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Analysis of Different Urban Forms in Istanbul

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ANALYSIS OF DIFFERENT URBAN FORMS IN ISTANBUL

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ABSTRACT

Istanbul has a very rich urban structure due to its historical background as being the capital of three empires. Since urban design has a long tradition of emanating from the past, it can be very stimulating to investigate the urban structure of Istanbul in different locations with different locational, historical and socio-economic background. With this respect Istanbul presents a rich urban structure to reveal the relationships among the different urban characteristics for the urban designers.

Thus, the purpose of this paper is to investigate building density with respect to population density, road surface ratio, urban block area, distance to central business district, to the subcenters and to the sea shores and distance to the main roads, housing price and land price in Istanbul. Multiple regression analysis is used as the research method. Building density is taken the dependent variable and the others independent variables of the analysis. According to the results of the analysis, building density of the neighborhoods is a function of population density, road surface ratio, urban block area, distance to the seashore and land price. There is no relationship between the building density and distance to subcentre, distance to centre and distance to main roads. Thus, the distribution of density has a wide spectrum within the city depending on the changing life styles, income, history and amenities.

The results of the study can be useful for urban planners, urban designers, policy makers, and transportation planners. For further research, it is suggested to investigate the relationship between building density and environmental control.

Key Words : urban form, building density, urban space, Istanbul.

INTRODUCTION

Istanbul as being the capital of three empires and having the both historical and natural amenities, it is an important city now as it was in the past periods. Within the physical, social, cultural, economic and technological developments it has a different urban structure than the other cities and it is an important laboratory for urban studies.

Density is an important variable in different kinds of cities as it causes the differentiation along the areas and also is an important factor to effect the form in the city. Much has fairly well demonstrated a considerable synchonomic relationship between the degree of concentration of the city and the availability of transportation and much finds a significant correlation between the decline in density and the proportion of central city dwellings classified as substandard.

So that, the issue density is analysed by different kinds of diciplines in different types such as building density or population density, or with a different point of view density of movement or density of information.

Istanbul having the transformation in different stages, shows different density characteristics within the time and also the densities differ according to the preferences of the changing users of the city.

By this reason, to be a background data for the different urban forms of Istanbul and also to be helpful for the future trends the study of the spatial analysis related to densities of different urban forms in Istanbul is made. The purpose of this study is to inform the various urban structure properties and the differentiation between these structures in Istanbul by the means of visual and also quantitative analysis related to densities. The method used to make the density analysis of urban form is the multiple regression analysis and it is applied in different phases.

There are several studies which investigate the spatial analysis of urban form in different countries. For instance, they generally try to explain the relations between urban form and some other variables like housing price, accessibility, information technology and density. As Song and Knaap (2004), in their study which is measuring urban form, tried to do this study related to some spatial urban form measures like street design and circulation system, density, land use, accesibility and pedestrian access. On the other hand, in the book of shaping neighbourhoods, evaluate different neighbourhood units by the help of their changing densities, characteristics and forms (Barton et al.,2005). Within all these studies the comman term density differs as population density or the density of the buildings, etc. In

this study the density will be used in two different categories as population and building density.

Organization of the paper is as follows. The second section explains the background information about Istanbul; density analysis of urban form from different districts is given in the third section. Final section is devoted a conclusion and further research.

BACKGROUND

Istanbul because of its location always was an important port city during the history, and because of this the settlement started by Halic and it continued to sprawl. Directly related to this situation, seashores still have the rich socio-economic and urban structure. Different socio-cultural groups that lived in the area also caused city to have rich urban structural elements.

The city itself has transformations related to different topics like natural disasters, technological developments or changing preferences. All these changing circumstances cause different density values within the city.

Especially, construction of the bridge which connects the Asian and the European sides and following this the construction of the new roads caused urban sprawl to the boundaries. The increase in accessibility effect the location of the new residential settlements and also the location of the firms.

Also Dokmeci and Berkoz (1993) stated that “Istanbul was a vigorous, core-dominated metropolis until well into the 1950s, with a very limited suburban development in the periphery. With this expanded use of the automobile and the construction of the bridges over the Bosphorus, however, the suburbs, in typical fashion, were pushed further out. At the same time, peripheral growth accelerated as squatter settlements increased due to rural migration”.

Various explanations for multi-nucleation in Istanbul can be made:

- 1- Firms established themselves in the first ring, in search of lower land and/or transport costs. These firms tend to have international and national relationships, and their ties to the old centre weakened.
- 2- After World War II, construction of national highways with Marshall Aid gradually created a new centre in counter balance to the older centre, whose transport links were completely dependent on the city's port. This new centre developed at the intersection of the radial and peripheral highways, which has easy access to both airport and to national highways.

- 3- As one of the results of the economic restructuring of Istanbul after the 1970s, firms required larger spaces. New firms not find sufficient room to locate in the old centre since land parcels were too small and the height of buildings was restricted due to density regulations in the conservation area of the old central business district. The new centre provided large parcels for the modern large office building and parking lots.

After the 1980s, as a result of increased international relationships, demand for office space for new office buildings increased and the new centre continued to develop along the highways.” (Dokmeci & Berkoz, 1993).

In addition to these, the increasing migration also change the structure of the city. So, Istanbul ‘s not a stable city that has some transformations in the past periods, and it is a dinamic city which the development of the city not finished yet according to the social, economic, cultural and technological developments.

ANALYSIS

Investigation of the urban structure of Istanbul by comparing building densities in different districts with different historical backgrounds and different development strategies and also to state the significant relations between the building density and the other variables is the aim of this study. The method used in the study is the multiple regression analysis just to be able to compare different kinds of data that comes from different kinds of variables.

For comparability purposes, multiple regression analysis, has been applied to 80 areas and shown on the map of the districts of Istanbul (figure 1).

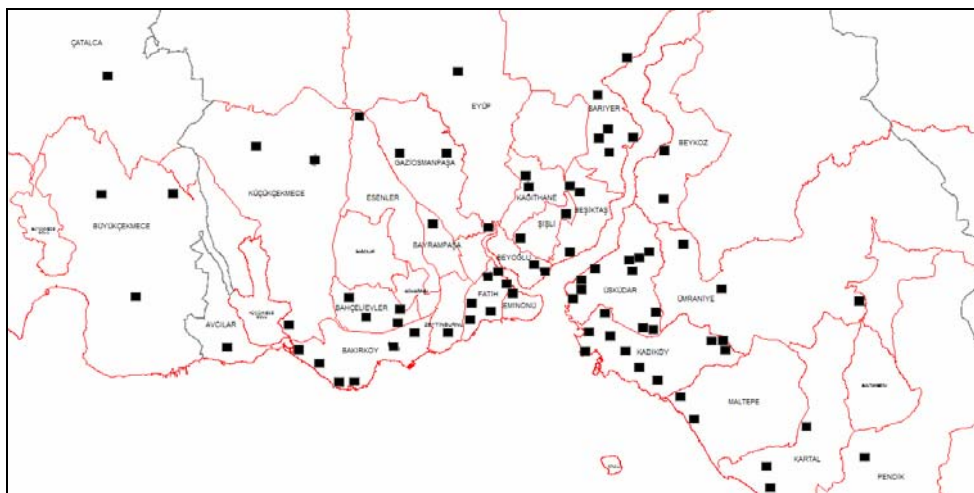


Figure 1. Districts of Istanbul.

There are six titles that can be the different variables of the study can be summarized.

1. density (building-population)
2. road surface ratio
3. urban block area
4. accessibility (distance to centre, distance to subcentre, distance to seashore, distance to main roads)
5. housing price
6. land price

Density which is a changing criteria according to the settlement's type and historical background, gives clues about the settlement units. Tsai (2005), takes density as one of the four factors that effects urban form. Also, Song and Knaap (2003), use the building and population density as one of the measures of urban form. In addition to these, urban form can be seperated three parts and one of them is density (Anderson et al., 1996).

As the street pattern shows difference in Istanbul, it is one of the variables of this study. In the 19th century the fire was the reason of the change in the street pattern (Çelik, 1996), but after this the new design trends are effective. As Lillebye (1996) stated the roads are investigated as a part of urban form within the new transportation alternatives after Second World War.

Urban block which is one of the urban form elements, differs related to the socio-economic, cultural and technological situation that they belong to. Like accessibility they are the important variables for making the density analysis of a big and historical city.

The socio-economic variables of this study are the housing and land price. In Istanbul, increasing population has some effects on the social structure and also the preferences of the user and this is followed by the new housing trends. The relation between the urban design and housing price is studied by Vandell and Lane (1989), and Asabere (1989) dealt with the relation between the historical urban form and housing prices.

Al these studies support the variables that are used in this study to evaluate the density analysis of different urban forms in Istanbul. And the regression analysis is done in different categories by using all of these different variables. These are;

1. dependent variable: building density
independent variable: population density, urban block area, road surface ratio, land price, distances to centre, to subcentre, to seashore, to main roads

2. dependent variable: housing price

independent variable: urban block area, road surface ratio, distance to seashore, housing squaremeter

3. dependent variable: building density of the settlements developed after 1950s

independent variable: population density, urban block area, road surface ratio, land price

4. dependent variable: building density of the settlements developed after 1970s

independent variable: population density, urban block area, road surface ratio, land price

Table 1: Factors that effect building density

$$R^2 = 0,507$$

$$F = 8,083$$

$$\text{Sig.} = 0,000^a$$

<i>Variables</i>	<i>Beta</i>	<i>t</i>	<i>Sig.</i>
Average urban block area	-0,316	-2,894	0,005
Road Surface Ratio	0,047	0,460	0,647
Population Density	0,343	3,303	0,002
Distance to centre	-0,155	-1,265	0,210
Distance to seashore	-0,106	-0,720	0,474
Distance to main roads	0,175	1,585	0,118
Distance to subcentre	-0,176	-1,244	0,218
Land price	-0,091	-0,818	0,416

Dependent variable-building density

n=72

According to the results of this regression analysis, if we rank the impact of the variables population density has the higher relation than average urban block area. But there is an negative relation between average urban block area and building density. The other independent variables are not significant with the dependent variable building density. So, the building density increases with the increasing population density. The building density increases if the urban block area decreases.

The increasing population density related to the increasing building density is not an interesting result but the negative relation between the building density and urban block area can be explained within the new settlement areas that locate generally out of the city centre. In this new trend they prefer low density and large green areas which result in large urban block areas. Any other kind of housing is the squatter settlement that can effect the result because of their non-organized settlement types. They built their house where they want. This also results in the low building densities in large urban blocks.

Table 2: Factors that effect housing price

$$R^2 = 0,879$$

$$F = 34,429$$

$$\text{Sig.} = 0,000^a$$

<i>Variables</i>	<i>Beta</i>	<i>t</i>	<i>Sig.</i>
Average urban block area	0,407	4,416	0,000
Road surface ratio	0,388	4,706	0,000
Distance to seashore	-0,182	-2,243	0,037
Housing squaremeter	0,631	7,037	0,000

Dependent variable-housing price

n=30

In this regression analysis, housing price is the dependent variable, and average urban block, road surface ratio, distance to seashore and housing squaremeter are the independent variables. According to the analysis, housing squaremeter has the highest impact on the housing price. Second is the urban block area and third one is the road surface ratio. There is also a relation between building density and distance to seashore which is negative.

So, if the squaremeter that the house increase than the price of that house increases. Moreover, the housing price increases if the road surface area and also the urban block area increase. This result again can be explained with the new housing units with low density, large green areas, comfortable and high technology which are especially located in the edge of the city.

On the other hand, there is a negative relation between the housing price and distance to seashore. According to this result, the housing prices of the buildings near or close to the seashore are higher. this situation can be

expressed as Istanbul's sea-based economic development and also the effect of view factor (Benson, 1998).

Table 3: Factors effecting the building density in the settlements developed after 1950s

$$R^2 = 0,401$$

$$F = 4,359$$

$$\text{Sig.} = 0,008^a$$

<i>Variables</i>	<i>Beta</i>	<i>t</i>	<i>Sig.</i>
Average urban block area	-0,450	-2,153	0,041
Road surface ratio	-0,351	-1,958	0,061
Population density	0,322	1,987	0,058
Land price	0,044	0,236	0,816

Dependent variable-Building density

n=31

The data used in this analysis for the both dependent and independent variables are belong to the settlement areas that are developed after 1950s. According to the results, in these settlement areas urban block area and building density are mostly effected variables. In these kinds of settlement areas urban block area, road surface ratio decreases if the building density ratio increases. But population density increases if the building density increases.

If it is thought that this data is belong to the early settlement areas of Istanbul, and in those parts, there are smalll urban blocks, narrow streets and high density of population and buildings. So, the result comfirms with the existing situation of these settlement areas of Istanbul.

Table 4: Factors effecting the building density in the settlements developed after 1970s

$$R^2 = 0,572$$

$$F = 9,368$$

$$\text{Sig.} = 0,000^a$$

<i>Variables</i>	<i>Beta</i>	<i>t</i>	<i>Sig.</i>
Average urban block area	-0,574	-3,753	0,001
Road surface ratio	-0,013	-0,100	0,921
Population density	0,331	2,353	0,026
Land price	-0,397	-2,841	0,008

Dependent variable-Building density

n=33

This regression analysis has the same independent and dependent variables of the Table 3 regression analysis but the difference is the data used for this analysis is belong to the settlement areas that are developed after 1970s in Istanbul.

The rank of the variables significance is first urban block area, second land price and third one is the population density. Although population density and building density has a positive relation, the other variables have a negative relation with building density. So, in these settlement areas building density decreases if the urban block area and land price increases and if population density decreases.

According to all these different phases of analysis,

1. The higher building densities are in the small urban blocks
2. The population density increase with the insreasing building density
3. The houses located in large urban blocks have the higher housing prices
4. The housing price is higher in the areas located near or close to seashore
5. If the squaremeter of the house increases, the price will increase

In the settlement areas developed after 1950s

1. In large urban blocks there are low building densities
2. In the areas of low building densities the road surface ratios are high
3. The population density increase with the insreasing building density

In the settlement areas developed after 1970s

1. In large urban blocks there are low building densities
2. The population density increase with the insreasing building density
3. The higher building densities are on the low price of land

The result are not very different than Istanbul's today condition like the old structure of the city which is close to the central area the building densities andd also the population densities are high. In these areas there are small urban blocks that are seperated with narrow streets from eachother are the main characteristics of these early settlement areas. The potential factor of the view is still positively effected on the housing prices. On the other hand, the decreasing building densities, increasing road surface areas and also urban block areas are in the peripheries of the city where the empty urban land is located.

It is an expected result that both central areas and seashore areas traditionally densely built areas and they continue to have some situation. In the future, high density development of sub-centers and housing completes might change this trend. This will effect land value development as well as new urban structures in the periphery.

In general, the different situation of the early and the new settlement types and also the effects of the changing housing trends and changing urban form characteristics can be easily seen within the result of this study.

CONCLUSION

In this study the multiple regression analysis is used as a method for different locational districts of Istanbul. With different locational and historical properties eighty different areas are chosen within the Istanbul metropolitan region to evaluate the analysis of different urban forms usually by taking the building density as the dependent variable, and road surface ratio, urban block area, distance to seashore, distance to centre, distance to subcentre, distance to main roads, housing price and land price as independent variables.

The results of this study states that Istanbul is still a dynamic city. The early settlement areas located around the Halic area are the highest areas in both

population and building density. The urban block which are smaller in these areas change according to the distance to the centre which means the metropolitan region that develops in the periphery of the city (Özçevik, 2004). According to the economic and technological developments and easy access to the long distances cause city sprawl.

Although the central districts and seashores have higher building density as a result of traditional urban development than the periphery, this situation might change in the future due to recent high density urban developments in the periphery. All physical, social, economic, cultural and technological developments cause urban form transformations. From now on, the new trends will be effective in every stage of the city structure.

As a conclusion, the urban form of Istanbul differs within the different time periods and according to the transformation, related to different topics caused different urban characteristics.

The result of the study can be useful for the urban designers, urban planners, architects, decision makers and investors to use as a database in order to adjust their environment and make the right decision.

For further research, it is suggested to increase the number of case studies and the social, cultural and also antropologic variables can be added to enhance the study.

REFERENCES

Anderson, W. P., Kanaroglou, P. S. and Miller, E. J., 1996, Urban form, energy and the environment: a review of issues, evidence and policy, *Urban Studies*, 33, 1, 7-35.

Asabere, P. K., Hachey G. and Grubaugh S., 1989, Architecture, historic zoning, and the value of homes, *Journal of Real Estate Finance and Economics*, 2, 3, 181-195.

Barton, H., Grant, M., and Guise, R., 2005. *Shaping Neighbourhoods*, Spon Press, New York.

Benson, E. D., Hansen J. L., Swartz A. L. and Smersh G. T., 1998, Pricing residential amenities: the value of a view, *Journal of Real Estate Finance and Economics*, 16, 1, 55-73.

- Çelik, Z.**, 1996. *19. yüzyılda Osmanlı Başkenti Değişen İstanbul*, Türkiye Ekonomik ve Toplumsal Tarih Vakfı, İstanbul.
- Dökmeçi V. and Akkal, L., and Dülgeroğlu, Y.**, 1993. *İstanbul Şehir Merkezi Transformasyonu ve Büro Binaları*, Literatür Yayıncılık, İstanbul.
- Lillebye, E.**, 1996. Architectural and functional relationships in street planing: an historical view, *Landscape and Urban Planning*, 35, 85-105
- Özçevik, Ö.**, 2004. Peri-urbanization analysis in the metropolitan context: the case of Istanbul metropolitan areas, *ITU Journal of the Faculty of Architecture*, 1, 2, 58-76.
- Song, Y. and Knaap G. J.**, 2003. New urbanism and housing values: a disaggregated assessment, *Journal of Urban Economics*, 54, 2, 218-238.
- Song, Y. and Knaap G. J.**, 2004. Measuring urban form, *Journal of American Planning Association*, 70, 2, 210-225.
- Tsai Y.**, 2005. Quantifying urban form: compactness versus 'sprawl', *Urban Studies*, 42, 1, 141-161.
- Vandell, K. D. and Lane J. S.**, 1989. The economics of architecture and urban design: some preliminary findings, *American Real Estate and Urban Economics Association Journal*, 17, 2, 235-260.