

CENTRALITY IN BEYAZIT SQUARE, ISTANBUL

103

Ayşe Sema Kubat

Istanbul Technical University/ e-mail: kubat@itu.edu.tr

Ozlem Atalay

Istanbul Technical University/ e-mail : ozlematly@gmail.com

Ozlem Ozer

Istanbul Technical University/ e-mail : oslem.oser@gmail.com

Abstract

Beyazit Square, once known as the Roman Forum Tauri, and later the Forum of Theodosius, is located at the heart of Istanbul and has always been one of the focal points of the city. Next to the Grand Bazaar, Beyazit also intersects with Ordu Street which leads to another crucial area of the city called Sultanahmet. Since the square lies in an area that is now home to the main campus of Istanbul University (previously the Ottoman Ministry of War and before that the location of the Old Palace), in addition to Roman and Byzantine remains, and Beyazit Mosque and Medresseh, it is mostly occupied by students and also visited by tourists.

It is observed that apart from being a gathering point for students and tourists, the area is also a vital transition space for people who work in the neighborhood. According to the pedestrian observations conducted at the site, it is noted that there are specific routes followed mostly by workers who are already familiar with the area. Pedestrians who enter the square from the west side track a line through the northeast and southeast sides of the square. One aspect of the movement pattern that needs further investigation is the preference pedestrians entering the square from east side have for using the route with the underpass, rather than the route with stairs. Throughout the paper, the reason behind this tendency is explained by employing Hillier's concept of "Centrality as a Process" stressing two kinds of movements—Linear Movement, which is global, and Moving Around, which is local. According to the analysis results obtained from the axial line patterns, the lines belonging to the underpass crossing route are fairly long lines connected to each other by obtuse angle intersections, whereas the route of the stairs contains more acute angles. The Underpass crossing route also has more direct relations with the other routes within the square.

During the pedestrian observations, it is also discovered that the square is heavily populated by street vendors who clearly follow the pedestrian movement pattern to settle during the evening times when most people depart from work. By this kind of process, the square provides solid proof for the concept of "Centrality as a Process" following the specifications listed below:

- 1- The specific location and layout of the square make it a center regardless of the functions it has.*
- 2- People use the area at the global and local level for their trips. At the local level, the inner layout gains more importance in the identification of movement patterns.*
- 3- As a result, layout is followed by natural movement and the pattern of natural movement leads to the agglomeration of street vendors in the square which is similar to the concept of how cities occur. If the square itself is thought as a city and one day with morning-afternoon-evening is thought as a long time process; then the study area becomes a small scale representation of a city and its center development over time which can be explained by Centrality as a Process concept where Hillier proposes that "the process works through the impact of spatial configuration on movement, and the subsequent influence this has on land use choices, and the development of the area as an 'attractor' in the settlement layout as a whole." (Hillier 1999).*

The preference for the route with underpass over the route with the stairs needs to be further analyzed from the perspective of visibility, and of users who are unfamiliar with the area. As a hypothesis, it can be said that the route with the underpass is more often taken by locals than by

users who are unfamiliar with the area since locals do not hesitate to use a passage by traffic as long as it minimizes their trip lengths, whereas visibility issues are a more decisive factor for the outsiders.

Keywords: *Istanbul, Visibility, Centrality, Movement, Urban Design*

Theme: *Urban Space and Social, Economic and Cultural Phenomena*

INTRODUCTION

According to Hillier, the configuration of space -whether the roads, streets, sidewalks or building corridors- plays a significant role in the use of those pathways so a city/building/public space and so on may have different use levels just simply based on the spatial arrangements of its pathways. Space Syntax is described as “a science-based, human-focused approach that investigates relationships between spatial layout and a range of social, economic and environmental phenomena” so the curiosity about the route selection of people is quite related to the inquiries that Space Syntax studies (Space Syntax Network n.d.) .

Throughout the paper, we present a broader view of our study area-Beyazit Square and its surrounding via analyzing the syntactic maps, at first. Integration values correlated to the pedestrian counts and connectivity values are the key components to present the overall view of the study area. And then, we focus on Beyazit Square itself to have a better insight about the reasons why the routes of pedestrians vary from each other at the very same area. It is observed that apart from being a gathering point for students and tourists, the area is also a vital transition space for people who work in the neighborhood. According to the pedestrian observations conducted at the site, it is noted that there are specific routes followed mostly by working people who are already familiar with the area. Pedestrians who enter the square from the west side track a line through the northeast and southeast sides of the square. One aspect of the movement pattern that needs further investigation is the preference pedestrians entering the square from east side have for using the route with the underpass, rather than the route with stairs (see “1. *The Images of the Route with Underpass* and 2. *The Images of the Route with Stairs*” in Appendix). Throughout the paper, the reason behind this tendency is explained by employing Hillier’s concept of “Centrality as a Process” stressing two kinds of movements—Linear Movement, which is global, and Moving Around, which is local (Hillier 1999). In his “Centrality as a Process: accounting for attraction inequalities in deformed grids” paper, Hillier proposes that well-defined spatial factors first play a critical role in the formation and location of centers, and then play an equally critical role in developing and sustaining their vitality. The route pattern of the square in local level and the way it is connected to the global system forced us to focus on two routes at global level. As mentioned before these are the ones with underpass and stairs. These two routes go almost parallel to each other in the square but there is a difference in the way they are connected to the square—one is connected by an underpass and the other is by stairs. We tried to understand whether this difference played an active role in the preference of the route selection.

To take a further step forward, after getting the help of the concept with finding a solid explanation to the question of “why route with underpass is selected over the route with stairs”, the paper provides a practical proof for the concept of “Centrality as a Process”. This proof is the Beyazit Square itself which is occupied by different pedestrian densities at different times of the day. During the pedestrian observations, it is discovered that the square is heavily populated by street vendors who clearly follow the pedestrian movement pattern to settle during the evening times when most people depart from work (see “3. *The Images of Beyazit Square, Vendors during the Evening*” in Appendix). By this kind of process the study area becomes a small scale representation of a city and its center development over time for the concept of “Centrality as a Process” at which Hillier proposes that “the process works through the impact of spatial configuration on movement, and the subsequent influence this has on land use choices, and the development of the area as an ‘attractor’ in the settlement layout as a whole” (Hillier 1999).

As a result using Hillier’s approach of centrality, the paper looks for an answer to its question and in return it also presents a confirmation for the very same inquiry over a public square.

STUDY AREA

Beyazit Square, once known as the Roman Forum Tauri, and later the Forum of Theodosius, is located at the heart of Istanbul and has always been one of the focal points of the city. Next to the Grand Bazaar which is one of the largest and oldest covered markets in the world with 61 covered streets and over 3,000 shops, Beyazit Square also intersects with Ordu Street which leads to another crucial area of the city called Sultanahmet. Since the square lies in an area that is now home to the main campus of Istanbul University (previously the Ottoman Ministry of War and before that the location of the Old Palace), in addition to Roman and Byzantine remains, and Beyazit Mosque and Medresseh, it is mostly occupied by students and also visited by tourists (Müller-Wiener 1977).

The area is also located nearby the bus station and the tramline station. As it is obvious that the square has not only historic landmarks but also it has a dramatically significant location in the big picture of Historic Peninsula.

METHODOLOGY AND ANALYSES

General Overview

Integration

Before talking about the “integration”, it is more accurate to explain the concept of “axial line” (Hillier 1996). Axial line is described as a straight line that can be drawn through a street or other movement space before that a building, wall or some other obstacle appears (Hillier and Seamon, Center for Humans and Nature n.d.). If the study area is a part of the city-as it is in this research, the layout of the city can be drawn following its road structure/configuration as axial lines. After that, this axial map is opened in a program called as “Depth Map-visual and spatial network analysis software” which is developed by University College London (Space Syntax Network n.d.) And then, some several analyses can be run. Among them, integration is just only one which is defined as a measure of the relative connectedness that a specific axial line has in relation to all other axial lines in the whole system. Since the analysis gives the relation of each line with the whole system, it is defined as a “global value”. If the integration value of an axial line is high, then it is more integrated to the system which means that we can expect more movement at this line.

For the study area Beyazit Square and around, when the integration map of the system is checked; a no surprising pattern is encountered. Ordu Street and the Square itself have higher integration values than the rest of the study area. However, the other main street-Kennedy Street at the south of the area cannot show similar integration patterns as Ordu Street. The reason beneath this probably is the existence of the railroad track as a border which is difficult for pedestrians to cross. The Kennedy Street is also cannot be fed by its two side since it is just located nearby the sea. One another finding about the integration analysis of the area is that the integration value is lower at the sections where there are cul-de-sacs-southeast, northwest and northeast of the area (Figure 1). These parts can be called as segregated places (opposed to integration) where there are a few lines running into each other.



Figure 1 Integration map of the study area.

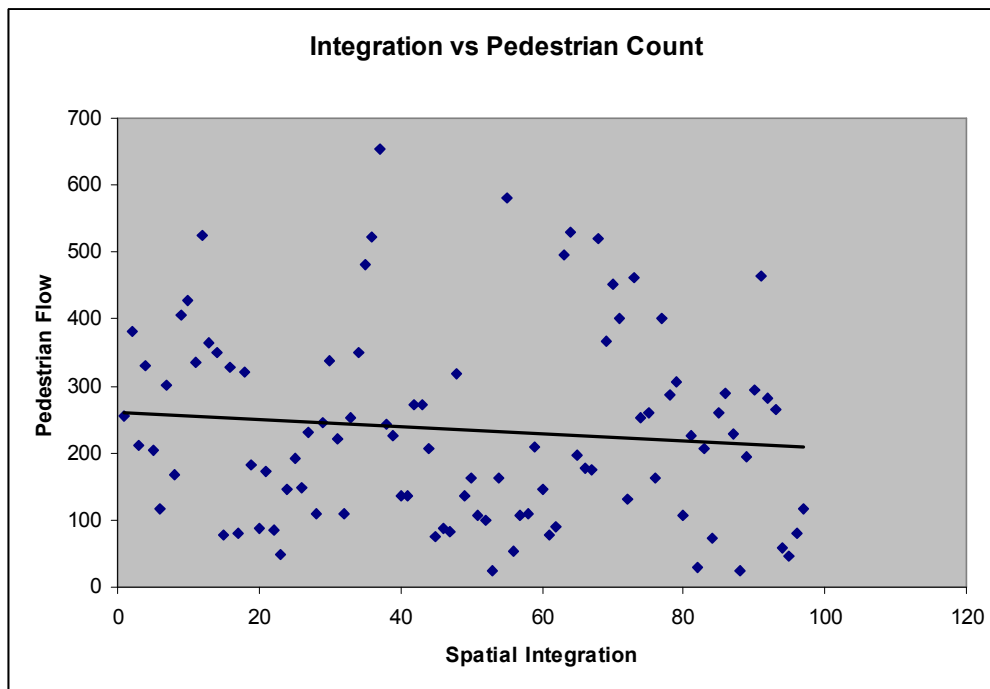


Figure 2 For the study area, 97 observation points were chosen in 11 gates¹. The scattergram shows the relation between the pedestrian counts observed at these points and the spatial integration obtained from the axial line map. $R^2: 0.216$ shows that there is a decent correlation at overall. For this scattergram, pedestrian flow values come from the total number of the pedestrians observed at the weekday.

¹ On a weekday during 8:00-10:00, 12:00-14:00, 17:00-19:00; and at the weekend, on Saturday during 8:00-10:00, 12:00-14:00, 17:00-19:00 pedestrian counts were recorded as a part of Phd Course-Social Logic of Space held at Istanbul Technical University, Fall 2012. The weather at the weekend was quite rainy that it probably effected the occupation of the area by pedestrians. In the scattergram the spatial integration values multiplied by 100 for the ease of reading.

Connectivity

Klarqvist describes connectivity as “the number of immediate neighbors that are directly connected to a space so this is a static *local* measure (Klarqvist 1993). With the connectivity analysis, it is possible to read the small scale relations that a line has with its immediate surroundings. By using connectivity values, the local centers can be clearly presented so this is a “local value” as opposed to the integration which is global. For the study area, Grand Bazaar stands very clearly to show its local center power in itself since it has different pattern than the whole system with its grid structure (Figure 3).

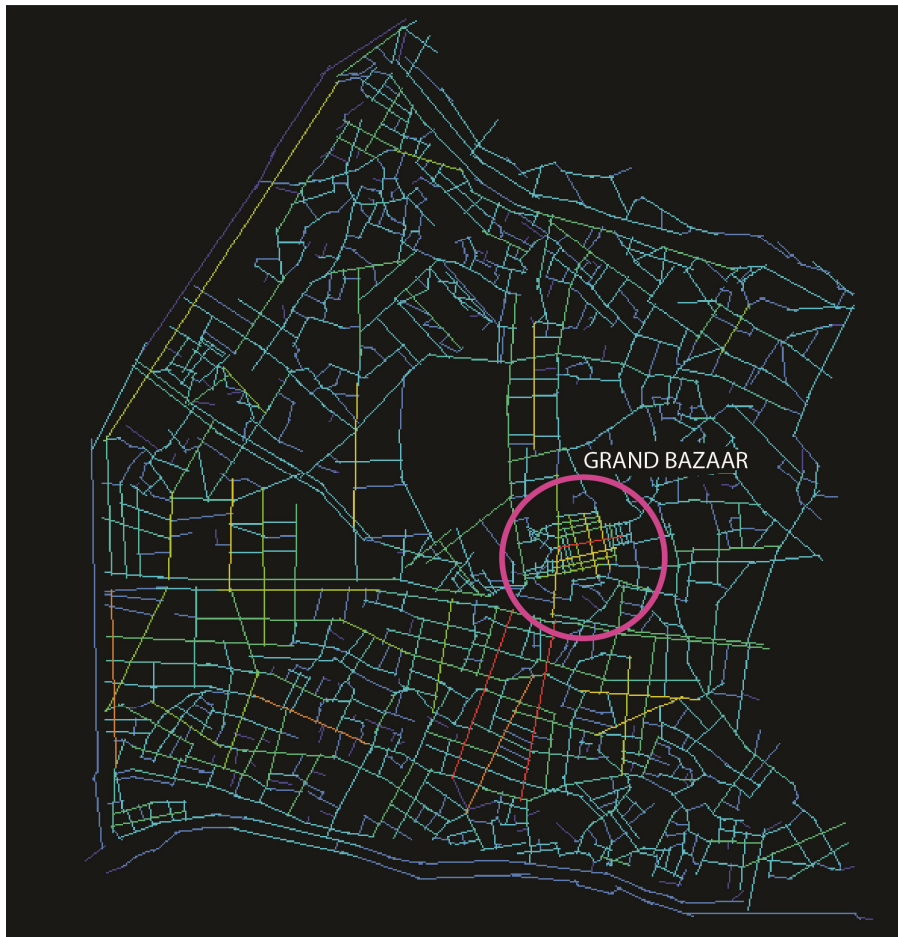


Figure 3 Connectivity Map of the area.

Focusing on Beyazit Square

After having a sight of the general picture, the paper aims to be specific at a section: Beyazit Square. As mentioned before, the underpass leading to the square was observed as more occupied than the route with stairs (Figure 4).

A significant amount of pedestrians prefer one way to another. These two ways come from similar directions and lead to same place; Beyazit Square. One has a stairs and the other one has an underpass. Except for these features, these two ways are not much different from each other in terms of location as it is seen in the Figure 4. This raises the question of “What is behind the curtain, why is this selection made by the huge quantity of people?” The answer will be sought by using Hillier’s concept of “Centrality as a Process” (Hillier 1999). The analysis of two kinds of movements;

- 1) Linear Movement (Global – to/from the center) and
- 2) Moving Around (Local – in/around the center) in the study area will be the key components to clear the research question.

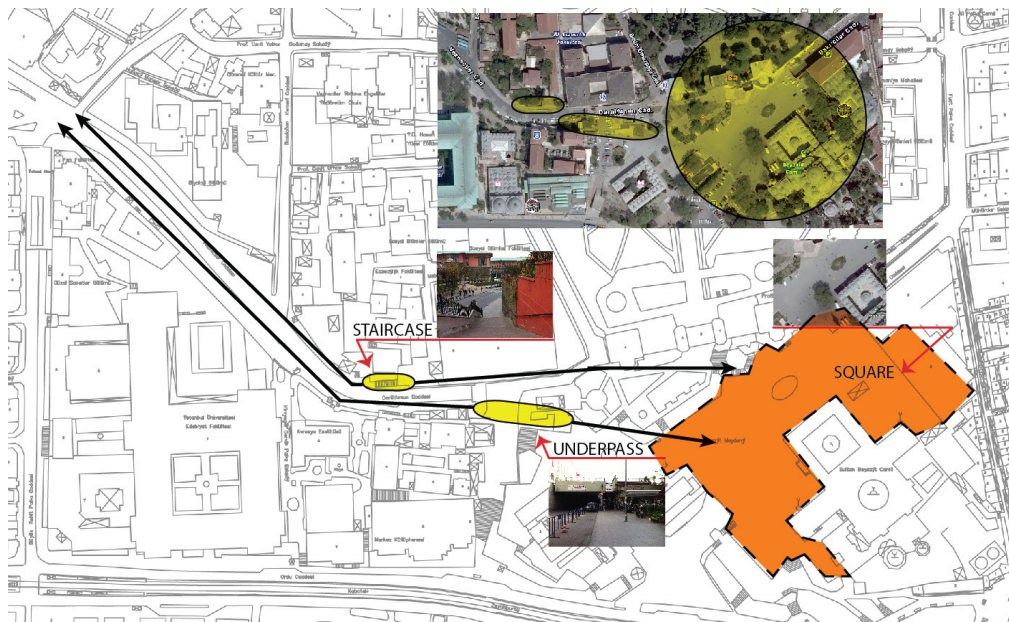


Figure 4 Stairs, Underpass and Beyazit Square

Linear Movement (Global – to/from the center)

According to Hillier, linear movement occurs from specific origins to specific destinations—think about the radials that connect the central areas of cities with their edges (Hillier 1999). In our case, for Beyazit Square the linear movement is provided by different lines passing through the area. Two of them are significant to follow for this study (Figure 5).

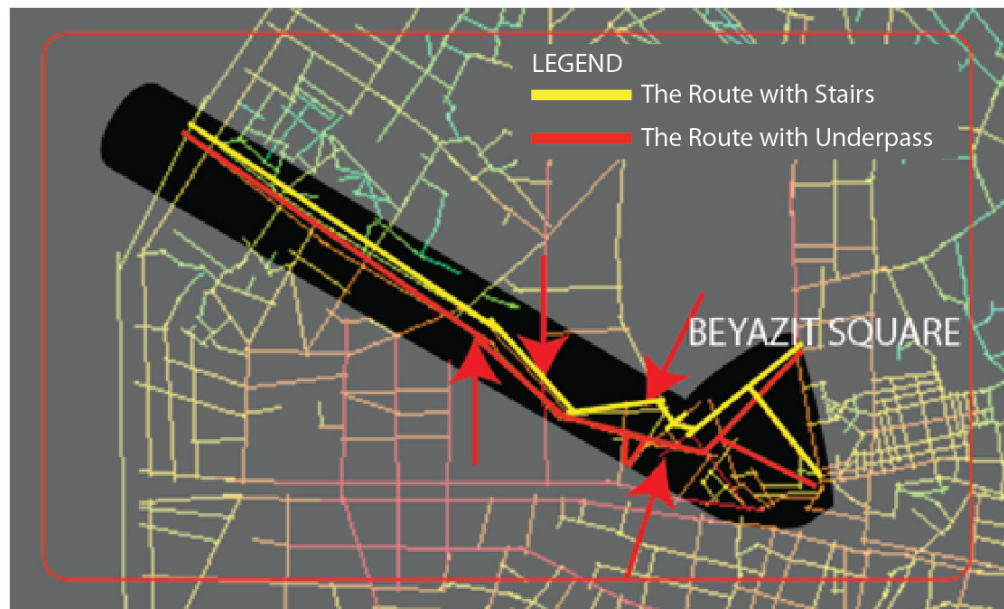


Figure 5 A close look at the study lines and the Square at global level with integration values and with regard to the angles that lines intersect each other.

As Hillier indicates, these alignments are usually composed of long lines, or sequences of fairly long lines connected to each other by obtuse angle intersections, thus minimizing distance from origin at the edge to destination in or around the center (Hillier 1999). In this case, red lines (the route with underpass) in the figure demonstrate fairly long lines connected to each other by obtuse angle intersections whereas the yellow lines (route with stairs) have more acute angles through the square. For global movement patterns, it is important for a line to be straight that eye can see, feet can flow unconsciously so one can easily leave himself/herself to the pattern of the layout without any difficulty finding his/her way. This concept gets its strength from the concept of Natural Movement. It is the term Hillier uses to describe the pathway network that facilitates movement. Natural movement determined by the structure of the urban layout itself rather than by specific attractors or generators (Hillier 1992).

As a result of this analysis, it is possible to see a solid reason why route with underpass is preferred over route with stairs at global scale. The red lines have more obtuse angles that make the flow easier whereas the yellow lines have more acute angles.

In the next section we get closer to the area and try to read the pattern of the square to look for answers more locally to our question.

Moving Around (Local – In/around the center)

As Hillier mentions in his study *Centrality as a Process* there is one another movement, ‘moving around’ within a local area, and relates all origins and all destinations within that area. He indicates that “this process has the effect of optimizing metric integration in two dimensions, that is minimizing means trip lengths from all points to all others within a 2-dimensional zone” (Hillier 1999). According to this concept we have a look at the square itself more closely to see the movement pattern.

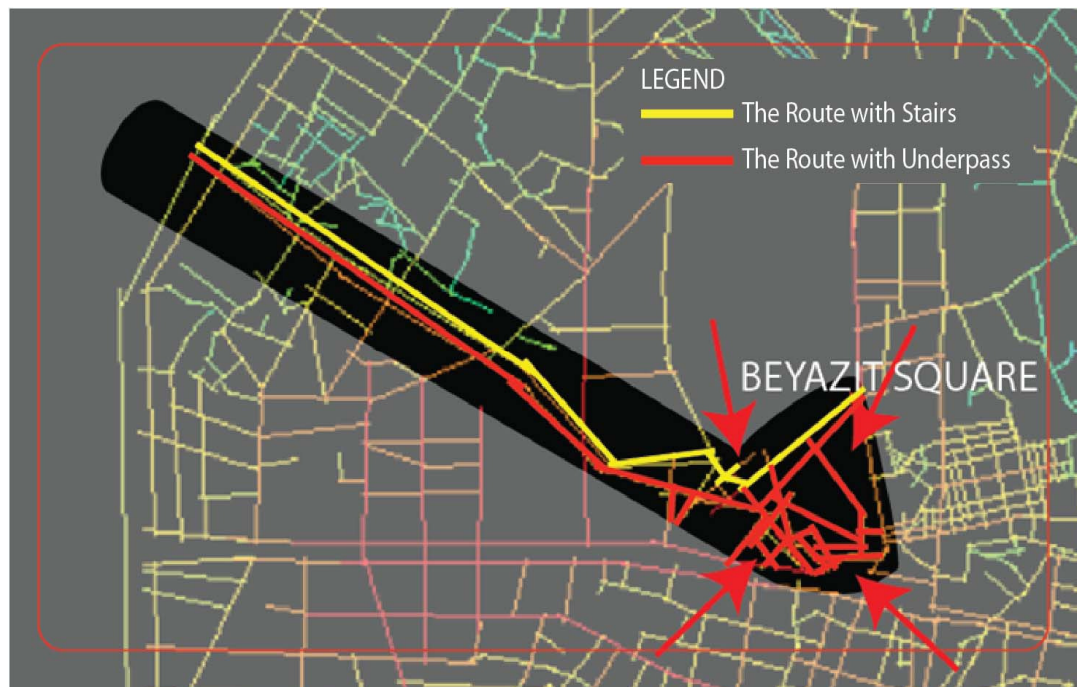


Figure 6 Map demonstrates the square and its movement configuration from a local level. It is possible to read the natural movement pattern of the square with the guidance of the lines.

As it is seen in the Figure 6, route with underpass has more direct relation with the lines at the square than route with stairs. People using the underpass as route can easily go around the square at minimized mean trip lengths. However the pedestrians, who use the stairs as the route, firstly have to visit the route coming from underpass to reach the square so this is another explanation why route with underpass is preferred over route with stairs.

Here the situation can be more clearly explained by indicating the pattern of “2-deep” grid from a line which is accepted as a distinctive spatial property of live center lines (Hillier 1999). There is distinctive 2-deep grid pattern which is quite compact in Beyazit Square. Here the more significant part is that this compact local grid system is connected to the “global pattern” via the route coming from underpass.

Thus, the route coming from underpass acts as the “global” live centre line which can be also accepted as the second integrator in the local system. The principle one in the local center is the one that provides the transition between the grid system of the square and the route coming from underpass (see figure 7).

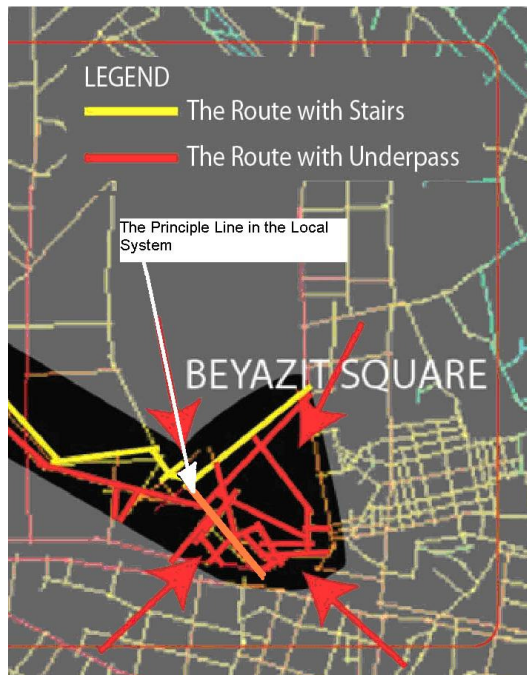


Figure 7 Local grid system and the principle line.

During the pedestrian observations, it is also discovered that the square is heavily populated by street vendors who clearly follow the pedestrian movement pattern to settle during the evening times when most people depart from work. Thus, as mentioned previously, paper also tries to provide a practical proof for the concept of “Centrality as a Process” in return in the following section.

Beyazit Square-A Proof of Centrality as a Process

Up to this section, it is obviously seen, Beyazit Square has high integration values and accordingly high pedestrian occupation. It acts as a center with the power of its layout and location. During the pedestrian counts, it is also observed that, the square is not only occupied by the pedestrians passing through it but also with the vendors who are clearly following the pedestrian movement to settle when people depart from work. It can be thought as in the following order:

1- The specific location and layout of the square makes it a center regardless the functions it has (Number 1 in Figure 8,)

2- People use the area at global and local level for their trips. At local level, the inner layout gains more importance for the identification of movement patterns. However, global level movement pattern still dominates the agglomeration of the vendors (Figure 6).

3- As a result, layout is followed by the natural movement and the pattern of natural movement leads to the agglomeration of the vendors in the square which is so similar to the concept that cities occur. If the square itself is thought as a city and one day with morning-afternoon-evening is thought as a long time process; then the square itself acts as a small scale representation of the city (layout-movement-functions-multiplier effect-more people-more functions-more movement). Vendors choose to locate at the square at a specific pattern which is exactly the movement patterns of pedestrians (Number 3 in Figure 8).

For these three qualifications as a whole see the Figure 8 below.

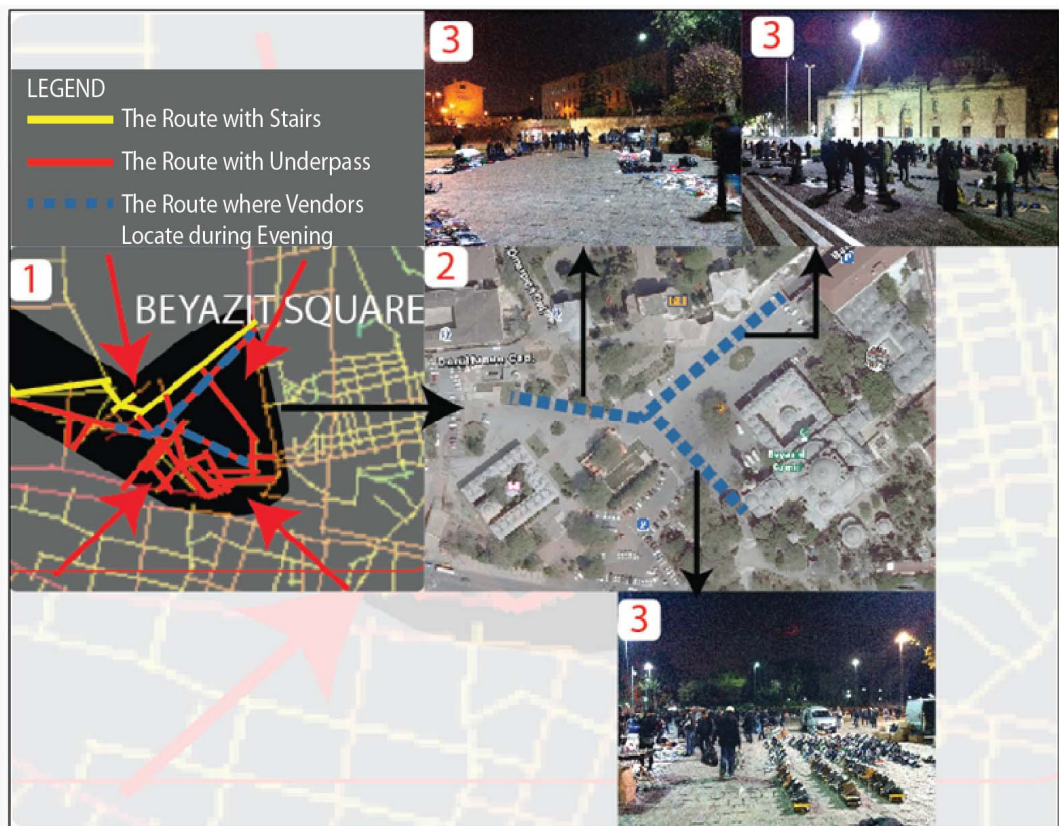


Figure 8 Beyazit Square-Centrality as Process

CONCLUSIONS AND DISCUSSIONS

The study area-Beyazit Square provides expected results both in terms of space syntax analyses and pedestrian observations in overall. With high integration values, Beyazit Square and Ordu Street are part of the center of study area. However, when closely investigated, there are parts of the square needs more attention. In this paper, the closely looked up area is the combination of two routes-route with stairs and the route with underpass and the square itself. By using the concept of centrality, this research tried to explain the reason why one route was more densely used than the other similar route. Both analysis results of the concept of global and local movements supported the dense use of route with underpass. Since the route with underpass has more obtuse angle intersections and as a result has more straight lines as opposed to the route with stairs, it is more used by global travelers. What is more, this finding was also supported by the local patterns of the square where pedestrians could travel at short trip lengths within a 2-dimensional zone. The route with underpass is more close to this pattern; it is at the heart of the 2-dimensional zone (it is a rather long and straight line and the other lines of the square are just sticking in it).

The preference for the route with underpass over the route with the stairs needs to be further analyzed from the perspective of visibility, and of users who are unfamiliar with the area. As a hypothesis, it can be said that the route with the underpass is more often taken by locals than by users who are unfamiliar with the area since locals do not hesitate to use a passage by traffic as long as it minimizes their trip lengths, whereas visibility issues are a more decisive factor for the outsiders.

One another research question is that; "Can the square itself provide a solid proof for Hillier's concept of "Centrality as a Process"?" Following the very first steps of Space Syntax theory, the study looks for the layout of the area. And then, the relation of the layout and movement of users (pedestrians) are investigated using space syntax maps and pedestrian observations. Finally, the surprising but not unexpected agglomeration of functions at evening when street vendors gather in the area is seen just in shape of the movement pattern occurred during the day. If the square itself could be thought as the city, and one day with morning-afternoon-evening could be thought as a long time process; then the study area becomes a small scale representation of a city development over time based on Centrality as a Process concept.

Note 1: A representation of the site where routes with underpass and stairs are located will be projected before the presentation or before and during the poster session and participants will be given a map of the study area and will be asked to choose a route between the stairs and underpass to reach the square from the projected representation of the site. The results of this interactive experiment where the participants will be standing as outsiders for the study area will also be shared with the audience during the presentation or poster session.

Note 2: The authors thank Aylin Şentürk, Ece Özden Pak, Ezgi Küçük, Gizem Kaya, Nevşet Gül Çanakçıoğlu, Özlem Atalay, Samira Malek, Sevcan Uçlar, Yasin Barış Göğüş in helping with the collection of pedestrian data and creating the syntactic maps of Beyazit Square.

REFERENCES

- Hillier, Bill. 1999. "Centrality as a Process: Accounting for attraction inequalities in deformed grids." *Space Syntax Second International Symposium*. Brasilia: Proceedings Volume (1) 06.1-06.20.
- Hillier, Bill. 1992. "Look Back to London." *Architects' Journal* : 42-46.
- Hillier, Bill. 1996. *Space is the Machine*. Cambridge, Cambridge University Press.
- Hillier, Bill, and David Seamon. *Center for Humans and Nature*.
<http://www.humansandnature.org/build-road---david-seamon-response-27.php#SeamonFtn1> (accessed January 2013).
- Klarqvist, Björn. 1993. "A Space Syntax Glossary." *Nordisk Arkitekturforskning* : 11-12.
- Müller-Wiener, Wolfgang. 1977. *Bildlexikon zur Topographie Istanbuls. Byzantion, Konstantinupolis, Istanbul bis zum Beginn des 17. Jahrhundert*. Tübingen: Wasmuth.
- Space Syntax Network*. <http://www.spacesyntax.net/> (accessed February 12, 2013).
- Space Syntax Network*. <http://www.spacesyntax.net/software/ucl-depthmap/> (accessed December 2012).

APPENDIX

1. Image of the Route with Underpass



2. Image of the Route with Stairs



3. Beyazit Square, Vendors during the Evening

a)



b)

