Reading Urban Spaces by the Space Syntax Method:

A Proposal for the South Haliç Region

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Abstract: *For a designer-architect to be able to make accurate predictions for any particular urban space, he/she needs to know the development stages of the city, as well as the city's various features across time. Thus, it is necessary to read the different segments that constitute the city to reveal its historical, cultural, social, physical and symbolic features. The aim of this study is to determine the social and physical problems of a historical urban space and subsequently to introduce physical and functional suggestions to improve the identified problems, and for the development of the area. The South Haliç Area was chosen as a work-space because of its special importance in protecting the historical and cultural heritage found there and transferring it to future generations. With this in mind, in addition to literature studies, on-site observations and interviews, the area has been analyzed and evaluated using the space syntax method. The suggestions developed for the identified problems and solutions have been re-analyzed, and both the present data and the data obtained after the suggestions have been examined and the results have been presented.*

Keywords: *Reading space; space syntax; The South Haliç Region.*

Introduction- reading the city

The city is a living organism; it goes through constant change and transformation, relating dynamically to all sorts of elements, alive or non-living, located within its present structure. A designer-architect can make accurate predictions for a particular urban space only if he/she knows the development stages of the city, as well as its various features across time. Therefore, it is necessary to read the different segments that constitute the city to reveal its historical, cultural, social, physical and symbolic features. When the literature on readability is examined, we see that the discipline makes use of different theoretical approaches and methods for reading an urban space.

Yücel (1979) emphasizes that it is necessary to make some abstractions in order to handle the space conceptually and theoretically, addressing architectural theories on this subject in three categories. The functional approach is the most distinct in the first of these. Yücel regards the realities of economical, cultural, historical, technological, ecological and social practices sufficient for the explanation of spatial environment. The second one involves placing the spatial elements within the principles of morphology, and the last presents analyses related to spatial typology and urban morphology within a linguistic and structuralist framework.

In this study, the approaches to reading space are divided into two groups:

The first group is reading based on objective data. Here, we include studies assessing the systematic knowledge and theories about reading space based on the researcher's observations. Krier (1979), identifying building types, questions how all these come together in a context, rhythm and spatial organization, while Rossi (1982) addresses structure and morphology with respect to pattern, ways, continuity and closeness. Trancik (1986), identifies two groups: strong areas, with standpoints, surfaces and boundaries, and soft areas, exhibited by symbols and contrasts.

In the second group are experiments that are designed based on subjective data or studies that formalise the abstract knowledge with the help of mental maps. These fall into three subgroups: studies about finding directions in urban space (Raubal, M., Egenhofer, MJ., 1998; Herzoh and Leverich 2003; Abu-Obeied, 1998; O'Neill 1991); studies about landmark elements (Lamit, 2004; Erem and Erkman, 2003); and studies about the degree of complexity of spatial pattern (Başkaya, A., Wilson, C.,et.al., 2004; Abu-Obeid, 1998).

The following researchers are categorized as post positivists because they evaluate information provided by the user, but they are also categorized as positivist because of their insistence on quantifying the information:

Lynch (1960) reads the city with the help of five main elements, namely, boundaries, symbolic elements/landmarks, intersection points, ways and nodes. Norberg-Schulz (1971) starts from an existential space concept based on the idea that the designer and the reader of the city are not the same, and neither are the features of the space and the information and image that it conveys, and evaluates the city's three main categories: node and place, axes and ways, and areas and region.

According to Hillier and his associates, there are two important features of a city. First, a city has both permanent spaces and moving individuals. The second one is the relationship between the local and the global structural features of the city. These relationships have a direct impact on the feature of readability of the cities (Hillier, B., Hanson, J., and Peponis, J., 1987).

Recently, the method known as "Space Syntax", in which the urban space is analyzed based on objective data free from users, is among the space reading methods often used by researchers. Not only does such analysis prove useful for obtaining results that combine physical space and life and thus establish relations with the social structure, but also, sub-concepts such as axial analysis, natural mobility, Connection and control values, Spatial interaction values, Readability, Predictability, and Utilization permanency can be explained.

The aim and the scope of the study

The aim of the study is to:
- Identify the social and physical problems of the historical part of a city
- Propose physical and functional suggestions for solving the detected problems and for the development of the area.

The South Haliç Area was chosen as a work space because of the importance of protecting the historical and cultural heritage there and of transferring those assets to future generations. With this in mind, in addition to literature studies, on-site observations and interviews, the area has been analyzed and evaluated using the space-syntax method. Suggestions were developed to alleviate the determined problems. In addition to suggestions for the entire urban area, four different extensive projects were carried out for four smaller areas. One of them is presented in the study.

Space syntax method in reading urban space

Space syntax is a method for reading space developed by a research team, led by Bill Hiller and Julline Hanson in *Bartlett School College London* in the late 1970s and early 1980s, for the purpose of identifying

constructed spaces. While the space-syntax method proves useful for reading the space objectively, it also maintains that there is a direct relation between physical structure and social structure. Especially in the open spaces of a city, it exposes the potential of people to get together by superimposing the field of operation and the field of view.

In this study, we used the criteria called "integration value", one of the parameters of the formation features of the space syntax method. The analysis starts with the expression of spatial axes; viewpoints in space influence where the axes are drawn. Once the axial maps are completed, they are fed into a programme that executes the required calculations. At the end of the process, the colors changing from dark blue into blue and green, or from yellow into orange and red, indicate the sub-spaces where urban space is integrated and disintegrated. The spaces described with the color red in the map are the most integrated spaces. These are open spaces serving both local users and visitors. The spaces described with the color red and its tones merge at one point globally (Rn), the integration core of the settlement. When axial map analyzed locally (R3), more than one core appears; this is the relation of every three subspaces in the system among themselves. They are the areas that offer more service to the local user and are "more special" (Hillier and Hanson, 1984).

Readability is determined by the relationship between global integration and local integration values. For a space to be comprehensible, the correlation coefficient of the global and local integration values needs to be around 45%. High values indicate comprehensibility and low values indicate that the space cannot be comprehended easily.

To sum up, Space Syntax is a method that can be used to assess the designing decisions belonging to social, cultural organization of space, in the city and at the building level that produces objective data. Within this study, it is implemented in the South Haliç Region.

The importance of the south Haliç region, its problems and potentials

The historical peninsula has been the trade and administration centre of İstanbul for centuries. The physical, cultural and social changes taking place on the peninsula throughout history help create İstanbul's present identity. It has a rich cultural, social and architectural value. Moreover, it is an important piece of the world's cultural heritage. The Haliç coasts of the historical peninsula constituted the backbone of the city, since it formed a natural harbor throughout the historical development of the city.

In the 19th century, with the start industrialization within the Ottoman Empire, several factories and industrial buildings started to locate along the Haliç coast and in the Topkapı region, a practice that continued during the Republic Period and into the 1980s. This industrial zone led to environmental pollution on one hand and increased emigration, due to the employment opportunities created by factories, on the other hand.

According to findings from a literature review, inventories and documents, as well as on-site observations and interviews, the potential and problems of the region are as follows.

• The number of unmovable cultural assets in the region is 403 (Anonymous, 2006). Although some of the buildings are being used today, many of them could not be occupied and have started to become dilapidated.

• The built environment has been constructed without any relationship with the coast.

• There are only 14 buildings related to tourism in the region (Anonymous, 2006).

• Most of the green areas in the region are along the Haliç Coast. The use of wide green areas is limited due to a lack of supportive functions and of cultural understanding of green area use.

• Thanks to the big motorways surrounding the region on three sides, the region is easy to reach.

Yet, the speed on the motorways is high, breaking the region's connection to the larger environment, especially for pedestrians.

Before we describe suggestions for the region, we need to state that the South Haliç Region has been analyzed using the Space Syntax method to collect objective data in addition to the problems and potentials listed above. The findings obtained at the end of the analysis are stated below.

Space syntax analysis related to present situation of the region

In order to understand the physical features of the space, and to see the effects of these features on human movements, an axial map of the work place was prepared and evaluated with the help of Depthmap software. Global integration values (Rn) and local integration values (R3) of the spaces were obtained from this map.

As a result of the analysis, the region constituted by the Yavuz Selim and Şeyhresmi neighbourhoods includes the axes with the highest Rn and R3 values. In other words, these neighbourhoods form the core of the region. The regions with the lowest integration value are the axis of Ayvansaray- Edirnekapı that constitutes the north border of the research site, the Zeyrek-Unkapanı axis that constitutes the south border, and a part of Fener-Balat region. When we look at the areas with the lowest integration values, we see that they were least affected by the restructuring after 1960 and thus were able to protect the organic urban pattern. When we superpose these analyses on maps of the present structure stock, we achieve an important result: the present structures and areas of important cultural-historical values are mostly located in the boundaries where the integration value of the region with the system is low. For instance, the Molla Zeyrek Mosque, Zeyrek Houses, Tekfur Palace, Anemas Dungeons and Kariye Museum are located in this region. As a result of these problems, we assert the need to take precautions and make suggestions in order to revitalise the South Haliç Region.

Suggestions for the region

Establishing visual relation for the monumental structures-increasing their values

In order to increase the perceptibility of the monumental structures, we suggest cleaning up their surroundings as much as possible, creating urban open spaces within the city pattern, suitable to the scale of the region, and making the landmarks one of the components of readability and distinctiveness.

Additionally, we opened new boulevards, cutting up the blocks that visually and functionally split up the axes used by the visitors in important areas. These new axes established users' visual relation with the landmarks in the region, and a connection between the user and the coast was created in some places. Moreover, it became easier for the users to orient themselves, minimizing the feeling of being lost.

Strengthening the connections of the region with the other sub-regions in the Historic Peninsula

In order to increase the accessibility of the region and to strengthen the connections of pedestrians and vehicles, we suggest providing direct pedestrian entries from other sub regions to the research site, anticipating that these entries would arrive at urban open spaces in the research area. Thus, these connection points provided both accessibility and the feature of an urban gathering space. The points for which we suggested pedestrian connections are as follows:

- A Saraçhane connection from the Eminönü-Sultanahmet Region
- A Karagümrük connection from the Aksaray Region
- An Edirnekapı connection from the Topkapı Region
- An Ayvansaray connection from the Eyüp Region
- A Fener dock connection from the Beyoğlu Region

Giving new functions to the region

In order to stimulate the region's potential to increase the integration of the historical and cultural assets in the region with the larger system and to make a contribution to the economic, social and cultural structure of the region, we suggest adding new functions related to tourism.

We propose using certain regions to connect currently disconnected regions and structures in such a way as to constitute a circulation route for tourism. In proposing these regions, we considered including the present and future urban open spaces into the system an important criterion.

Within the framework of the proposal identified above, we defined five points to be taken into consideration:

- The region should be at the connecting points with other sub-regions.
- The region should contain sufficient amounts of salient building stock.
- Besides qualified, well-located buildings, the region should contain a well-organised urban pattern.
- The region should be accessible through different transportation options (seaway as well as motorways).
- The region should have sufficient amounts of green space.

Taking these criteria into consideration, the regions of Saraçhane, Zeyrek, Fener and Ayvansaray were chosen as work places, and four different areas were designed. However, in the paper only presents the sample suggestion for the northwest walls and the Ayvansaray region. The suggestions were drawn on the regional site plan, and axial maps were completed and evaluated.

Schema for the suggested project/ north west walls and Ayvansaray region

We suggest connecting the Eyüp sub-region with the Ayvansaray region, so that visitors could walk instead of using vehicles. For this reason, a visitor parking lot was placed in the area between the O-1 motorway and the walls. Another suggestion is to save the outer sides and inside of the İstanbul Walls from the poor quality buildings closely built near the Walls. Therefore, a walking path was created along the walls starting from Edirnekapı and ending in Ayvansaray. The surface of the walls and the towers on this path could be used for visual displays and temporary exhibitions.

Moreover, three important stop points were designated on the path. The first is the Tekfur Palace; it would be an important stop along the southwest direction of the path. The second stop is the Anemas Dungeons. Third, the İvaz Efendi Mosque has a suitable installation area for purposes like a museum or exhibition. The last point on the walking path is the double-hull building, located at the Ayvansaray section of the walls. Works of art could be exhibited as well as placards giving information on historical, cultural and social structures of the region. This designated walking axis would be integrated with the Fener-Balat walking path from the east and the pedestrian entryways that will be made from Edirnekapı.

The above suggestions were transferred into the site plan and evaluated by the space syntax method. The findings obtained in the analysis and evaluation are below.

Analysis of the suggested project by the space syntax method

In order to understand the physical features of the suggested project, and to see the effects of these features on human movements, an axial map of the study site was prepared and evaluated with the help of Depthmap software. Global integration values (Rn) and local integration values (R3) of the spaces were obtained from axial map.

As a result of the changes, the average Rn integration value in the suggested project rose from 0,72 to 0,73. The five axes with the highest Rn global integration values have the same value as the present axis. Only the 4th and the 5th axes, having the highest integration values, switched places. Since

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(TEKFUR SARAYI)

the axis with the highest integration value did not change, the core area of the system did not change either. When we look at the axes with the lowest Rn integration value, we see that the axes concentrated around Zeyrek Region in the present situation would move towards axes in the Ayvansaray Region after the suggested project. We also see that the axes with low values in the present situation got higher values after the suggestion

While the average R3 integration value is 1,79 in the present situation, it rose to 1, 83 in the suggested project. While 2 of the 5 axes in the present situation, which have the highest R3 (local) integration values, are in the first 5, the other 3 axes' R3 values increased.

In the readability graphic, we detected that the angle of the line that combines the averages of the axes in the region with the X-axis rose from 25 degrees to 28 degrees. Although this value is below 45 degrees, there has been an increase of 3 degrees compared to the present situation.

In conclusion, the integration values of the system in the suggested project increased, as did the level of readability, when compared to the present situation.

Conclusion

The South Haliç Region has been analyzed using the space syntax method, a tool that provides objective data for reading the city. The project, which was designed to solve the problems identified in the analysis, was examined again with the same method, and the results were presented based on the present situation and to the suggestion.

Analysis of the research site following the suggested projects concluded that formerly isolated regions of the system, namely, the Zeyrek, Fener-Balat and Ayvansaray regions, became much more integrated into the system. This progress observed in these regions was also seen in the system overall. The global integration value (Rn), which is 0,72 in the present situation, changes to 0,73. Similarly, the local integration value (R3) of 1,79 in the present situation rose to 1,83. The level of readability of the urban space increased 3 degrees.

Opening the city for visitors in addition to local users will contribute to the social, physical and economic value of the region, since it is regarded as an important part of the world's cultural heritage. Functions intended for tourism and investments in the region will provide improvements in the infrastructure and superstructure. In this way, present historical, cultural and social assets will be preserved the future with minimum disruption.

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