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## Land development in turkey: A model on the subdivision in urban areas

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## **LAND DEVELOPMENT IN TURKEY: APPLICATION OF LOCAL PHYSICAL PLANS IN URBAN AREAS AND A MODEL**

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The main objective of application of local physical plan in urban areas is to constitute the healthy urban structure, to provide land development and to regulate the use of private and public land for public interest. The other important objective is to prevent sprawl of city and chaotic growth. Especially, subdivision is an important tool for application of physical planning decisions in the urban space in Turkey. The municipalities are responsible for the application of local physical urban plans except a voluntary basis through agreements according to the civil law but there is lack of sufficient research related to realizing of subdivision in urban spaces throughout the Turkey. The purpose of this study is 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, socio-economic index, the number of personnel for different city size groups. Also this study aims to determine whether there is a difference between the behaviors of different city size groups in realization of application of local physical plans (detailed plans).

For this research, a sample survey method is used and 462 questionnaires are completed by Planning Office of the Municipalities of urban areas in different population groups. In this model, the index of realization of local physical plan (RLPP) are used as a dependent variable and population, population growth rate, global density in urban areas according to detailed plans, adequacy of budgets, socio-economic index, the number of personnel. Multiple Regression Model is utilized for each city size groups and comparison tables.

The results of the paper can be used to identify the problems concerning the application of local physical plans in Turkey and to suggest solutions to these problems based on existing legislation in Turkey.

## I. INTRODUCTION

Planning Systems and laws change from country to country, but planning services have the same goal: “modeling for future”. Plans, as tool of planning, can be thought in two groups: First one is the socio-economic plan and the second one is physical plans. Physical plans are also divided into two groups that are superior and local physical plans. Especially, local physical plans are important tools by providing to shape of space directly. Physical plans constitute according to the decisions of socio-economic and superior plans, they reflect their decisions to the space. The goal of the local physical planning is not only to fulfill basic needs in settlements, but also, is to constitute the achievement of good urban design, efficient use of public resources, the good use of land and the creation of high quality urban environments. (22,23) The realizing of this goal is only possible with the application of physical plans.

The application of physical plans (detailed plans, scale: 1/1000) to the space services for two main aims. First is to constitute healthy and high quality urban environment, second one is to produce urban plots in sufficient amounts. The developed countries have realized these two aims with the different policies and methods as like subdivision control, land adjustments projects, land policies. (1,3,5,6,13,14,15,16,17)

The consequences of rapid urban growth have affected the urban space in Turkey in negative way. (19) There are several problems, like the growth of illegal housing areas, insufficiency in land market and infrastructure and essential services (roads, parks, and car parks) according to different studies. (4,9,12). Two reasons related to these problems can be discussed. First reason is that local physical plans in Turkey are either produced with substandard quality or even not produced. Second one is the problem in the application of local physical plans. Up to now, any detailed research has not been done dealing with the quality and quantity of local physical plans in Turkey. İller Bankası, a public authority, plays an important role in preparing and financing local physical plans (8), so the local physical plans (except privately initiated plans they have a small percentage) in Turkey satisfies at least minimum quality provided by law. Generally, all of the municipalities has prepared their own local physical plan once, 37.1 percent of municipalities have been prepared local physical plans second time, 17.5 percent of their third time and 6.2 percent of their fourth time. So, the local physical plans cannot be blamed only, to cause the problems mentioned above though their quality is disputable. The point is they cannot be applied to the space properly. There are not enough sources about the application of detailed plans in Turkey. It has been said that infrastructure and essential service areas in urban areas is unsatisfactory for both existing and new development areas (12). The lack in producing of urban plots is determined in Habitat II Report. (20) According to this report, Turkey have to produce urban plots for housing, 25000 hectare in 2000 and 30000 hectare in 2005 and also the same amount urban areas are needed for other functions apart from housing function. According to the other study, (18) Turkey have to produce 320.000 house units in a year depending on the development of population, 70.000 house units for renewal and 5000 house units for disaster. So it is needed 13.680 hectare urban plots in a year in Turkey. These findings show the importance of application of local physical plans but there has not been any study which grade the application of local physical plans in Turkey.

The purpose of this study is first to investigate whether there is a relationship between the realization of application of local physical plans and population, population growth rate, global density, budget possibilities, socio-economic index, the number of personnel for different city size groups. Also this study aims to determine whether there is difference between the behaviors of different city size groups in realizing of application of local physical plans (detailed plans). For providing this purpose, an index is needed to be developed. The constituting index is the other purpose.

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 tables are explained. The final section is devoted to a conclusion, and the implications of the results for Turkish Planning System.

## **II.TURKISH PLANNING SYSTEM**

Turkey has a long tradition of urban planning. Buildings and Streets Ordinance of 1882 is commonly cited as 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. (25) 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 (26).

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.

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.

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). (24)(Figure 1).

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 land use and local physical plans are approved by the council of municipality throughout municipality area. Local physical plans are approved by governorship for the areas out of municipality area. These plans can also be prepared by Iller Bankasi or private sectors. (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. The implementation programs are prepared by municipalities 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. (1,3,5,6,14,15,16,17,18) Land readjustment is a method whereby the ownership of scattered and irregular plots of agricultural land is polled, 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 is the more fractional than Article 18.

### III. METHODOLOGY

As mentioned before, the purpose of this study is to investigate whether there is a relationship between the realization of application of local physical plans and population, population growth rate, global density in urban areas according to local physical plans, adequacy of budget, socio-economic index, the number of personnel for different city size groups. So the research is made on the form a questionnaire survey of municipalities selected through a stratified random sampling in Turkey.

Firstly after questionnaire form had been constituted, a pilot survey was made 20 questionnaires to check the intelligibility of the questions. Some questions were corrected again and the question form reconstituted. A questionnaire forms were sent by post with back return envelops to the planning department of the municipalities (2). Questionnaires were posted in October 2000. The research questionnaire was collected to the latest days of December 2000. The sampling of the questionnaire survey is given in Table 1.

Table1. The Sampling Area of the Questionnaire Survey.

City Size Group (Municipality Size Group) Population	The Number of Municipalities	The Number of Collected Questionnaire Forms	Percentage (%)
300.000>	28	28	100
100.000-300.000	71	57	80
100.000-50.000	83	51	60
50.000-10.000	411	116	28
10.000<	2607	210	8
<b>TOTAL</b>	3200	462	

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

- determined 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;
- considered a proposal for solutions to problems.

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

## IV. MODEL

A multiple-regression model is used for each size groups. The aim of a multiple regression model usage 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;  
 $B_i$  = 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 city i (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 composed of 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 control in i city;

#### Independent Variable

##### Population Size

Population size is taken as the 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 other 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)

## **Socio-Economic Index**

The socio-economic index is another variable of analysis. This variable is taken from a study. This study is the development order of the county socio-economic prepared by State Planning Authority in 1996(7).

## **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, surveying engineer, and other technical staffs.

## **4.2 Results**

The regression results are given respectively in Table 2, Table3, Table 4, Table5, and Table 6. Five regressions were run for each city population groups.



Table 2- The result of regression analysis for cities over 300.000

Predictors	Beta Weights	t
Constant	0.785	0.428
Population (log)	0.682	2.078
Population Growth	0.0003	0.016
Population Density	-1.068	-6.795
Socio-eco Index	0.025	1.164
Personnel	0.0193	1.873
Ad.of budget	-0.032	-0.400

Analysis of Variance for Total Equation				
Source	Sum of Squares	df	Mean Square	F
Regression	3.213	6	0.536	15.975
Residual	0.704			

Multiple R: 0.906
R2 :0.820
Standard Error:0.183

\* Significance level was chosen as  $\alpha$  0.05

\*Source: Questionnaire Survey and census of population 1990, 1997 (The State Institute of statistics Republic of Turkey)

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, socio-economic index, the number of personnel and adequacy of budget for the application of local physical plan. Looking at the results of which appear in Table 2, there are a very high relation (0.906) between dependent variable and independent variables.

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

Table 3- The result of regression analysis for cities between 300.000-100.000

Predictors	Beta Weights	t
Constant	-1.651	-1.721
Population (log)	1.175	6.038
Population Growth	0.0007	0.529
Population Density	-1.047	-9.641
Socio-eco Index	0.0096	0.790
Personnel	0.0601	1.029
Ad.of budget	0.0024	0.506

Analysis of Variance for Total Equation
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Source	Sum of Squares	df	Mean Square	F
Regression	5.064	6	0.844	21.277
Residual	1.904			

Multiple R: 0.852

R2 :0.727

Standard Error:0.1992

\* Significance level was chosen as  $\alpha$  0.05

\*Source: Questionnaire Survey and census of population 1990, 1997 (The State Institute of statistics Republic of Turkey)

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, socio-economic index, the number of personnel and adequacy of budget for the application of local physical plan. Looking at the results which appear in Table 3, there are a very high relation (0.852) between dependent variable and independent variables.

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

Table 4- The result of regression analysis for cities between 100.000-50.000

Predictors	Beta Weights	t
Constant	-7.946	-1.815
Population (log)	2.509	2.676
Population Growth	-0.002	-1.208
Population Density	-1.279	-5.393
Socio-eco Index	-0.004	0.908
Personnel	0.246	1.704
Ad.of budget	0.005	0.238

Analysis of Variance for Total Equation

Source	Sum of Squares	df	Mean Square	F
Regression	10.467	6	1.745	7.698
Residual	9.971			

Multiple R: 0.716

R2 :0.512

Standard Error: 0.4760

\* Significance level was chosen as  $\alpha$  0.05

\*Source: Questionnaire Survey and census of population 1990, 1997 (The State Institute of statistics Republic of Turkey)

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, socio-economic index, the number of personnel and adequacy of budget for the application of local physical plan. Looking at the results of which

appear in Table 4, there are a high relation (0.716) between dependent variable and independent variables.

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

Table 5- The result of regression analysis for cities between 50.000-10.000

Predictors	Beta Weights	t
Constant	-1.147	-1.882
Population (log)	1.126	7.518
Population Growth	0.0003	0.627
Population Density	-1.013	-10.147
Socio-eco Index	0.0031	0.228
Personnel	0.138	1.874
Ad.of budget	0.036	1.880

Analysis of Variance for Total Equation				
Source	Sum of Squares	df	Mean Square	F
Regression	17.719	6	2.953	26.025
Residual	13.049			

Multiple R: 0.759
R2 :0.576
Standard Error: 0.3369

\* Significance level was chosen as  $\alpha$  0.05

\*Source: Questionnaire Survey and census of population 1990, 1997 (The State Institute of statistics Republic of Turkey)

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, socio-economic index, the number of personnel and adequacy of budget for the application of local physical plan. Looking at the results that appear in Table 5, there are a high relation (0.759) between dependent variable and independent variables.

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

Table 6- The result of regression analysis for cities under 10.000

Predictors	Beta Weights	t
Constant	-1.575	-4.164
Population (log)	1.170	10.096
Population Growth	-0.0027	-0.774
Population Density	-1.056	-15.943

Socio-eco Index	0.0000003	0.696
Personnel	-0.0887	1.315
Ad.of budget	0.000712	-0.018

Analysis of Variance for Total Equation
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Source	Sum of Squares	df	Mean Square	F
Regression	46.241	6	7.707	48.371
Residual	32.025			

Multiple R: 0.769
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R2 :0.579
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Standard Error: 0.3992
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\* Significance level was chosen as  $\alpha$  0.05

\*Source: Questionnaire Survey and census of population 1990, 1997 (The State Institute of statistics Republic of Turkey)

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, socio-economic index, the number of personnel and adequacy of budget for the application of local physical plan. Looking at the results of which appear in Table 6, there are a high relation (0.769) between dependent variable and independent variables.

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

Table 7- The directions of impacts of independent variables on dependent variable.

Variables	300.000>	300.000- 100.00	100.000- 50.000	50.000- 10.000	10.000<
Population (log)	+	+	+	+	+
Population Growth	+	+	-	+	-
Population Density	-	-	-	-	-
Socio-eco index	+	+	+	+	+
The number of personnel	+	+	+	+	-
Adequacy of budget	-	+	+	+	+

According to Table 7, the relationship between population variable and dependent variable is positive for each city population groups. The same feature is also valid for socio-economic index. The relationship between population density variable and dependent variable is negative for city population groups. The impacts of population growth, the number of personnel and adequacy of budget variables on dependent variable are different for each city population groups.

## V. CONCLUSION

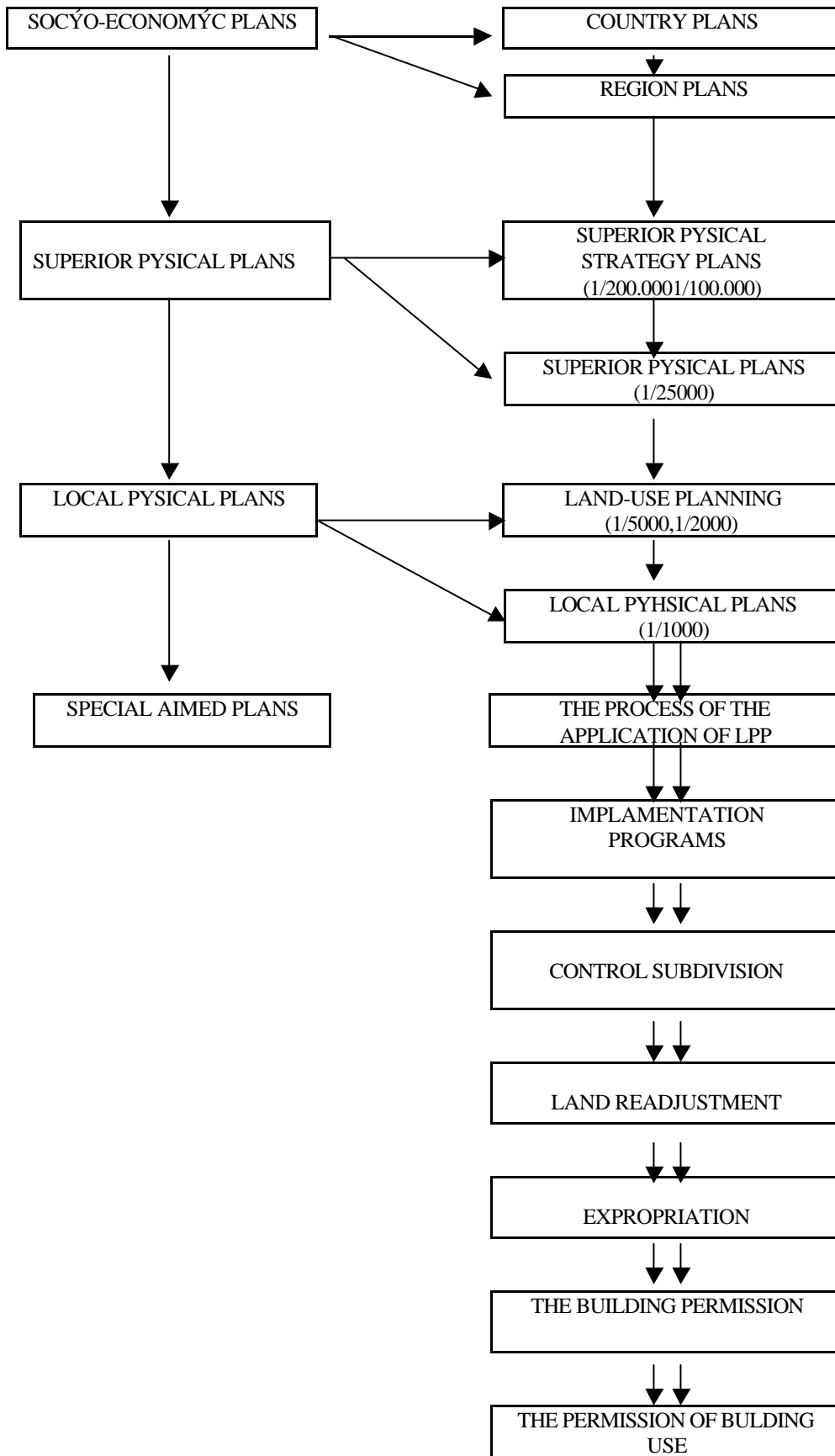
The main objective of this study is to investigate whether to be relationship between the index of realizing of local physical plan application and population, population

growth rate, global density, adequacy of budget, socio-economic index and the number of personnel for different city size groups. Also this study is to determine whether to be difference the behavior of different city size groups in realizing of local physical plan application (detailed plans).

According to results of analysis, the important findings are obtained for each city population groups. Firstly there is a high correlation between dependent variable and independent variables for each city population groups. This means that the realizing of local physical plan application mostly explains population, population growth, population density, socio-economic index, number of personnel, and adequacy of budget variables for each city population groups. The other important finding is that the direction of the impact independent variables on dependent variable is same for population, socio-economic index and population density. However, the direction of this impact is different for population growth, the number of personnel and adequacy of budget. City population groups of 300.000-100.000 and 100.000-50.000 demonstrate the same feature.

This research and its findings can help to the re-regulation of local physical plan application in development law in Turkey. Act no 3194 only determined a single procedure in the application of local physical plans for each city population groups. For example, city population groups of over 300.000 and between 50.000-10.000 have to apply the same procedure for application of local physical plan but these two groups have different features. The increase in realizing of local physical plan application in Turkey can be possible to consider into the features of different population groups in plan applications.

FIGURE 1. Turkish Planning System and Hierarchy of Plans



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