

CHANGING URBAN PATTERN OF ISTANBUL; FROM MONOCENTRIC TO POLYCENTRIC STRUCTURE

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Abstract

Istanbul, within its strategic location and historical background as the capital of three empires, has been the heart of national and international economic activities in Turkey. After 1950's, the rapid population growth has caused rising density, congestion, pollution and a scarcity of urban land. At the same time, because of the insufficient space in the historical Central Business District (CBD), new office functions took place in the periphery and Istanbul gained a polycentric structure.

In this paper, the historical development of CBD is discussed and the present polycentric structure of Istanbul Metropolitan Area is overviewed according to land price variable.

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INTRODUCTION

Istanbul, within its strategic location and historical background as the capital of three empires, has been the heart of national and international economic activities in Turkey. After 1950's the rapid population growth has caused rising density, congestion, pollution and a scarcity of urban land. At the same time, because of the insufficient space in the historical Central Business District (CBD), new office functions took place in the periphery and Istanbul gained a polycentric structure.

In western cities suburbanization has been taking place since the end of Second War. The impacts of dispersion on the city created a new form of urban spatial structure (Berry and Kim, 1993). Numerous empirical studies on the polycentric process have been conducted in the context of western cities (Boume, 1989; Erickson, 1983, 1986; Hartshorn and Muller, 1989; Heikkila, 1989; McDonald and McMillen, 1990; Shukla and Waddell, 1991, 1993).

The various facets of the process; for example, population density (Boume, 1989), land price (Heikkila, 1989; McDonald and McMillen, 1990; Peiser 1987), and firm location (Waddell and Shukla, 1993) has been studied by researchers in western countries.

Land value is another indicator of changing urban space. Most studies on the polycentric transformation implicitly pursue a better fit to the land value curve. When modern cities become increasingly polycentric, the subcenters affect land value within a specific radius as a result of agglomeration benefits on enhanced accessibility. Considering subcenter effects on land values in the analysis land value estimation can be improved.

A better fit to the curve would suggest that the urban spatial structure should be evolving towards polycentricity. It is shown by Heikkila (1989) that subcenters have statistically significant influence on metropolitan residential land value in Los Angeles. Accessibility to the CBD is of statistical insignificance. Similarly, McDonald and McMillen (1990) found that the subcenter of Chicago, has exerted a significantly positive effect on land value. The transformation of the economy away from manufacturing has stimulated the growth of the CBD, new subcenters based on office employment, research and development communication and head quarters. Peiser (1987) showed that the land value of different types of land use – were affected in different ways by a number of independent variables-.

Kumar (1990) has insisted on decentralization, investigating the impacts of technological development on urban form and travel behaviour. Matthew (1993) has studied office decentralization in Toronto between 1951-1986. Odland (1978) has derived a set of formal conditions for multi-center versus single-center urban forms using a mathematical programming model of the spatial arrangement of a city. Heikkila, Gordon, Kim, Peiser, Richardson and Dale-Johnson (1989) have used hedonic regression methods to assess the impact of dwelling and structure characteristics, neighborhood effects and multiple locations on residential property sales in Los Angeles County in 1980. Dowall and Treffeiser (1990) have found out the relationship among land values, population density and decentralization in Bogota. Guntermann (1996) has analyzed land prices which reflect a significant premium based upon expectations about future growth.

In the context of developing countries disaggregated socio-economic data are not available, and land use detection might be the most reliable information in analysing the transformation of urban spatial structure (Wu, 1998). In spite of data restrictions, after 1990's several studies on the transformation of spatial structure of Istanbul have been done. In 1991, Dökmeci and Berköz have analyzed the transformation of Istanbul from a monocentric to a polycentric spatial structure. Berköz (1997) has determined the sectoral zones of Istanbul referring to its changing land use pattern. Ç• rac• , applied cubic-spline density function to three regions of the Istanbul metropolitan area and found that they display different spatial patterns.

The aim of this paper is to analyse the policentric spatial structure of Istanbul using land value indicator.

CHANGING STRUCTURE OF ISTANBUL DURING THE HALF OF CENTURY

The geographical location of Istanbul has been the most important factor that affects its function as a capital city and urban growth. As there was no change in the position of the main harbour, the business center of Konstantinopolis was to be found in the same location of the Turkish capital and even later (Kuban, 1996).

In 19th century Istanbul became a metropolis with two centers located on the opposite sides of Golden Horn. Changing commercial structure under the influence of the relations with western countries and specializations in the modern sense appeared in the quarters of Galata and Beyoglu. This dual structure had affected the housing and the environment of the city (Ortaylı, 1996) and has been existed during the 20th century.

The nature of urbanisation process changed during 1930-1950 in Istanbul. This may be seen as the beginnings of the more rapid transformation which was to follow after the war. Housing shortage created gecekondu phenomenon which created a dual structure consisting of both legal and illegal housing stock in the city.

In the beginning of 1950's, the development of Turkish economy reinforced the dominant economic role of Istanbul in all over the country. As a result, banks and companies preferred Istanbul for location (Berköz, 1996). In 1950's, commercial and manufacturing functions took place in Eminönü and Galata.

Eminönü, the heart of the historical peninsula, was the core of the CBD between 1950-1965 and spread out along the main roads. On the opposite side of Golden Horn, Karaköy as the sub-section of CBD had the financial activities. Business office buildings and administrative centers located in Kabatas as the extension of Karaköy.

The CBD not only spread into new locations but also displayed internal differentiation as well. Previous sub centers, which had served as neighborhood centers until then were modified to become part of the CBD.

In the 1965's, the majority of jobs were still concentrated in the core of the city. Since the historical centre was the hub of a transportation system, it possessed locational attributes and potential business advantages sought by a wide range of office-based services and trade; which is very characteristic for a city in a developing country based on public transportation (Kumar, 1990).

Until 1965, CBD had expanded and grew simultaneously within the population growth. As a result of this expansion, the former residential areas had been surrounded and captured by CBD functions, which carried functional differentiation.

Harbiye and Sisli axis which used to be a neighborhood center experienced a transition in this period and gained CBD characteristics. Development of high income residential areas towards this core had an impact on its transition. Like Istiklal Street first luxurious expensive consumption activities appeared then transition process for Mecidiyeköy began.

While discussing the diffusion of the CBD both horizontally in space and vertically through increases in the number of stories of buildings, business office buildings are built. While the CBD was diffusing transformed into commercial functions and office buildings.

During 1965-1985 period, Bosphorus Bridge (1973) and its beltways initiated a new reconstructing process in the urban space of the city, influencing the inner city's direction of expansion, specialization and functional differentiation. This changed the hierarchy of prestige areas in the urban context, opened new areas up to speculative activities and created a new hierarchy of business centers, decentralization and car ownership increased.

As part of city's expansion after the 1970's, new subcenters of employment and commerce started to develop along the highways. Those subcentres arose because the

economic, cultural and physical fabric of the old CBD was not compatible with the traffic, parking and space needs of modern office and retail buildings. Sisli and Besiktas developed as office district due to transit roads linked to the Bosphorus Bridge (Berköz, 1991).

After 1975, CBD functions expanded through Besiktas. Bosphorus Bridge (1973), made accessibility easier between Asian and European Sides, meanwhile it helped to the development of Kadıköy, the main center of Anatolian side.

In the recent years, CBD and the subcentre being formed during centuries, have become insufficient for new functions and especially for new office buildings. So these new functions have located in newly developing business axe called Levent-Maslak axe where there is sufficient land and lower land price.

The extension of the CBD along Mecidiyeköy, Gayrettepe and Büyükdere began to specialize in insurance companies as a location for the central offices of foreign banks, large holding and multinational companies. The high accessibility of this area for high income car owning groups via the bridge access contributed to its rapid develop.

The CBD, which dominates Istanbul Metropolitan Area, affected new developing business being developed as subcentres. However, these subcentres suffered from lack of social and technical infrastructure. The Master Plan's Report indicates that 3 third subcentres are affected by the nearest dominant CBD and subcentres. (Master Plan Report)

In the Eastern side, Kadıköy has developed as primary subcentre. The secondary subcentre is Üsküdar. Kartal, Maltepe and Pendik, the edge districts of the Asian side, seem as third subcentres, but their infrastructure is insufficient for their neighbourhoods. Kozyatagı, due to the easy accessibility, quality of housing and the shopping malls (Carrefour and Metro) has a potential of thirdly subcentre. (Master Plan Report)

As Istanbul faced to rapid population flood caused by migration, after 1950's, the planning processes remained insufficient against to this speed, and as a result, Istanbul gained a complex and uncontrolled urban pattern. Today, Istanbul, expanding linearly

both west and east direction, becomes a threat on the northern forest area day by day. The empirical researches on Istanbul indicate the transformation of its monocentric form to polycentric structure. So, it is suggested to balance the population-employment rates in both western and eastern sides. The rapid population growth in Istanbul, increasing the density overall, business and trade districts are extended through the adjacent residential neighborhoods and as a result new sub-centers are transformed. The traditional CBD preserves its dynamic structure unsimilarly the western examples.

Table 1 shows the population and the employment rates of Istanbul by the Asian and the European sides. However, these scattered aspects do not seem equivalent. In the Western side, there is 30% excess of population within 45% excess of employment comparing with the Eastern side. Comparing the Asian and European side, the demographic data show there is a significant commuting between each other. In early morning, approximately 18% of the total population pass across the Bosphorus from the Asian side to European side.

	POPULATION	%	EMPLOYMENT	%
WEST	5,381,838	65	2,017,173	74
EAST	2,872,405	35	706,661	26
TOTAL	8,254,243	100	2,723,834	100

Table 1 The Population and the Employment Rates in Istanbul

EMPIRICAL ANALYSIS

This study analyzes the relationship between land price of residential areas and accessibility and social facilities in the Istanbul Metropolitan Area, in the frame of polycentric structure of land use. Three hypothesis have been examined:

- In unplanned areas, where social facilities are missing, residential land price is lower than planned areas.
- There is a direct relationship between the diversity of transportation modes and the accessibility level, which results in higher residential land prices.

- Near the CBD and the other sub-centres, residential land price increases. Distance from CBD is distinctive for residential land price.

The geographical advantage of Istanbul offers another transportation mode: the sea transportation system. This variable has been included in the analytic model as of it may affect residential land prices. The relationship between density–residential land price is related to the distance from the CBD and planned–unplanned areas. Thus this relationship may differ from region to region. From 23 districts, only 333 neighbourhoods where the residential levels are high a total of 556 neighbourhoods are included in the analytic study. The other 223 neighbourhoods are not included in the study field. The data included into the empirical study are:

The Dependent Variable (Land Price) : Land values are from 1989 values and the scale of neighbourhood studying as median value. Each land use has its own land price, so in this study, only the land value of residential areas has been included. The other type of usage (such as industrial or commercial functions) has been excluded.

Independent Variables:

Population density : 1996 accounts taken from Istanbul Municipality

Distance from CBD and Sub-centers: Subcentres are; in Eminönü Region, Bayazıt Kapalı Çarşı ; in Beyoğlu Region, perpendicular distance from Sisli-Maslak axe and Barbaros Avenue; in Bakırköy Region, Ataköy 1. Köşmesi; in Kadıköy Region, Iskele Mahallesi and in Kartal Region, Merkez Mahalle.

Adjacency to the Sea Shore: adjacent=1, away from=0

Planned-Unplanned Areas: planned=1, unplanned=0

Accessibility: Differentiation of transportation modes; main roads, railroad system, TEM (Transit European Motorway) and sea transportation. Scale from 0 to 4.

**RELATIONSHIP BETWEEN DEPENDENT AND INDEPENDENT VARIABLES
COMPARING EUROPEAN AND ASIAN SIDE**

Because of the difference of population and employment rates in Anatolian and European Sides, land values are higher in the European part of Istanbul and the data have been analysed separately for the each side. In the European Side, two main parts of CBD are located on the two sides of Golden Horn, the traditional center (Eminönü) and

the modern center (Taksim-Maslak Business Axe). Bak• rköy is the main sub-center of this side.

The empirical analyses have been realised in two steps. In the first step, the case of European and Asian side have been examined. In the European side, the distance from the center, has been calculated as distance from the centre point of the traditional CBD and direct distance to Sisli-Maslak axe. Although Bak• rköy is the dominant sub-center, it has not been calculated independently because it is still under influence of the Historical CBD, Eminönü. In the Asian Side, as Kartal is a developing new subcentre, the effects of Kad• köy subcentre are remarkable, so that the Kartal Region has not been included to the analysis separately.

In the European Side the proportion of residential areas is 58%. After multi – regression analysis, independent variables of adjacency to the seashore, planed areas, accessibility, and distance from centre are able to explain 32.3% of residential land price on the European Side. As the explanation level is lower, European side has been examined into two regions in the third and the 4th steps.

REGION	R ²	T Significant	Tolerance
European Side	0,323		
Seashore		0,000	0,777
Planed Areas		0,000	0,735
Accessibility		0,001	0,899
Distance		0,000	0,823
Density		0,971	0,818

In the Asian Side the proportion of residential areas is 62%. After multi – regression analysis, independent variables are able to explain 61.3% of residential land price on the Asian Side. In this region, there is no relationship between the dependent variable and adjacency to the seashore, density and planed areas.

REGION	R ²	T Significant	Tolerance
ASIAN SIDE	0,613		
Seashore		0,226	0,808
Planed Areas		0,654	0,696
Accessibility		0,000	0,694
Distance		0,006	0,704
Density		0,004	0,703

In the Eminönü Region independent variables of adjacency to the seashore, planed areas, accessibility and distance from CBD are able to explain 59,6% of residential land price. The dynamism of Historical CBD influences land prices of the nearest residential areas. The main reason of this situation is that the surrounding residential areas have potential to transform to business districts. In Eminönü Region, there are different modes of transportation so that the land prices are higher if a neighbourhood has all of them. The adjacency of the seashore is another significant independent variable on land price. These four variables prove the hypothesis. Unplanned areas, which are far from CBD and have dense population, suffer from lack of facilities. In this part of analysis, there is no relationship between density and land price, because in the surrounding of the airport, the districts of Yesilkoy and Yesilyurt, have low density and very high land values due to the high residents standards.

REGION	R ²	T Significant	Tolerance
EMINONU	0,596		
Seashore		0,000	0,781
Planed Areas		0,000	0,600
Accessibility		0,000	0,882
Distance		0,000	0,608
Density		0,247	0,758

In the Beyoglu Region independent variables of planed areas, distance from Sisli-Maslak Axe and density are able to explain 38,7% of residential land price. Land price is higher when the density decreases. Near to Maslak, the adjacent residential areas have lower population density. In higher density and unplanned areas, land price is lower.

However, the residential areas within the highest land values, lying along the Bosphorus show low density in this region. The residential neighbourhoods next to Sisli-Maslak Axe have higher land price because of their potential to transform to business district. In this region there is no relationship between dependent variable and accessibility and adjacency to the seashore. The variable of accessibility is affected by the situation of Bosphorus residential zone. This region, as indicated above, is the most valuable area, however, the accessibility, the differentiation in the transportation modes, is low rather than the other parts of the city.

REGION	R ²	T Significant	Tolerance
BEYOGLU	0,387		
Seashore		0,231	0,721
Planed Areas		0,001	0,771
Accessibility		0,147	0,975
Distance		0,002	0,774
Density		0,045	0,794

In the Bak•rköy Region independent variables of adjacency to the seashore, accessibility and distance from the centre are able to explain 87,7% of residential land price. Around the centre, population density is low and the land price is high. The altitude limitation caused by the Atatürk Airport is the reason of why the nearest neighbourhoods to the centre have a low density within the high land price. Far from centre, unplanned areas and density increase so that land price decreases. Accessibility is very important for this area. New offices, which could not able to find a place to locate in CBD, prefer low price areas, some unplanned areas have potential of transformation to business district, as a result in these areas land price is becoming higher. In Bak•rköy Region, adjacency to the seashore is another remarkable independent variable.

REGION	R ²	T Significant	Tolerance
BAKIRKOY	0,877		
Seashore		0,000	0,459
Planed Areas		0,433	0,297
Accessibility		0,009	0,577
Distance		0,000	0,269
Density		0,180	0,603

In the Kartal Region only the independent variable of accessibility has a relationship with land price and it is 48.6%. The reason is that Kartal Region is still under dominance of Kad• köy despite of the distance from it.

REGION	R ²	T Significant	Tolerance
KARTAL	0,486		
Seashore		0,254	0,732
Planed Areas		0,240	0,621
Accessibility		0,015	0,622
Distance		0,560	0,733
Density		0,067	0,560

CONCLUSION

This study is the main evidence that Istanbul has now a polycentric structure. According to the relationship between land values and the other independent variables, there are some significant results which could be cited:

- Accessibility is a component which enable the land values being high. Differentiation in the transportation modes enforces the accessibility. Beside the main road transportation, sea and railway transportations make the zones as the node of the regions.

- Planned areas have high land values, however, the areas near to the centers and sub-centers, as they have a potential of the transformation to the business or services areas, have also high land values.
- The density are higher in the surrounding areas of the centers and the subcenters, so the land values are also high. However, in the far regions from the centers and the subcenters, because of the slums, there are a negative relationship between the density and the land value.

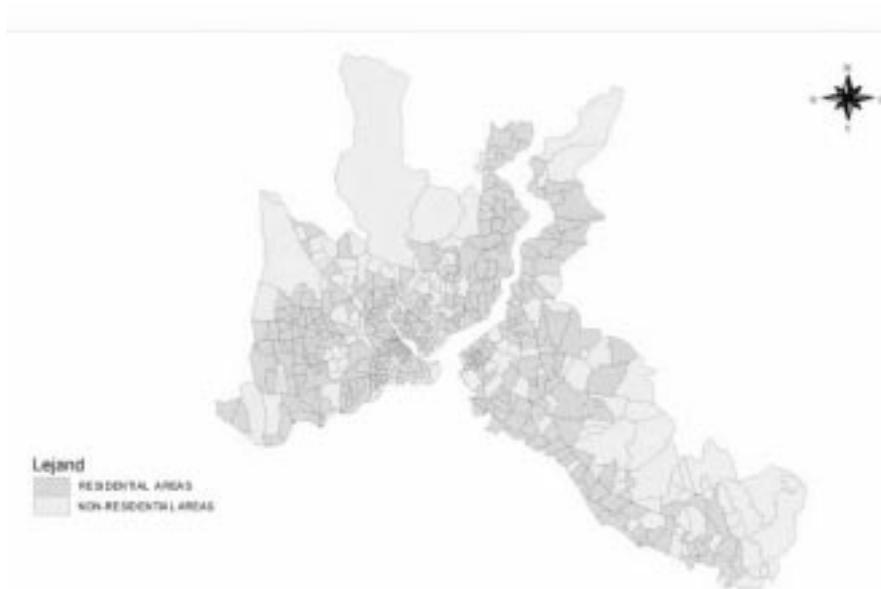
Istanbul has been changing its monocentric structure to the polycentric structure. The development of this structure which causes the formation of the new sub-business districts, has to be encouraged by physical planning. This polycentric structure provides with some vital benefits to Istanbul Metropolitan Area such as the deduction of transportation charge between the residential areas and the CBD, the prevention of the consumption of the resources and the environmental pollution, and the integration of unplanned and illegal areas with their surroundings due to the new developing subcentres.

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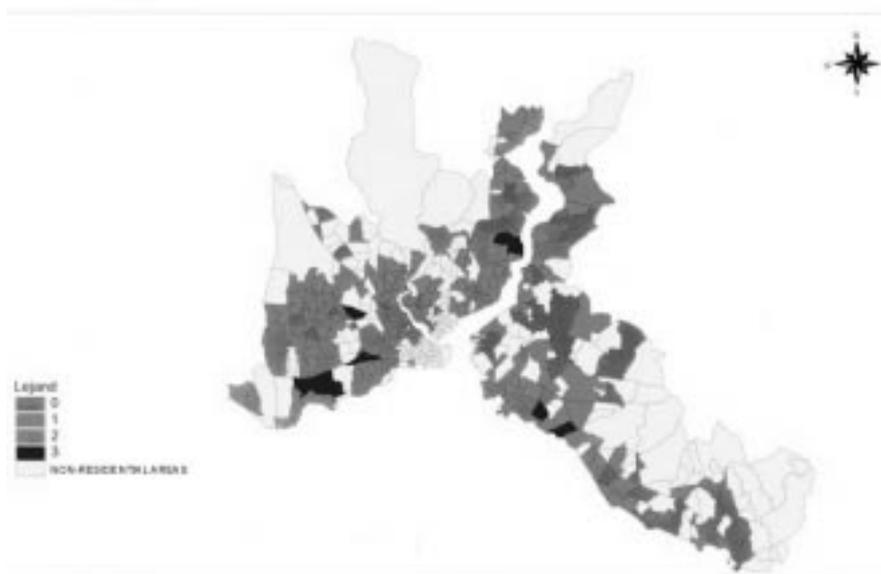
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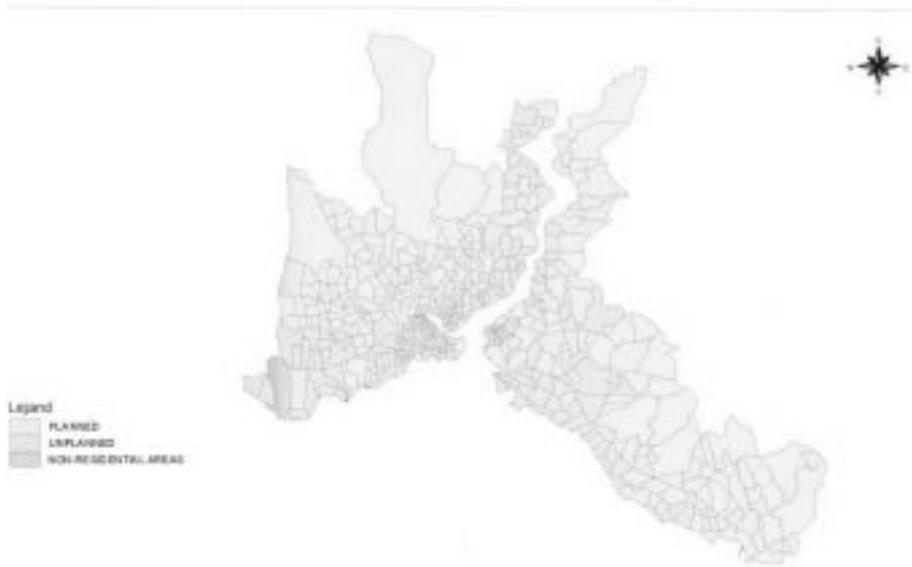
FIGURES



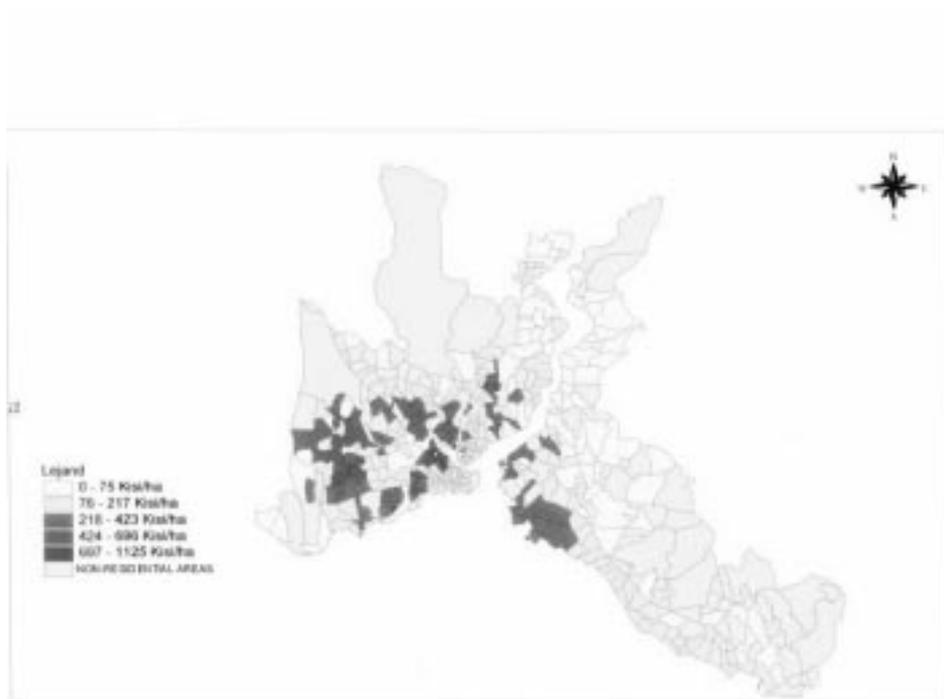
Residential Areas



Accessibility



Planned-Unplanned Areas



Şekil 1.4 Çalınca Toplam Kırmeç Alanlarında Yoğunluk

Density (p/ha)