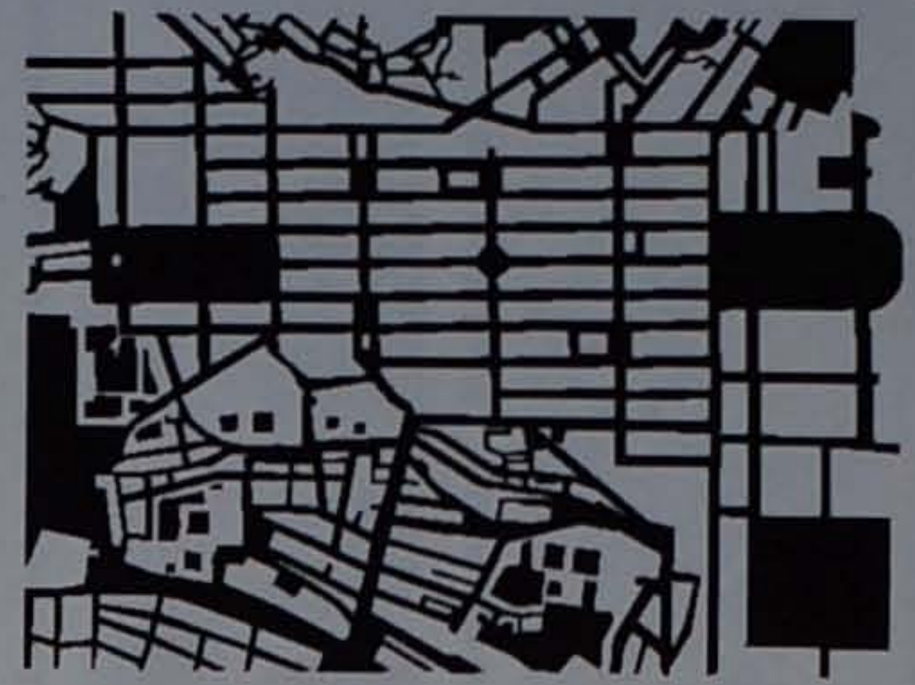
TABLE 1
SUM OF AREA OF SPACES OF PERMANENCE ON MAPS FROM 1756 TO 1786 (Sampayo, 2012, p. 429).
The maps analysed cover the period from 1756 to 1786 and show the evolution of spaces of permanence in the different post-definition project plans [1758].

Nome	Carta											
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
Terreiro do Paço	31128	34040	29265	33621	51780	25242	27282	34382	36052	33658	33426	32907
Rocio	16767	15585	15282	15381	15514	20212	15895	20548	18545	19506	18635	16518
Praça das Arrematações	6083	1010	1093	978	9477		6075	9977	5656	5568	10975	12214
Adro da Igreja e Convento de São Francisco	460	774	742	738	510	2835	3371	2814	1553	649	1385	1196
Largo do Carmo	1340	1518	1609	1562	1559	1766	1538	2859	2442	2659	2569	2569
Feira das Bestas	3102	3546	3695	3686	3595	3471	3405		2720	2935	2549	
Adro da Igreja de São Nicolau	1230	1256	1782	1616	1951	2928	2802		732	558	828	526
Largo do Pelourinho	976	542	834	848	983							
Adro da Igreja de Santa Justa	730	582	1872	1317	845	3208	1387		790	445	782	639
Adro da Igreja de S. António da Sé	659	1466	829	1569	1390	1393	1730	659	277	3812	1343	492
Adro da Igreja da Madalena	595	562	927	148	1297	1585	1042	1002	527	436	532	782
Adro da Igreja de S. Julião	417	426	2974	688		2959	617	9977	811	746	12204	10593
Largo do Magalhães	377	832	890									
Largo da Portagem	340	695		675	1010							
Largo do Conde de S. Vicente	320	378	555	780	1077	853			1384	1198	1652	1568
Largo do Aljubre	286	232	208	202	218							
Adro da Igreja de Nossa Senhora da Conceição	206	166	190	163	195	1421	1252	98	366	338	1209	122
Largo do Poço	196	150	264									
Adro da Igreja de Nossa Senhora da Vitória	180		1373	538	180	2042	455	449	92		110	356
Adro da Igreja da Boa Hora	135	280	210	206	187	219			25	293		
Adro da Igreja do Espirito Santo	118	70	80	76	129	112	140		172			
Praça da Palha	549	326										
Praça da Ribeira Nova									4020	7721		
TOTAL	66194	64436	64674	64792	91897	70246	66991	82765	76164	80522	88199	80482



FIGURES

1
Voids versus Built Space for the different Lisbon reconstruction plan: 1) pre-earthquake situation; 2) plan no. 1; 3) plan no. 2; 4) plan no. 3; 5) [1758] plan; 6) plan no. 4; 7) plan no. 6.

2
Urban form elements for the different Lisbon reconstruction plann: 1) pre-earthquake situation; 2) plan no. 1; 3) plan no. 2; 4) plan no. 3; 5) [1758] plan; 6) plan no. 4; 7) plan no. 6.

3
Section of the urban drawings of the areas of permanence extracted from the 11 maps.

AT [1758]	AT (1756)	Plano 1 (1756)	Plano 2 (1756)	Plano 3 (1756)	Plano 4 (1756)
Terreiro do Paço	Terreiro do Paço	[Terreiro do Paço]	Terreiro do Paço	Terreiro do Paço	Terreiro do Paço
[Rocio]	Praça do Rocio	[Rocio]	Praça do Rocio	[Rocio]	[Rocio]
[Praça das Arrematações]	[Praça das Arrematações]	[Praça das Arrematações]	[Praça das Arrematações]	[Praça das Arrematações]	
[Adro da Igreja e Convento de São Francisco]	[Adro da Igreja e Convento de São Francisco]	[Adro da Igreja e Convento de São Francisco]	[Adro da Igreja e Convento de São Francisco]	[Adro da Igreja e Convento de São Francisco]	[Adro da Igreja e Convento de São Francisco]
[Adro da Igreja de São Domingos]	[Adro da Igreja de São Domingos]	[Adro da Igreja de São Domingos]	[Adro da Igreja de São Domingos]	[Adro da Igreja de São Domingos]	[Rocio]
[Adro da Igreja de São Roque]	[Adro da Igreja de São Roque]	[Adro da Igreja de São Roque]	[Adro da Igreja de São Roque]	[Adro da Igreja de São Roque]	[Adro da Igreja de São Roque]
[Praça de S. Paulo]					

Plano 6 (1756)	Plano de [1758]	Cartas de 1770	Carta de [1777]	Carta de [1786 Jan.]	Carta de 1786 Set.
Terreiro do Paço	Praça do Comércio	Praça do Comércio	Praça do Comércio	Praça do Comércio	[Praça do Comércio]
[Rocio]	Praça do Rocio	Praça do Roçio	Praça do Rocio	Praça do Rocio	[Praça do Rocio]
Praça das Arrematações]	Praça à Porta do Arsenal	Praça das Arrematações	Praça das Arrematações	Praça defronte do Arsenal	[Praça das Arrematações]
Adro da Igreja e Convento de São Francisco]	[Adro da Igreja e Convento de São Francisco]	[Adro da Igreja e Convento de São Francisco]	[Adro da Igreja e Convento de São Francisco]	[Adro da Igreja e Convento de São Francisco]	[Adro da Igreja e Convento de São Francisco]
Adro da Igreja de São Domingos]	[Adro da Igreja de São Domingos]	[Adro da Igreja de São Domingos]	[Adro da Igreja de São Domingos]	[Adro da Igreja de São Domingos]	
Adro da Igreja de São Roque]	[Adro da Igreja de São Roque]	[Adro da Igreja de São Roque]	[Adro da Igreja de São Roque]	[Adro da Igreja de São Roque]	
	Praça de S. Paulo	Praça de S. Paulo	Praça de S. Paullo	Praça de S. Paulo	

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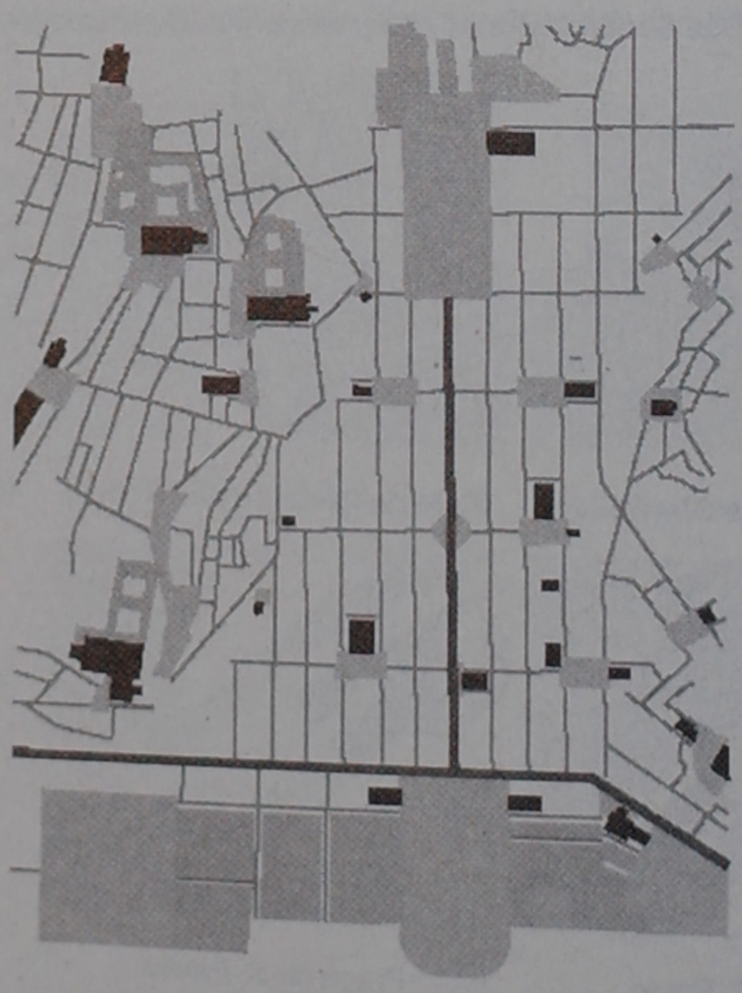

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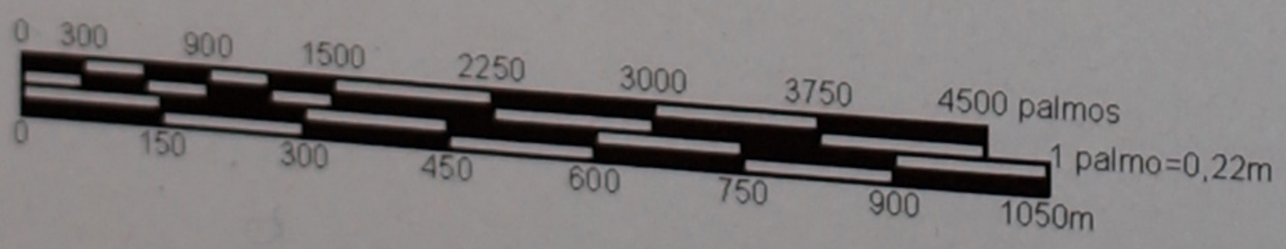
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