

## THE RENOVATION IN URBAN PUBLIC SPACE THE CASE STUDY OF JARDIN DE LA RAMBLA DE SANTS

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**Palabras clave:** morfología urbana, renovación urbana, conectividad urbana, ferrocarril, espacio público

### **Resumen:**

La estación de tren, uno de los más importantes componentes en una ciudad, juega un papel muy significativo en la conexión de distritos entre sí y con otras ciudades. Desafortunadamente, en muchas ciudades el ferrocarril en lugar de actuar como un enlace para promover el desarrollo urbano, ha cortado los enlaces internos de las ciudades y los ha separado. El proyecto de renovación urbana de Barcelona muestra cómo reconectar áreas desconectadas y, más importante, cuán importante es el proyecto para los residentes locales y para la morfología urbana. La sintaxis espacial es una buena metodología para revelar todo el proceso de renovación, y también puede explicar la influencia y el resultado tanto para el ciudadano como para la ciudad.

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**Keywords:** urban morphology, urban renovation, urban connection, railway, urban public space

### **Abstract:**

The train station, one of the most important components of the city, plays a significant role to connect each district and others cities. Unfortunately, in many cities their train station and rail, instead of acting as a link to promote urban development, have cut off the inner links of cities and cut them apart. Urban public renovation project in Barcelona demonstrates how to reconnect the separated area together, and more importantly how decisive the project to the local residents and the urban morphology is. Space syntax is a good methodology to reveal the entire process of the renovation, and it also can explain what the influence and result to both citizen and city.

This article is based on the methodology of space syntax and urban theory to do a case study, analyze urban public traffic project renovation in Barcelona, and attempt to reveal the differences in before and after, how the project changed the urban morphology, to provide the Chinese urban department a study case, and finally summarize the methodologies and conclusions.

## **1. INTRODUCTION AND CONTEXT**

Since the 1960s, Barcelona has been undergoing the renovation and renewal of modern urban public space, and each renovation and renewal often accompanied by some important remodeling and innovation of urban traffic space. The renewal of urban traffic space is closely related to the development of the entire city. It is a kind of amendment and progress to its own problems and a re-recognition of humanity and society. It has a positive role in promoting the development of urban areas, realizing the regeneration and reconstruction of urban space and enhancing the value of urban space.

On the traditional cognition of China, the traffic space is usually defined as the pure «traffic» attribute, which is a node, space or facilities used by people and vehicles. First of all, the current situation of Chinese traffic space is often given priority to and designed by car traffic, and the importance of people in traffic space is seriously neglected. Secondly, large-scale urban design, urban planning dominated by car behavior, and large space scale make people's travel seriously impeded, and pedestrian space is also greatly compressed and occupied. In his book *Cities for people*, Jan Gehl stresses that we must design Cities for people, not just for cars, for beautiful buildings, or for blind simple economics. Urban design needs to maximize the diversity of social interaction, minimize the demand for transportation, enable people to enjoy life in public spaces, and create opportunities for unintentional or intentional encounters. Compared with the design of traffic public space in China, which is one-sided in pursuit of traffic efficiency, however, the transformation of urban traffic space in Barcelona not only meets the basic functional attributes of «traffic», but also demonstrates the urban strategy and social appeal to a higher level from the perspective of urban management and planning. Based on the perspective of human beings and the needs of society, it shows the priority and respect for human beings in dimension design, and closely connects to urban planning, urban public space transformation and citizens' daily life.

The train station plays a significant role to connect each district and others cities. Unfortunately, many cities their train station and rail, instead of acting as a link to promote urban development, railways have cut off the inner links of cities and cut them apart. The Barcelona Jardins de la Rambla de Sants, La estacion de Barcelona- La Sagrera are positive examples to demonstrate how to contact urban community of each side which cut by huge gap of rail and train station, and how to re-establish the communication and re-activate the urban vitality. The following words will do a case study of Jardin de La Rambla de Sants to show how the urban project revive and reconnect the city.

## **2. CASE STUDY: JARDIN DE LA RAMBLA DE SANTS**

Sants railway station built in the 1970s, its railway and affiliate traffic brought supplies and labor to Barcelona continuously, however about 30 meters wide gap and eight railway tracks cut apart the district Sants into two areas. It destroyed the whole city

morphology, constant rail transport and huge crack of urban morphology formed some serious problems, such as lead low quality of the urban public space, social problems, crime, inconvenient movement of pedestrian, etc. Finally, local people generally move out from the railway track area, and the city start to lose its' vitality (figure 1).



Figure 1. Sants and Railyway area before and now

The axial and segment analysis data table of space syntax shows how the urban condition changed in this area because of the renovation project Jardin de la Rambla de Sants.

Attributes table 1: mean Integration value in different radius

	NC	m. conn	m. depth	m.Int R200	m.Int R400	m.Int R800	m.Int R1200	m. Int (n)	Synergy R400/N
Before	1086	4.37	2923.51	25.24	59.02	149.18	246.32	418.42	0.430
After	1137	4.43	2989.24	25.98	62.91	164.47	273.04	449.30	0.446

Attributes table 2: mean Choice value in different radius

	m.Choi R200	m.Choi R400	m.Choi R800	m.Choi R1200	m.Choi (n)
Before	43.32	324.86	2261.64	6160.04	17530.8
After	46.26	365.44	2600.44	7069.54	19362.8
Growth	6.78%	12.49%	14.98%	14.76%	9.46%

By contrast, China as emerging country has similar problem situations like this, magnificent social architecture and construction do not only play a simple function as social service, but is also responsible for the displaying of the nation power, urban scape and authority. This behavior and essence reflect the miss consideration of humanity, and the desire of urban future from authority who wants to establish the nation and the city upon examples learnt from western-world cities.

### 2.1. Re-unified and re-connected urban space and morphology

From the perspective of urban dimension, Jardins de la Rambla de Sants could not simply be understood and defined as an ordinary urban infrastructure or construction, which has a significant impact on the urban spatial and social value of the Sants district of Barcelona.

First of all, the establishment of Jardin de la Rambla de Sants reconnects the urban fabric with the intervention of urban public space. Fundamentally, the garden strengthens the lateral connection between the two sides of the railway. The previous several overpasses have been changed into a transport public space for citizens, which can be used as the connection of the urban area. Due to this project, the urban accessibility has been significantly improved, the urban scars have been repaired, and the regional connections have been restored and strengthened.



Figure 2. Connectivity of Jardin de la Rambla de Sants changing between before and after. Average Connectivity: before: 4.37, after: 4.43.

In the analysis result of connectivity of Depthmap (figure 2), urban connectivity changes owing renovation can be seen. The average connectivity raised from 4.37 to 4.43, a slight increase, but, more apparently, the roads directly connected by the Jardin de la Rambla de Sants are quite increased (Table 3). Depending on the change of connectivity, we can notice that half of them increased 50%, which means Jardin de la Rambla de Sants enhanced the local connectivity dramatically between the two sides of the railway.

Attributes table 3: connectivity of several connected street

connectivity	C/ Tinent Flomesta	C/Jocs Florals	C/Sant Jordi	c/pavia	c/Bonaventura Pollés
Before	3	2	3	3	4
After	4	5	6	6	6

## **2.2. Increased urban integration and vitality**

The establishment of Jardin de la Rambla de Sants has a great social value. High integration promotes potential value in this district, which means the urban public space around railway transformation changed the area into a center area in the Sants district. In the urban space not only enriched the urban forms, but also improved the social forms--- society and local resident population structure changed at the same time. For instance, the previous dark area that made small robbery easy has been converted into an open and connected public space, whilst the combination of square garden public space and transport hub space also attracted a lot of people to get in. It enriched the urban vitality and cohesion, the stream of people also strengthened the local commercial potential and increased urban value (figure 3), improved a residents' well-being and promoted urban renovation and development.

The analysis of RN integration before and after are respectively 418.42 and 449.3 (figure 3), the garden definitely raised up the value of sants area. As the depthmap demonstration, in global the Jardin de la Rambla de Sants is becoming a high integration value street, which means the garden is the new center, and it has the potential to be the most «to movement» place.

Moreover, when compared with a pedestrian dimension, radius r400, (Figure 4), the previous railway places are low, and the position of railway has no value at all. However, after the construction of the Sants Rambla garden, the entire area of the cross of C/National N340 and C/Antoni de Capmany became the center area, and also the high value area extends to the Sants Rambla garden. Besides, owing to the increase of the crossings and Jardin de la Rambla de Sants, those connected street values have been enhanced as well. Thus, in the local R400 analysis, the Jardin de Rambla de Sants helped to renovate this area and create a new city center, totally changing a previous poor urban condition to the current high integration public space. The whole area, especially the Sants Rambla Garden connected area, changed from being of low vitality, an almost forgotten area (figure 5) into a new center, with new commercial potential, new urban morphology and revived urban public space.

## **2.3. Increased urban integration and vitality**

Choice measures how likely an axial line or a street segment it is to be passed through on all shortest routes from all spaces to all other spaces in the entire system or within a predetermined distance (radius) from each segment (Hillier, B., Burdett, R., Peponis, J., Penn, A. 1987).



Figure 3. Average RN integration value before : 418.42 after : 449.3



Figure 4. Average RN integration value before : 59.02 After: 62.91



Figure 5. The railway cut the city

Attributes table 4: mean choice value between different radiuses.

	M.ch r200	M.ch r400	M.ch r800	M.ch r1200	M.ch N
Before	43.3	324.86	2261.64	6160.04	19362.8
After	46.26	365.44	2600.44	7069.54	17530.8



Figure 6. R400 Choice. Before: 2261.64 and After: 2600.44



Figure 7. RN Choice. Before: 19362.8 and After: 17530.8

Depending on the choice analysis, this article selected R400 pedestrian for local domains and RN for the global dimension. Firstly, starting with the global dimension, (Figure 7) the diagrams do not show big difference between each other, but the Sants Rambla area becomes to the most passed through place and form one of the shortest routes in the Sants area. In other words, starting from the construction of Jardin de la Rambla de Sants, it changed the civic pass choice and solved the traffic problem caused by the cut of railway. Secondly, the local dimension of radius R400, (Figure 6) exhibits the most significant change in the surrounding area of the Sants Rambla. A quite apparent

change, before the renovation most streets around the railway showed low choice values, and few people would chose those areas as a route to pass through; by contrast, with the Jardin de la Rambla de Sants the places near the railway acquired high choice values, enhancing people to pass through, helping pedestrian use and increasing vitality.

Correlation between integration and choice informs about the accessibility of a space as destination from all others and the likelihood of being a shortest routes destiny from all points to all other points in the layout, i.e. it indexes the agreement between a space's potential for to-movement and through-movement.

«The degree to which a space is likely to lie on the shortest routes from all points to all other points in the layout is not an intuitable property of the layout, whereas the number of steps a space is from all other spaces is an intuitable property in that knowledge of it can be built up over time by moving around the layout”. Choice may be a better predictor of movement for "inhabitants" with better knowledge of the layout than for "strangers" who rely on reading the layout, in order to move around» (Hillier 1987, 2009).

Those analysis of accessibility (movement interface) also can indicate how the urban condition changed. (Figure 8), As the figure (over 0.5) shows the integration and choice turn to positive correlation, this area has a good accessibility. The accessibility has a slight increase, not dramatic. Because of the data does not show the west urban condition, including the entire Sants and some Les Corts area, further research is required for precise analysis, that will be done in the future.

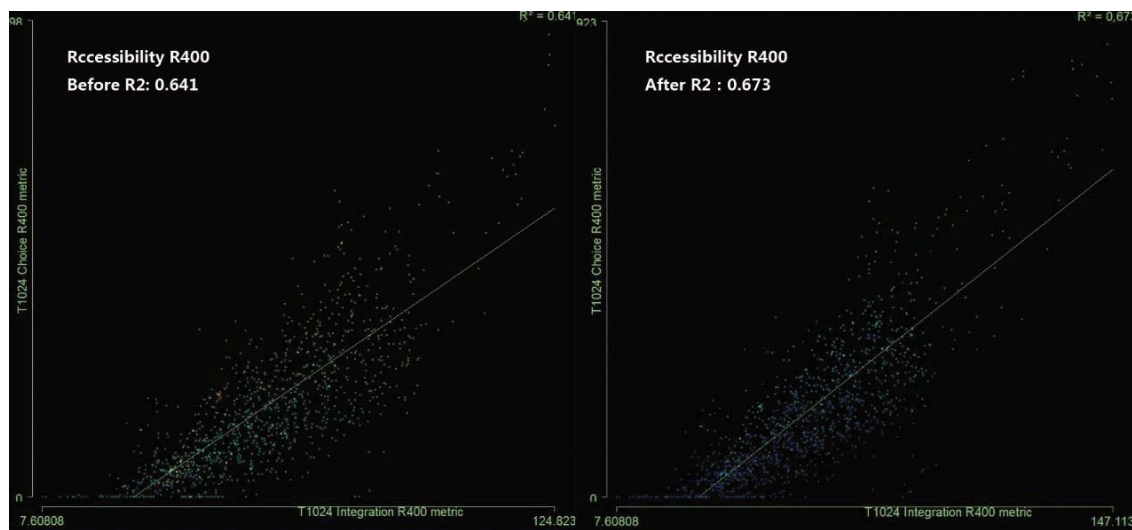


Figure 8. Accessibility before and after

#### 2.4. Highly integrated multiple functional urban public space

The types of urban public space in a traditional sense can be limited here to four types: street, square, park and garden, and usually the public space project has only a single attribute. The Jardin de la Rambla de Sants integrates the traditional concept of public space classification and integrates the multiple types of space of urban square, park, rail transit and public facilities, which is a reconstruction project of urban public space superimposed by multiple urban elements. (Figure 9)





Figure 9. Jardin de la Rambla de Sants revived the area.

First of all, from the function of public space, the urban garden, square, street and other types of public space are integrated, and the original urban space forms of the old city are combined to make the urban form diversified. Secondly, urban public activity space and traditional traffic space are combined in spatial attribute, which greatly enriches the urban interface. The Sants rail garden is located in the Sants railway station, Sants square and the old city. In order to avoid the large railway line renovation project, the Jardin de la Rambla de Sants not only maintains the existing rail transit system, but also meets the demand of road and pedestrian traffic. In addition, the platform park above the track meets citizens' demand for public space, greatly expands the existing urban interface, and improves the quality of residents' living environment. In terms of hearing and vision, this project also solved the problems of noise and visual pressure caused by original track construction and train traffic. The diagonal intersecting structure of the support platform and the closed glass facade isolates the noise of the track and train operation to the maximum extent within the tunnel; a large number of shrubs, climbing plants and trees in and around the garden also try to reduce noise pollution caused by rail transit. On the visual level, the platform stands on the track, which is tens of meters above the ground. As a result, it becomes the highest point of view in the region, providing a new visual experience for the surrounding residents, relieving the auditory pressure and visual pressure caused by the boring and indifferent rail transit.

## **2.5. Urban public space with continuous growth**

The development and continuity of a city cannot be separated from its sustainable development and construction. An urban project is the carrier of urban development and construction. If successful, it could drive and lead sustainable development of a district or a city. However, many cities in China fail to consider the continuity of development and

planning, the project is independent of city existence, and the urban development policy is constantly changed, resulting in the lack of continuity of urban construction and planning.

Compared with the Chinese single and independent urban projects, Barcelona often makes forward-looking and systematic planning and management in urban projects combining the existing conditions and the future development of the city. In the case of the Jardin de la Rambla de Sants, it also reflects the continuity and extension of the public space in Barcelona. The garden total length is 800 meters, in the east it connects with Sants square and railway station, and in the west side it gives a full consideration to the future urban expansion and development. The extension interface can grow and extend westward along the railway, and lead the direction of urban expansion to the Llobregat district. Consequently, the continuous and sustainable consideration of Jardin de la Rambla de Sants leave a huge potential to the entire city, it can play the function of repairing urban scars, enhancing regional accessibility, strengthening urban connection and establishing urban public space in the following urban renovation (Figure 10).

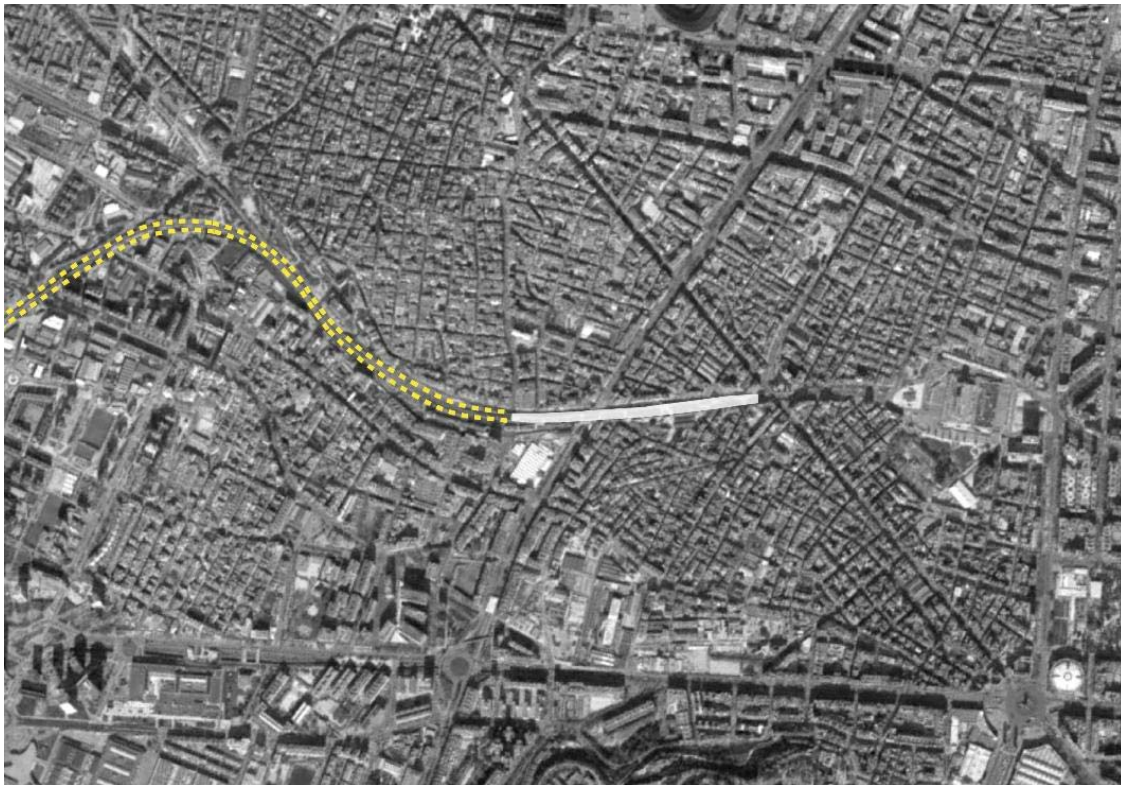


Figure 10: the opportunity of continuity of Jardin de la Rambla de Sants

## 2.6. A systematic and interconnected urban public space system

The Sants district is the old town of Barcelona, and the whole area is attached to the Sants railway station. Compared with other districts of Barcelona, Sants district has fewer parks, limited open space, narrow roads, high urban density, poor living quality, and in general, a slow development of urban public space. The Jardin de la Rambla de Sants not only provides an open urban terrace for the area, but also strengthens the connection between the public space and the surrounding urban area, forming an interconnected public space system (Figure 11).

Specifically speaking, the East-West of Jardin de la Rambla de Sants meets the north-south Rambla de Brasil, therefore the formerly closed Sants region is completely integrated with the two districts: Les Corts and Zona Franca. As the result, the urban public space has been connected and shared, the value of the Sants district has also been maximized, and finally the whole western urban public space system of Barcelona is formed together by the connection of Jardin de la Rambla de Sants.

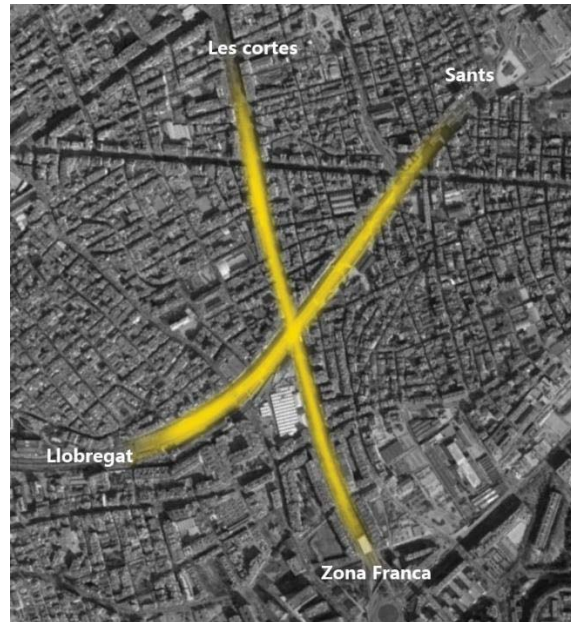


Figure 11: possibility of continuity

### **3. CONCLUSION**

The renewal of traffic public space in Barcelona is not only the optimization of the traffic system in the sense of function, but also a great progress in urban planning. From the single and simple traffic functional space, it gradually evolved into a complex urban public space, additionally, integrated into the deep understanding of the city, the community, the environment, the urban space and the requirement of citizens.

Otherwise, the re-cognition to city and people is also a new urban research aspect which Chinese urban department need to seriously face to, the current Chinese city almost design for vehicles but not for pedestrian, the shortage of urban public space and public transportation will continually stimulate the increase of private cars and intensify the traffic pressure. The only way to solve urban problem is back to the original point, and design the city with a comfort scale and the pedestrian dimension to modify and design the urban public space, especially the traditional traffic space. Due to the process of the research, case study of Chinese part did not included this part will be done in the following steps.

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