

Turk, Sevkiye Sence

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Land subdivision: A case study in metropolítan area of Istanbul

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LAND SUBDIVISION: A CASE STUDY IN METROPOLITAN AREA OF ISTANBUL

S. Sence TURK
Istanbul Technical University
Faculty of Architecture
Department of Urban and Regional Planning
80191 Taskisla / Taksim
ISTANBUL/ TURKEY

The application of local physical plans is only possible by realizing subdivision in urban areas. Minor subdivisions, land readjustment projects and expropriations in Turkey are primary methods for realizing the subdivision of urban areas. Municipalities are responsible for the application of detailed urban plans. In metropolitan areas this power is given to sub-municipalities. The purpose of this paper is to determine whether there is a difference in realizing of subdivision according to detailed urban plans between urban areas in Istanbul Metropolitan Area.

The other purpose of this paper is to constitute a model concerning realizing of local physical plan application in Istanbul Metropolitan Area and then to compare each of these city groups. For this research, a sample survey method are used, the questionnaires are sent to Municipalities of urban areas with different population groups in Istanbul Metropolitan Area. In addition, the index of realizing of local physical plan (RLPP) are used as a dependent variable and population, population growth rate, global density, adequacy of budgets, the number of technical personnel in municipalities. Multiple Regression Model is used for Istanbul Metropolitan Area.

I. INTRODUCTION

Istanbul is the largest metropolitan center in Turkey. After World War II, under state-led industrialization policies, public investments were targeted away from Istanbul to build up the new capital city, Ankara, and develop new centers throughout Anatolia. When Istanbul regained its centrality under the economic liberalization policies in the late 1940s, it was no longer a prime city. As the leading harbor and major industrial, financial and cultural center, it attracted private and public investments and grew rapidly, with massive flows of migration mainly from rural areas. Istanbul's population increased from fewer than one million people in 1950 to three million in 1970 and over seven million in 1990. It is estimated that about ten million people now live in Istanbul Metropolitan area, which still accounts for 20 percent of the total urban population. (4)

The consequences of rapid urban growth have been affected negatively to the urban space in Istanbul. The problems as like the appearance of illegal housing areas,

insufficiency in land market, lack of infrastructure and essential service particularly roads, parks, car parks etc. have been put forward with different studies. (4)

The purpose of the study is first to investigate whether to be relationship between the realizing the application of local physical plans and population, population growth rate, global density, budget possibilities, socio-economic index, the number of personnel in Istanbul Metropolitan Area. Also this study is to determine the direction of the impact of independent variables on dependent variable.

The paper is organized in the following way. Turkish planning system is given in the next section. In other section methodology is determined. Then model is given and the definition of the variables is made, regression results and its table are explained. The final section is devoted to a conclusion, and the implication of the result for Istanbul Metropolitan Area.

II. TURKISH PLANNING SYSTEM

Turkey has a long tradition of urban planning. Buildings and Streets Ordinance of 1882 is commonly cited at first modern city planning law in Turkey. It gives more priority to buildings and its surroundings than the urban scale but the rules in this law are very important from the perspective of modern urban spaces. That law provided the basis of future planning legislation. Municipalities Law came into force in 1930. This law gave power to the all municipalities for preparing of local physical plans (implementation plans) those have the population of 2000 or more. Then the new The Building and Streets law passed in 1933. The context of law had two sections. First one is related to the maps and projects, second one is related to buildings standards. This law was obligatory to the municipalities for preparing future local physical plans in five years. (25)

Although this law remained in force during the 24 years, the result on the urban areas in Turkey is not successful. Instead of this law; Act No.6785 came into force in 1956. With this law, a population criterion was put for preparing of local physical plans. The population criterion was determined as above 5000. Act No. 6785 brought first time the concept of zoning planning system. According to this law, local physical plan was accepted by the council of municipality, but after then, it had to be approved exactly same or varying by Minister of Public Works. This law was changed with Act no.1605 in 1972. But Act no.6785 determined to be realize the process of approval of local physical plans by central administration. This state caused to the problems concerning time in amendments, supplements and revocations of land use plan and local physical plans.

While Act no 6785 were into force in period, it only brought decisions in areas in municipality border. But the urban settlements had a dynamic structure in that period. Act no 6785 did not response this dynamic structure in urban settlements. This law remained in force during 24 years. (26)

Act no 3194 came into force in 1985. This law is still in force. This law has been the main source for Turkish urban planning system. The law is applied everywhere in areas inside or outside of municipalities border (24). But Act no: 3194 has some the

exception laws. There are Tourism Encourage Law (Act no. 2634), Preservation Law (Act no.2863), Istanbul Bosphorus Law (Act no. 2960), Metropolitan Administration Law (Act no.3030). Because these laws came into force before Act no.3194, Act no.3194 did not deal with inside them.

Istanbul Bosphorus Law (Act no.2960) and Metropolitan Administration Law (Act no.3030) are the main legal sources affected to the space and administration of Istanbul Metropolitan area. According to Metropolitan Administration Law (Act no.3030) there is a staged structure in metropolitan areas. These are metropolitan municipality and its county municipalities. While Metropolitan municipality is responsible for preparing of metropolitan land-use plan, County municipalities are responsible for preparing of local physical plans. This state is valid for Istanbul Metropolitan area (22,23).

According to Act no.3194 plans are divided to main two sections. First is socio-economic plans, second is physical plans. Physical plans are also divided to sections according to scales as like superior physical plans (1/200.000, 1/100.000,1/50.000 and 1/25.000), land-use plans (zoning plans) (1/5000 and 1/2000), local physical plans (implementation plan) (1/1000)(22,23).

Socio-economic plans are divided to the two sections. First one is the country plan that is prepared for five-year periods. Second one is regional plan that is prepared by state planning authority.

According to Act no 3194, the council of municipality throughout municipality area approves the land use and local physical plans. Local physical plans are approved by governorship for the areas out of municipality area. *İller Bankası* or private sectors can also prepare these plans. (24)

With Act no 3194, a criterion is brought for the preparation of local physical plans related to population. This population criterion is 10.000. But if a municipality has not a population of 10.000, the council of municipality may decide on whether the preparation of local physical plans need. According to Municipalities Act (Act no 1580) the minimum limit to be a municipality is over 2000. A preparation of local physical plan depends on the council of the municipality for a municipality that has 2000 population. Generally, municipalities especially being founded newly urgently prepares own local physical plans. Because of the number of small municipalities under 10000 populations, the application of local physical plans affect badly.

Due to exception laws to the Act no 3194, there is power chaos in Turkish urban planning system. (22,23) The different authorities are responsible in preparing or application for the different scales and plans. So, a few authorities are responsible for the different scales and plans in the same area.

The process of application of local physical plans constitute of six sections. These are respectively implementation programs, subdivision control, land readjustment, expropriation, the building permission and the permission of building use. Municipalities prepare the implementation programs in three months right after the approval of local physical plans by the council of municipalities. Also this program is set up in five-year periods but although there is an obligatory for preparing of

implementation programs, the municipalities cannot sometimes fulfill this responsibility. (10,11). A time restriction is not set up for control subdivision in Act no 3194. The municipalities have to implement the control subdivision according to implementation programs section by section for the whole of local physical plans. For this, land readjustment and expropriation are the most important tools. The land readjustment is often applied by various countries successfully. (1,3,5,6,14,15,16,17) Land readjustment is a method whereby the ownership of scattered and irregular plots of agricultural land is pooled, roads and main infrastructure are built, and the land then subdivided into urban plots (35% of the total land in Turkey)(15,21). Each plot contributes a portion of their previous land holding to provide space for roads. The land readjustment has to be realized by municipalities without request. The criterion for redistribution in the process of the land readjustment is determined as a size in Turkey. The land readjustment is named as Article 18 in Turkey. Although the Article 18 (the land readjustment) is an obligatory for municipalities, the municipalities cannot be commonly applied the Article 18. Instead of Article 18, the Articles 15-16 are usually applied by voluntary reallocation. The Articles 15- 16 are the more fractional than Article 18.

III. METHODOLOGY

As mentioned above, the purpose of this study is first to investigate whether there is a relationship between the realizing of application of local physical plans and population, population growth rate, global density in urban areas according to local physical plans, adequacy of budget, the number of personnel for Istanbul Metropolitan Area.

Firstly, after questionnaire form is constituted, a pilot survey is made with 10 questionnaires to check the intelligibility of the questions. Some questions are corrected again and the question form reconstituted. A questionnaire forms are sent to 74 settlements (all of settlements in Istanbul Metropolitan Area)(2) by mail with back return envelopes to the planning department of the municipalities. Questionnaires are posted in October 2000. 43 questionnaires are collected until the latest days of December 2000.

The questionnaire questions are divided up into three parts. Questions corresponding to each seek to assess whether local planning authorities:

- Determining the behavior in application of the local physical plan in own areas;
- Finding out the problems in application of the local physical plan in own areas;
- Considering for solutions to problems.

Data analysis is conducted using the statistical PC Software SPSS (Version 8.0)

IV. MODEL

A multiple-regression model is used for Istanbul Metropolitan Area. The aim of the usage of a multiple regression model is not only to determine a relation between dependent variable and independent variables, but it is also to assess the possible effects and directions on dependent variable of independent variables for each size group. The Multiple-regression model used in the analysis is given below:

$$Y_i = a_0 + a_1 B_i + a_2 C_i + a_3 D_i + a_4 E_i + a_5 F_i + a_6 G_i$$

Y_i = index of realizing of the application of local physical plan in a city
 A_0, a_1, \dots, a_6 constants;

Y_i = index of realizing of the application of local physical plan in a city
 a_0, a_1, \dots, a_6 = constants;
 B_i = population size (log) for city i;
 C_i = population growth rate for city i;
 D_i = population density for city i;
 E_i = socio-economic index for city i
 F_i = the adequacy of budget for the application of local physical plan in i city (dummy variable)
 G_i = the number of technical personnel in municipality i (in city i)

4.1 Variables

Dependent Variable

Dependent variable is an index that it is constituted from factor scores by using factor analyzing with principal component analysis extraction method. Dependent variable contains from seven questions in questionnaire. These are collected in a single factor. These are;

Y1 whether if there is implementation program in city i;
Y2 whether if there is subdivision control in whole local physical plan in city i;
Y3 whether if there is realizing the application of local physical plan part to part in city i;
Y4 whether if there is use of Articles 15- 16 in city i;
Y5 whether if there is use of temporary or permanent of articles 15- 16 in city i;
Y6 whether if there is use Article 18 first method in city i;
Y7 the amount of realizing subdivision controls in city i;

Independent Variable

Population Size

Population size is taken as one of the independent variables of analysis in order to take into consideration growth effect in realizing of application of local physical plans.

Population Growth Rate

The urban growth rate is another variable of analysis. The calculation procedure for the urban growth rate assumes that past population growth has followed a linear pattern in which population is explicitly a function of time. In order to take into consideration the differing time periods, each intercental period was reduced to an average annual change figure. This is expressed as:

$$r_i = (P_n - P_0) / P_0 : N$$

- r_i = annual population growth rate for city i;
 P_n = population of city i in most recent census;
 P_0 = population of city I in the preceding census;
 N = number of years in an intercental period.

Population Density

The population density is another variable of analysis. The calculation procedure for population density is that the population divides to plan area. This is expressed as:

$$d_i = N_i / A_i$$

- d_i = global population density
 N_i = population city i
 A_i = local physical plan area city i (as a hectare)

The Adequacy of Budget for the Application of Local Physical Plan

This data is a dummy variable and data is extracted from questionnaire.

The Number of Technical Personnel in Municipality

The number of technical personnel in municipality is another variable of analysis. This variable constitutes from total number of technical personnel working in municipality as like urban planner, survey engineer, other technical staffs.

4.2 Results

The regression results are given respectively in Table 1, Table 2, Table 3, Table 4, and Table 5. Five regressions are run for each city population groups.

Table 1- The result of regression analysis for cities over 300.000

Predictors	Beta Weights	t
Constant	1.947	10.666
Population (log)	0.065	1.900
Population Growth	-0.00002	-0.009
Population Density	-0.012	-0.100

Personnel	0.014	0.977
Ad.of budget	0.290	2.408

Analysis of Variance for Total Equation				
Source	Sum of Squares	df	Mean Square	F
Regression	2.199	5	0.440	3.553
Residual	4.456			

Multiple R: 0.575
R2 :0.330
Standard Error:0.3518

* Significance level was chosen as α 0.05

The results of regression analysis revealed that index of realizing of local physical plan application in a city are largely predicated by population, population growth, population density, the number of personnel and adequacy of budget for the application of local physical plan. Looking at the result that appears in Table 1, there are an evident relation (0.575) between dependent variable and independent variables.

The impact of population, adequacy of budget, the number of personnel on index of realizing of local physical plan application is positive. But the impact of population density and the population growth on dependent variable is negative.

V. CONCLUSION

The main objective of this study is to investigate whether there is a relationship between the index of realizing of local physical plan application and population, population growth rate, global density, adequacy of budget and the number of personnel for Istanbul Metropolitan area. Also this study aims to determine the direction of the impact of independent variables on dependent variable.

According to the results of analysis, the important findings are obtained for Istanbul Metropolitan. Firstly, there is an evident correlation between dependent variable and independent variables for area. This means that the realizing of local physical plan application mostly explains population, population growth, population density, number of personnel, and adequacy of budget variables for Istanbul Metropolitan area. The other important finding is that the direction of the impact independent variables on dependent variable is same for population, adequacy of budget and the number of personnel. However, the direction of this impact is different for population growth and population density.

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