INDUSTRIAL MOBILITY IN ANKARA INNER METROPOLITAN AREA

"TEST OF INCUBATION HYPOTHESIS FOR DIFFERENT INDUSTRIAL SECTORS"

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Nilgün GÖRER

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Approval of the Graduate School of Natural and Applied Sciences

Prof.Dr.Alpay ANKARA

Director

I Certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science in City Planning.

Prof.Dr.Gönül TANKUT

Chairman of the Department

We certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science in City Planning Department.

Inst.Murat GÜVENÇ

Supervisor

Examining Committee in Charge:

Prof.Dr.İlhan TEKELİ

Assoc.Prof.Dr.Ayda ERAYDIN

Inst.Murat GÜVENÇ

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Görer, Nilgün

Faculty of Architecture

Department of City and Regional Planning

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Supervisor: Inst. Murat GÜVENÇ

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ABSTRACT

Recent discussions in the industrial geographical literature, concentrate on restructuring of industry as a result of new technological innovations, and dynamics of industrial production. All these changes in economic relations are reflected in space as new economic relations require new spatial relations. This new tendency is studied under the heading of "Decentralization of industrial activity".

In this context, this study attempts to understand the interrelationship between industrial production dynamics and the metropolitan development in the case of Ankara.

The central focus of the thesis is to identify the attributes of "relocated industries" within the general structure of industrial landscape of Ankara Metropolitan Area.

The study also tries to analyse manufacturing activities in relation to the development in the urban macroform, as a whole.

Key words: Industrial geography, manufacturing industry, industrial mobility, relocation, incubation, weighted center of gravity, metropolitan growth.

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ANKARA METROPOLİTAN ALANINDA SANAYİ HAREKETİ

"FARKLI SEKTÖRLER İÇİN KULUÇKA HİPOTEZİNİN TESTİ"

GÖRER, Nilgün

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ÖZET

Sanayı coğrafyası literatüründeki güncel tartışmalar yeni teknolojik buluşların ve üretim dinamiklerinin bir sonucu olarak sanayinin yeniden yapılanması üzerinde yoğunlaşmıştır. Yeni ekonomik ilişkiler yeni mekansal ilişkileri gerekli kıldığından dolayı ekonomik ilişkilerde meydana gelen bütün değişmeler mekana yansıtılmaktadır. Bu eğilim literatürde "sanayi aktivitesinin decentralizasyon"u konusu altında çalışılmaktadır.

Çalışma bu kapsamda, sanayi üretim dinamikleriyle metropoliten gelişme arasındaki karşılıklı ilişkileri Ankara örneğinde anlamayı amaçlıyor.

Tezin ağırlıklı inceleme konusunu, Ankara Metrepoliten kentinin sanayi peyzajının genel yapısı içinde "yer değiştiren sanayilerin" özelliklerinin tanımlanması oluşturmaktadır.

Ayrıca bu çalışma metropoliten alanın şekillenmesinde önemli bir faktör olan imalat sanayinin mekansal davranış kurgusunun kent makroformu içinde gelişme eğilimlerini de vurgulamaktadır.

Anahtar sözcükler: Sanayi Coğrafyası, İmalat Sanayi, Sanayi hareketliliği, Yeniden Yerleşim, Kuluçka, Ağırlıklandırılmış Çekim Merkezi, Metropoliten Büyüme.

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INTRODUCTION

Location of industrial activities constitute one of the key issues in the process of urbanization. Both population increase, size and the development of urban functions are related to the scale and to the spatial distribution of industries. And it also gives impetus to the economic and urban growth of a country. Under obvious national and international economic determinants, urban dynamics and structure of industry follow the capital accumulation process, as it reflects itself on metropolitan space. Its interrelations with the national level lead to changes in the geography of manufacturing activity and also tend to change the spatial distribution of population together with industrial production space in the country or region.

Historically, metropolis developed as a center of industrial production at the beginning of nineteenth century. Later on the concept of metropolitan regions appeared as a new form of spatial organization in industrialized countries.

In most developed countries metropolises a new process of spatial transformation is observed as a result of industrial movement from central cities of metropolitan area to non-metropolitan areas.

Parallel to changes in the phenomena of urbanization there has been changes in theories pertaining to the locational behaviour of industries in the metropolitan areas. Especially during late 1970's, urban realities began to change dramatically when specialized industrial districts started to decentralize. These transformations were often associated with the geographical decentralization of production. This brought a new set of social problems and policy issues that can hardly be analysed with available theoretical frameworks. These developments generated a new attraction and theoretical interest on the industrial location. In this sense, several studies have brought new dimensions to location theory, through new arguments explaining locational behaviour of industries. The evolution of this theory is important since scientific explanation of the locational behaviour of industries goes generally parallel with the understanding of the dynamics of urban growth.

According to overviews on the evolution of industrial location theories, these frameworks can be classified under four headings.

1. Chicago school of urban sociology,
2. Neo classical industrial location theory,
3. Behavioural industrial location theory,
4. Structuralist and post-structuralist approaches to industrial location theory,

First, in the 1920's by Chicago School of Urban Sociology was dealing with sociological research to describe and clarify,the morphological features and the dynamics of transformation of metropolitan areas. Effects of Von thunen's locations theory which determines areal specialization and distribution of optimum service

models, are seen in their researches. For the first time Chicago School of Urban Sociology studied industrial location at the intra-metropolitan level by using a model based approach. The spatial differences between morphological elements of metropolis are explained using urban ecological methods. However functional relations among the elements which create metropolis, are not considered. The emphasis was on the growth of metropolis; as a whole. Within this ecological framework industrial firms or industrial areas do not have different functions from other land uses. In this sense this approach neglects the role of the production space in the formation of metropolitan morphology. The spatial form of metropolis develops from center to periphery and each zone invades the adjacent ones. In brief this ecological approach studies the quality and the position of industrial concentrations with respect to the metropolitan whole.

Using a quite different approach Classical Location Theory attempted to integrate industrial location into the economic theory and into the theory of the firm. Decision makers are considered to possess two primary goals; maximizing receipts or minimizing costs.

There are three approaches in classical location theory:

The Least Cost Approach, Market Area Analysis, The Profit Maximisation Approach.

The Least Cost Approach, attempts to derive optimum location in terms of the minimisation of factor costs. This approach is developed by A.WEBER. WEBER believed that three factors influenced industrial location. These are transport costs, labour costs, and agglomerative or deglomerative economies or diseconomies. According to this approach

the entrepreneurs select sites which minimise total costs, during optimum substitution between these factors.

Hoover elaborated on the Weberian model. He gives emphasis to some of industrial location decision factors. Such as, land needs of firm for production, differentiation in urban land prices, the institutional and economic restrictions on the growth and expantion of firms and local taxes. (Glasson.J, 1978, pp: 127)

Market Area Analysis, emphasizes demand, or receipts market factors. LÖSCH attempted to incorporate demand into the theory by considering the optimum size of the market. He concludes that the optimum location is the point where profits are maximized. (Glasson.J, 1978, pp: 132)

The Profit Maximisation Approach, arises as the logical outcome of the other two. Costs and revenue are assumed to vary with location and the optimum location yields the greatest profit. (Glasson.J, 1978, pp: 134 - 135)

Classical Location Theory is considered as the one that deals mainly with the location of firm by reducing transportation costs from raw material, site, to market area. According to this theory proximity to transportation modes, from factory site to markets, and to raw material sources are taken as basic factors that account for the industrial concentrations and dispersions over the country. This theory were successful in examining of industrial location and dispersion interms of urban and regional scale.

In 1960's another theoretical explanation started to take shape. That is the Behavioural Industrial Location Theory. During the 60's geography was characterized by a greater emphasis on quantitative

methodology. The aim of behavioural school was to change the priorities of Neo-classic researches from deduction to empirical generalization. In doing so behaviouralists attempted to develop a theory of industrial location which is more realistic and which can be tested with empirical data. Behavioural industrial location approach developed mainly into two theoretical lines: one emphasized the internal characteristics of the company and was advocated by Dicken in the UK (1971). While other analysed the internal characteristics of the company more in relation to the underlying forces of the economic environment. This form is characterized by the works of Washington School.

While in the first approach, industrial location decision is taken as a part of investment process of firm, the second approach emphasizes the effect of environmental factors. Here, 'environment ' is defined in such a way to include economic and spatial policies at the national level and social processes which effect the locational behaviour of the firm. Unfortunately spatial effects of these decisions produced by firms are not duely studied.

After 1970's the Structuralist Industrial Location Theory started to take shape. Here, changes in the production and employment levels of firms are studied as consequences of macro level economic changes observed at national and international levels.

As opposed to behaviouralists proponents of the structuralist framework, stressed the need for an approach that studies societal phenomena as a whole. Consequently they rejected the behaviouralist model, which mainly studied firms in isolation from their socio-economic context. Instead they proposed a new approach which

explicitly relates locational changes to the macro economic forces. Structuralist approach is well illustrated in MASSEY and MEEGAN'S research. Here, national and international economic trends are analysed in the first place.Secondly specific effects of these economic changes are analysed. These processes explains why firms are grouped on the basis of their experience of economic change, rather than within structuralist approach their organizational characteristics.

SCOTT developed an historical-theoretical framework which accounts for the evolution of the location of industries at the intra-metropolitan level. According to Scott, at early stages of industrial development plants are likely to be randomly distributed in and around city center. At the subsequent stage one center starts to generate agglomeration economies, and arises as an industrial concentration area. Then after these nodes start to decentralize as production units substitute capital for labour. This last stage, could be characterized by decentralized capital intensive plants, controlled by specialised labour intensive management units clustered as the core of the city. (Scott.A.J, 1982(b), pp:133)

As a result of researches carried out by structuralist geographers a new urban model is shaped, in which cities started to be shaped at the intersection of reproduction to production spheres. We may think of considerable changes in economic and social relations in the western countries such as relocation of firms, as a consequence of economic restructuring, and rising unemployment levels as being effective in this transformation. In this manner decentralization has became a popular research topic among industrial geographers.

The relocation of an established firm can result from pressures both internal and external to the firm. The main internal pressure comes from growth in output, and external pressure may come from a variety of sources. Faced with these pressures, most firms would first investigate whether their existing site could be used more efficiently or not. If the pressures are too great, there are several options open to the firm. If the decision is taken to move, a new site must be chosen and this choice involves a consideration of several general location factors. Location factors are difficult to quantify, varying from firm to firm, and are difficult to rank in any order of importance. The following location factors are major ones. (Glasson.J, 1978, p:137)

- Capital
- Labour
- Land and other immobile factors
- Transport and communications
- Environmental factors
- Government aid
- The role of agglomeration economies

The key issues in location theory are transport, labour, agglomeration and market factors. They are basic variables to any location decision. But, in practice there are also behavioural and institutional factors which is also influence location decisions together with the other location factors. And all the location factors influence the process of spatial pattern of urban and metropolitan development.

In this perspective, the study analyses the relocation of industry with its spatial and structural attributes in the case of Ankara. The study uses empirical data so as to derive spatial motives of relocated firms during the time period between 1974 and 1988.

The study is organized under four main parts. So as to shed light to the relocation and motives in different types of manufacturing activity within the limited industrial background of Ankara, as compared to that of Istanbul and Izmir. But, above all we expect to provide a useful account of industrial geography of Ankara.

To this end, the evolution of industrial activity is explained by different form of organization of industrial production and the effects of technological changes. This part is based on historical view of decentralization tendencies and theoretical explanations of the process of industrial decentralization in metropolitan areas. Second chapter deals with methodology of the study which was used to account for industrial mobility and existing industrial structure in Ankara.

Third part of study is dealing with the development and spatial distribution of manufacturing industry in Ankara within a historical framework. Four time intervals are defined with respect to the economic situation of the country, and some breaking points in the planning history of Ankara.

Fourth, the empirical part of the study deals with the incubation hypothesis. Here we attempt to elucidate the characteristics of relocated firms, such as size, capital, sector and land use factors in the production process.

The features of relocated industries will be compared by those known for Western Countries.

Also, Changes in the distribution of metropolitan population and industrial production factors are described through a locational analysis of related centers of gravity.

In the concluding section, we discuss the results derived from our empirical study using geographical description methods.

As a result, predicting and planning of the location of employment have surely an important role in shaping of urban land use. Therefore understanding of locational behaviour, or industrial mobility patterns in metropolitan areas are important research items in urban planning programs and policies.

CHAPTER 1

1. THE SPATIAL MOBILITY OF MANUFACTURING INDUSTRY IN THE HISTORICAL FRAMEWORK.

The metropolis emerged in the 19 th century on the basis of highly organized complexes of manufacturing activity. In the present century, we are faced with internal changes within the industrial system. These changes lead to decentralization of units of capital and to the emergence of a new spatial division of labour and industrial land use at dispersed suburban and peripheral locations.

Changes which effect industrial location decisions, also affect it's labour force and it's living environment. So this causes a new population movement in metropolitan areas. As a result of this movement, new work and residential centers appeared in metropolitan regions. The empirical researches, carried out in industrialized countries support these tendencies.

These various shifts have non negligeable effects on the geographical pattern and historical evolution of the metropolitan system as a whole. This chapter provides an overview on the major locational tendencies of industries. And also concentrates on the

theoretical explanation of the process of industrial decentralization in the case of industrialized countries.

1.1. Characteristics of First Generation Manufacturing Plants in The Metropolitan Area.

In the late nineteenth century, there were two forms of industrial enterprise in a typical North American Metropolis. The metropolis was a center both of the large-scale materials intensive and also small-scale labour-intensive manufacturing activities.

The location of material intensive manufacturing activities can be explained by the costs of transporting commodities from raw material sources to production sites. Weberian locational principles used to explain the dominant pattern of geography of manufacturing in Several American Cities. In the literature Moses and Fales correctly invoke Weberian locational principles to explain dominant pattern of manufacturing in Chicago.

The materials-intensive industries were clustered around the main rail road and water transport terminals where transport costs were lower. High density working class residential district developed around this industrial core. By the this way, core of nineteenth century city appeared. (Scott.A, 1982, pp:119)

For different reasons, small-scale labour intensive industry clustered around the core of nineteenth century metropolis like the materials-intensive manufacturing form.

They produced for direct final consumption in a highly competitive market situation. For this reason, final demands were varying and uncertain. Thus, methods of production in these kinds of industries resisted standardization and mechanization and production was carried out mainly by live labour. In the nineteenth century, the labour-intensive qualities of these industries were often compounded by the widespread use of the putting-out system and sweated labour.

Two major locational tendencies appeared for small-scale labour-intensive industry in the nineteenth century metropolis. First, these activities clustered in distinctive functional areas. Because it is characterized by an elaborate division of labour, this type of industry tends to form labyrinthine complexes of economic activity. Within these complexes inter-plant linkages between small individual producers are highly developed with small scale output and input flows between firms. Transportation was not easily obtainable because of the high unit transport costs. On the other hand constantly varying design specifications such as form, color, fit, increased the need for face to face contacts which also played an important role in clustering.

Secondly, because of the massive collective demand for labour in these complexes, they gravitated to central locations for increasing maximum accessibility to their principal workforce. (Scott.A, 1982, pp:121)

The core was surrounded by densely populated residential areas in which labour was settled. Hence we can conclude that industrial and residential land use determined the locational outcomes. As a result metropolis became a major labour pool and the cores of large cities were characterized by industrial production. (Scott.A, 1982, p:188)

1.1.2. An Overview of The Process of Industrial Decentralization in Historical Context:

By the time of World War II, the cores of large cities in the United States were still typically given over to a considerable degree to industrial production. Nevertheless, from the very beginning of modern industrial development, and even as far back as the middle of the 19 th. century, there was a slowly accelerating tendency for industry to decentralize from the metropolitan core and locate in suburban and peripheral areas. It would seem that this process of decentralization was characterized from the start by more capital-intensive forms of productive activity. (Scott.A, 1982, pp:188)

Like Scott, Vernon and Hoover also emphasized the effect of these trends on the decline of major metropolitan manufacturing centers and it has been to shift manufacturing employment from periphery and suburbs in their case study in New York Metropolitan Region. (Vernon, Hoover, 1959, pp:242)

During late nineteenth and early twentieth centuries, by the intensification of capital in the industrial production processes there was a constant increase in routinized highly productive technologies. This tendency freed many kinds of manufacturing plants from the need to be close to major labour pools, and allowed plants to escape from high land prices in the center and to move out along the main transport routes.

By the end of the Second World War, manufacturing activity and other productive activities have decentralized from the cores of large metropolitan regions in the United States.

There were mainly two forms of decentralization in the United States after Second World War. First, the migration of plants from inner city areas to the urban periphery. Secondly and more important one, the growth of new industry and employment opportunities in peripheral areas and the decline of old industrial activities at the core areas.

There were several reasons for this decentralization process which effected mostly manufacturing industries. Scott enumerates the following points:

- Technological and organizational change in the production system is expressed in the form of capital deepening. This means more efficient production technologies, and with scientific management, enable firms to grow in size, to achieve vertical and horizontal integration of functions and to secure internal economies of scale. These developments encourage decomposition of old centralized industrial complexes made up of small-scale labour-intensive activities. (Scott.A, 1982, pp:193-194)

- Technological advances tend to reach to greater standardisation of production processes, and this leads to greater standardisation of linkage patterns. Through standardisation, unit transport costs decrease and industries become to less dependent to each other in spatial terms.

- Improvements in industrial technology tend to decrease the need for specific skills in production processes. Thus, industries are freed from the pools of labour skills where are concentrated in the metropolitan labour market.

- The tendency of blue-collor and white-collor work within the firm is spatially split up as the firm grows in size.

The 1970s represents a period of transformation of American cities and regions. This was a time when the whole space economy of the United States was undergoing reorganization with in a new spatial and international division of labour. And formerly growing metropolitan regions started to lose both jobs and population. Increasing amounts of routine blue-collar work were being transfered to the periphery, and, many locations started to appear in the form of new centers of concentrated industrial growth in the far metropolitan hinterland. This outcome has been associated with an increasing functional centralization of industrial capital and the rise of the multiestablishment and multinational corporation. (Scott.A, 1988, pp: 204-205)

Scott suggests that, the dissolution of industrial complexes in large metropolitan regions and the growth of dispersed new industry in suburban and non metropolitan areas are not, two distinct and unrelated phenomena. It's roots lie in the historical transformation of the social relations of production in capitalism. The spatial character and dynamics of cities, and regions in capitalist society grow within the social and technical relations of commodity production.

1.2. THEORETICAL EXPLANATIONS OF THE PROCESS OF INDUSTRIAL DECENTRALIZATION

The study of intra-urban industrial location is not a new topic in the field of industrial geography. There are many studies about characteristics of industrial zones in cities and mostly all discussed concentration-deconcentration and decentralization of industrial activities over metropolitan areas.

Several critical observations exist on theoretical accounts of industrial location and relocation in and around the large metropolis. Theories about the process of industrial decentralization begins with such factors as; (a) obsolete central plant and equipment, (b) lack of space for expansion, (c) the invention of truck transport, (d) the development of horizontal factory layouts, and (e) management-union conflicts in inner city areas as contributing to the creation of forces pushing industry away from the urban core.

In this subject Scott's studies brought a new view point to account for these decentralization tendencies. He reduced decentralization process into economic base. Therefore centred his study on the dynamics of production processes.

According to Scott' this process depends upon, capital deepening and resynthesis of work tasks that is on increases in units of machinery and equipment deployed per worker, technological change, rationalization and standardization of existing production procedures, and restructuring in plant such factors also play role in the escaping of industry from center areas.

In brief, factors which effect location decisions and relocation of firms are classified under two headings.

1. There are positive and negative effects which are presented by spatial requirements. Pushing factors of central industrial areas and pulling factors of periphery areas.

2. Changing relations at the level of production, marketing, and interlinkages of firms cause new spatial demands.

Scott also underlies that the decentralization movement depends on the development of capitalist production system, as a whole.

1.2.1. A Theoretical Overview of Decentralization Process Of Manufacturing Activity In Metropolitan Areas.

All theories attempt to explain two phenomena related to the location of industrial activities:

a. dissolution of industrial complexes in large metropolitan regions.

b. growth of dispersed new industry in suburban and non-metropolitan areas.

Theoretical studies pertaining to the escape of industry from center can be divided into two sub-categories:

The first group,consists of static and formalistic explanations. They are adressed to the problem of defecting and explaining the causes of industrial decentralization by positive as pushing factor of central industrial areas and pulling factor of periphery areas.

Summarizing published researches, Scott classified the factors taken up as being the major factors of industrial decentralization as follows:

Basic push factors of industry from central areas are;

1. The growth of firms and the lack of space for expansion at inner city areas
2. Obsolete central plant and equipment
3. Traffic congestion
4. High central wages
5. Central labour shortages
6. Labour conflict and high levels of unionisation in the inner city.
7. Planning restrictions on industry and urban renewal in central areas.
8. High central land prices
9. Cost-benefit calculations which induce centrally located firms to vacate their present locations so as to capitalize site values
10. High central tax rates on industry.

Basic pulling factors of industry to the suburbs are;

1. The development of truck transport and the spread of intra-urban expressway systems.

2. The invention of efficient horizontal plant layouts combined with cheap land in the suburbs.

3. The prior decentralization of the working population.

4. The favourable social climate of peripheral areas

5. The proximity of suburban locations to major airports

6. The accessibility of the periphery to the residences of managers and administrative staff. (Scott.A, 1982, p:123-124)

While not totally irrelevant, to the subject these factors do not yield determinate accounts of the phenomenon of industrial decentralization.

Research efforts in this category examine redistribution industries within the CBD mostly descriptively, to disclose locational tendencies which are revealed by firms operating in different sectors analyse the decision making process. Under this framework different zones within metropolitan region with increasing distance to the CBD are analysed. Net changes in labour force, is used as a tool to test the movement of decentralization.

The other research category studies the process of industrial decentralization as a long-run trend, and concentrates on this trend

on the basis of "incubation", "product cycle", "hierarchical filtering theory".

Scott summarizes the research done in the second category as follows: He describes, a schematic scenario outlying three hypothetical stages of metropolitan development in relation to the product system dynamics.

The first stage begins with the small, new and innovative and fragile firms which need to find a friendly economic environment for surviving. Such an environment could be found at the centre of the city, where positive agglomeration economies exist. The core of the city acts as an incubator for immature and marginal firms. Under these conditions the productive activity hapen to be predominantly clustered at the center of city under the evident pressure to avoid burdensome costs of commodity and information flows, combined with need to be accessible to a large pool of labour.

In the second stage of development, nation of a product cycle is brought in involving growth and maturation of the demand for industrial products. In the early phases of cycle, plant engages itself to the manufacture of small and skill depended products. At this stage proximity to skilled labour inputs and pozitive agglomeration economies are still important for the plant. This means that, the firm will still be at the center. As the market for the firms production expands, the production process becomes more standardized and firms grow in size, locational specialization starts to appear within the firm. While, white-collar and control functions remain in the core, blue-collar productive activity and few branch plants are established at the periphery.

Finally, firms became fullymature and establish capital intensive branch plants choosing sites that are far away from the urban centers. Control units are clustered at the core of the city. This briefly summarizes of "hierarchical filtering theory", account for the diffusion of firms down through the urban hierarchy. (Scott.A, 1982, p:133)

All of the above theories touch at several points of explanation of the locational patterns and dynamics of industry in the modern metropolis. But, according to Scott these theoretical explanations, fail to go much beyond the investigation of formal spatial relationships. (Scott.A, 1982, p:125)

Scott claimed that Moses tried to integrate the theory of location and the theory of production. This proposition is substantiated by the fact that the choice of location and choice of production technique are interdependent processes. This composite theory consists of two main trends. The first relates to the tendency for labour intensive firms to cluster together at the center of the metropolitan labour market. While the depicts second, the tendency for capital intensive firms to seek out cheap land inputs at relatively in accessible peripheral locations.

Also we can classify these tendencies involved in relocation of industrial production over the metropolis, under two hypotetical cases.

1 - Inner city hypothesis,

2 - Industrial dispersal hypothesis, though sub-urban and non-metropolitan area.

1.2.1.1. Inner City Hypothesis: The hypothesis concernsincubation characteristics of core areas and the advantages of labour intensive - small scale industrial establishments derive from clustering.

The characteristics of industries in the inner city can be defined in spatial terms. The defination includes older premises, high density, high linkages, high rent and a highly disintegrated production sequences encouraged by the close proximity of many manufacturers in the production chain. Such characteristics are not constant. Features and their variation over space and time also important to explanation of intra-urban manufacturing structure. (Whitelegg.J, 1976, p:333)

Several studies have shown that the distribution of establishment entries and the employment which they generate, tends to be concentrated near the centers of urban areas.

The more traditional view, based on the absolute distribution of new manufacturing establishments and the inner city areas assume an incubator role. In the other words, the inner area of the city acts as a 'nursery' for new firms and industries which find there the environment they need to begin their economic life but which migrate to the suburbs or to smaller cities when they reach maturity. (Nicholson.B, Brinkley.L, Evans.W, 1981, p:57)

The earliest statement of the inner city hypothesis was found by United States Temporary National Economic Committee in 1941. It is of interest in that the highest birth rates in both the durable and semi - durable goods industries have been in the cities. The availability of loft space, the presence of a large reservoir of

workers with various skills, proximity to large concentrations of population and to transportation facilities tend to make the principal and satellite cities a favourable place for industrial incubation.

In the fifties, Hoover and Vernon in their study for the New York Plan Association first put forth the Incubation hypothesis, (Leone.R, Struyk.R, 1976, p:325) without using "incubation" term for the role of center areas in Metropolises. They explained the location tendencies of small firms trough the concentration in center areas of metropolis by the external economies which is exist in the metropolitan centers. Also, they defined a group of industries which are called special industries.

Such industries, clothing, printing, manufacturing of toys, jewellery. In these industries the specifications of the product are not standardised and may be changed overnight to follow the fashion and meet the demands of the public. It was hypothesised that firms would constitute an integral part of the core, their basic locations changing only as the dimensions of the core itself changed. (Hoover.M, Vernon.R, 1959, p:67)

Such areas which provide incubation function are characterized by a relatively high establishment birth rates and with an out-migration of successful, sufficiently matured establishments seeking space for expansion.

Leone and Struyk divide the original incubation hypothesis into two parts, a simple hypothesis which states that highly centralised locations are attracting disproportionate number of new firms and the

employment associated with these new firms. (Nicholson, Brinkley, Evans, 1981, pp:57-60)

And a complex hypothesis which suggests that as new firms mature and grow old, they became less dependent on the services offered by others at incubation sites. The decreased locational dependence added to the requirements for additional space to accommodate expansion lead to push the firm away from the incubation site, to lower density areas with a lower site rents.

Thus, the two parts of the complex hypothesis concern first, the growth and second the relocation patterns of new firms as compared to mature firms. (Leone.R,Struyk.R, 1976, pp:327)

One of the latest studies noted that, new firms show a greater affinity for the inner area of the city than for the outer suburbs. Although smaller zones of older buildings near to the periphery also perform a "seed-bed function. Fagg's study in Greater Leicester support the incubation hypothesis, while indicating that pockets of nineteenth-century development within the present urban periphery also perform a "nursery" function. (Fagg.J, 1980, pp:35)

1.2.1.2. Industrial Dispersal Hypothesis Towards Sub-urban and Non-metropoliten Sites: It is based on dynamic approaches to the decentralization process of manufacturing activity. This theory concerns mainly large scale capital intensive firms. Also product life cycle and hierarchical filtering theories are associated with this hypothetical phenomena.

From the end of the nineteenth century the locational constraints which had caused large-scale material intensive industries to settled around central metropolitan transport terminals decreased in importance, later on, this type of industries began to seek out new locations towards the edge of the city where land prices were low and where labour relatively cheap.

In the historical process, explanations for industrial decentralization must go far beyond the simple issue of increases in outputs relative to inputs and of decreases in intra-urban transport costs, and must begin to take into account the full complexity of the phenomenon of changing industrial technology and labour processes.

As capital intensification proceeds forward and the scale of production in industry increases, input and output became both larger in physical quantity and standardised in terms of quality.

Small scale physical linkages between firms seem to constitute a strong locational constraint, while large physical linkages seem to be asso ciated with an increase in the range of feasible locational choices. On the other hand as firms substitute capital for labour in the production process, their spatial dependence on labour is correspondingly reduced.

Consequently firms using new production technologies reduce their dependence on pools of specific labour skills that had been created and recreated within the core of the city. They have thus considerable advantages by locating at the vicinity of relatively cheap labour at peripheral areas.

Industrial decentralization can may be seen as a fundamental long-run process involving changes in differential locational costs as intermediated by a series of structural changes in capitalist production techniques. (Scott.A, 1982, pp:134)

CHAPTER 2

THE METHODOLOGY

In this chapter, we concentrate on methodology used in the analysis of existing structure of and the spatial dynamics of the industrial establishments in Ankara.

Two different data set are used to account for industrial mobility within Ankara.

The first, data set relates to research studies on industrial structure and spatial dynamics of industrial development in Ankara. It is hoped that this data set would be useful to develop a background for the study. These studies provide also a detailed review of empirical studies on the evolution of industrial sectors in Ankara.

Secondly, we have studied industrial mobility. Data for relocated firms are gathered from directories of the Ankara Chamber of Industry published in 1974, 1984, 1988. These data are reported at establishment level, in which each plant is assigned a sequential also idendification number. Using of this identifier it was easy to follow each establishment through time and space. These directories also enable us to identify births, deaths and the movements of

establishments. Unfortunately however, these directories do not provide detailed information about the characteristics of industrial firms besides addresses and the sectors for the new, relocated and defunct firms.

To overcome this difficulty attributes of firms are studied from industrial capacity reports files obtained from The Union of Chambers of Commerce and Industry of Turkey.

The Characteristics of Data in the Directories of the Ankara Chamber of Industry:

The data is produced in the alphabetical order. It also produces mail addresses and the product sectors.

First we compared names of firms in the directory of 1974 with those in 1984 by using simple hand check method. Then, the same firms are compared according to their postal addresses. The same process is also repeated to compare the directory of 1984 with that of 1988.

These comparisons enabled us to define the following three groups;

1. New Firms.
2. Defunct Firms.
3. Relocated Firms.

1. If a previously not recorded firm appears, then it is considered as a birth. This also enabled us to classify firms according to their years of establishment. Hence a firm which appears for the first time on the Directory of 1974 is considered as being established in the period (1974-1988). Notice that the data is not sensitive to

changes in ownership.

2. If a firm is recorded at one directory and not at the subsequent one(s), then it is assumed that the firm has been closed in that interval. Notice that firms that are closed are considered in the same manner as those who moved to other cities. However we know that the latter is very few in mumbers.

3. It follows that the analysis of relocation relates to firms that are not newly established or defunct. (i.e. the firm should appear in at least two directories.) If a firm's post address is not the same as in the subsequent one, then we deduce that the firm has moved in this time internal. It is clear that this approach excludes shifts in the same zone.

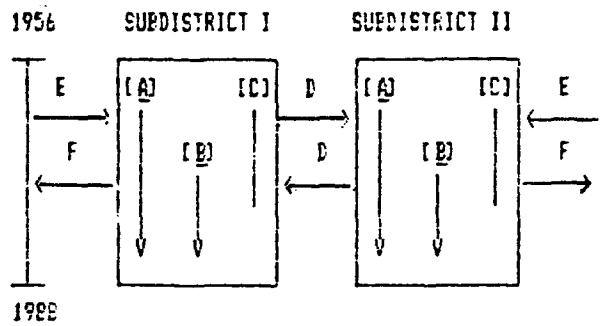
These definitions are based on Whitelegg's formulations about Births and Deaths of firms in the innercity. (Whitelegg.J, 1976, pp:333)

We have also some other definitions about plant movements used: . All the transfers into the area are called gains, like as new establishment in same zone.

. All the transfers out of the zone are called losses from this zone.

. The rest, are considered as non-movers.

The structure of data set is summarized in the figure.



A = Non-movers
B = Births-new firms
C = Deaths-Defunct firms
D = Transfers-relocated firms
E = Immigrants which closure elsewhere
F = Out-migrants with closure in initial zone

Source: The figure based on Cameron's article about Intraurban Location and the New Plant. (Comeron.G, 1973, pp:127)

The Characteristics of Data in the Capacity Reports File:

In the capacity reports file, there are 11 variables could be considered under three basic headings; labour, capital and characteristics of spatial uses.

Variables under labour factor sorted are;

- number of engineers
- number of technicians
- number of foremen
- number of workers
- number of administrative personel

Variables under capital factor sorted are:

- Capital (building) (000 TL)
- Capital (machine) (000 TL)

. Revolving capital (000 TL)

. Fixed capital (000 TL)

Variables related to the characteristics of space are;

. Open area (m2)

. Built-up area (m2)

These data have been collected in the period between 1982-1988 from the Union of Chambers of Commerce and Industry of Turkey.

This file enables also sectoral classifications as well. CCIS System (classification of manufacturing industry) was used in this analysis for the industrial classification.

In addition to these variables, there are two other data which give us the establishment years' and post addresses of the firms. These addresses are translated into geographical area codes and are matched with a code number. (It was done for a research study of National Productivity Center in M.E.T.U.) (Tekeli.İ, Şenyapılı.T, Güvenç.M, 1990, Ankara'da Sanayi Üretiminin Tarihsel Gelişim Süreci ve Mekansal Örğütlenme Biçimlerine İlişkin Çözümlemeler.)

Registered data indicate the establishments in geographical sub-districts. Thus, it became possible to describe the features of spatial distribution of industrial production factors in detail.

The area code map is used for graphical presentation, and corresponding place names could be found in the Appendix. The geographical zoning map is based on the study of E.G.O 2015 Traffic Master Plan for Ankara Metropolitan City.

The Raw Data Is subjected to the Following Processes:

. The addresses of all firms were translated into geographical area codes.

. According to their area codes and registration numbers; relocated, new and closed firms were listed in a different card-index.

. Then, location of the relocated, new and closed firms were mapped. The relocated establishments were pointed according to their origin and destination locations on the geographical zoning map.

. The information related to origin and destination locations of firms, establishment years, sectors, and size of firms were taken as the basic elements of the analysis, in addition to the other variables. The data related to the previous production factors of the firm (classified as relocated) before relocation are not available. Hence we couldn't account for changes in production processes of initial firms.

. On the other hand concentric circles were drawn from the geographical center of the city to analyse the general characteristics of Industrial Landscape around Ankara. Capital-labor intensity indices and closed-builtup areas were used to indicate the differences amongst these industrial zones.

At the end of this study, we have organized a data sample which is ready to elaborate in the research. In 1988, there were 1237 different firms in Ankara which are the members of Ankara Chamber of Industry. We have found that 157 of them had changed their location within Ankara Metropolitan boundaries. There are 622 firms, established between 1974-1988. And 176 of these firms were closed at the time of this study.

CHAPTER 3

3. DEVELOPMENT AND SPATIAL DISTRIBUTION OF MANUFACTURING INDUSTRY IN ANKARA

3.1. A HISTORICAL OVERVIEW OF INDUSTRIAL DEVELOPMENT AND URBAN GROWTH IN ANKARA

Prior to the examination of relocation of industries; we are going to discuss the spatial distribution of industrial establishments, the quality of process of industrialization and spatial differentiation of industrial location patterns using available of empirical researches.

In this study, industrial development and urban growth have been summarized from 1927, the first industrial census year, up to today according to the following periodisation. (a) Before 1960, (b) The 1960-70 period, (c) the 1970-80 period and (d) after 1980.

Each period will be discussed in four paragraphs. First; we present economic inputs-decisions giving shape to industry, secondly; we present statistical data that show the quality of industry, thirdly; determination factors in development and pattern of spatial

distribution of industries in Ankara, Finally; we concentrate on the relationship between urban form and industrial land use.

3.1.1. Industrial Development in Ankara Before 1960.

3.1.1.1 Economic Decisions Influencing The Industry in The Period: The industrial development process of Ankara, gained momentum with its proclamation as the capital in 1923 and increased paralelly with the population of the city. At the very start, demand for building activities of the state and for housing the migrant population gave the shape to industrial production base of the city. (Bademli.R, 1987, pp:50)

3.1.1.2. Statistical Data Demonstrating The Quality of Industry Before 1960: According to 1927 population census, total population was 74553, working population was 40508. At that time there were 591 industrial establishments in Ankara employing some 2916 workers If we exclude mining, industrial employment accounted for 5.5% of the total population.

In the early 1950's urban population reached 288536, working population became 117075. In respect to the previous period, although population rised by 25 percent, working population increased by some 34 percent. (Tekeli. İ, Şenyapılı.T, Güvenç.M, 1990)

However even in 1954, Industrial establishments were very limited. The city had only 25 industrial establishments and no less them 16 of which, could be classified as workshop rather than factory type establishments.

Total industrial labor force was around 24000. The distribution of industrial working population by sectors show concentrations in the consumer goods such as food, textiles-garments and wood-furniture and in certain manufacturing trades such as paper-printing, production of metalware and repair of vehicles. The distribution of manufacturing by trades and the immediate demand patterns in the city shows an obvious correspondance (Bademli, R, 1987,pp:51)

3.1.1.3. Factors Determining The Spatial-Expansion And Development Patterns of The Industry in Ankara Before 1960.

Industrial Investments Which are Made by State: State made important investments in the sectors of food, construction, machine, chemistry in Ankara. Besides of development of production in metal goods, production and repairing of vehicles, and paper-printing, location of industries were determined by the direction of, the demand of state. (Bademli, R, 1987, pp:51) Industries established by the state were much bigger than industries established by the private sector. Because of the insufficiency of highways, and the availability of railways, the industries were located along the railway. Availability of large public lands in this sector can be considered as a factor of location.

Industrial investments which are shaped by the increasing demand that based on increasing population.

Most of them were at the workshop scale and repairshop. They operated mostly in trades such as construction, food, wood-furniture and casting. These private industries were predominantly small investments and located near Ulus while bigger ones were located outside circle of Ulus around Iskitler.

3.1.1.4. The Relation Between The City Macroform and Industry Before 1960: First squatter housing areas (Atifbey, Altındağ) were taking place near this development. As it showed in the map 1, that is done in 1956 and demostrated buildup areas and industrial uses. City developed under the arch formed by the Konya-Ankara-Samsun road. Notice that out of Yenimahalle there wasn't any important development observe in north part of the city.

3.1.2. Development of Industry in Ankara During 1960-1970 Period.

3.1.2.1. Economic Decisions Influencing the Industry In The Period: From 1950's to 1970's state sector did not loose its importance the private sector gained importance. After that, state, rather than taking the initiative, took the role for which supporting private enterprises. In this period, supporting to tendency of establishing small industry sites, distribution of credits by the mediation of Halk Bank, connive at working uninsured labour and loose taxation attitudes are tools which is used by State in order to support small or big private enterprises . (Bademli. R, 1987, pp:51)

3.1.2.2. Statistical Data Demonstrating The Quality of Industry During 1960-1970 Period: In the year 1968, there were some 5307 industrial establishments in Ankara. No less than 98.5 percent of which employed less than 50. These were mostly private sector firms, and accounted for some 56.2 percent the industrial employment of the city. Out of a total of 4916 small firms, 2004 were tailors and

shoemakers employing less than 10 workers. The rest of the employment (43.9 percent) was distributed amongst 81 big industrial firms with more than 50 workers. These were mainly state owned industrial establishments. (Bademli.R, 1987, pp: 52)

In 1970 the population of Ankara reached 1208791. This shows a 38 percent increase with respect to 1955, population. However, the increase in industrial employment was greater; (46 percent) and reached 51981.

When the distribution of labour upon the sub sectors of the industry is considered we see that tendencies of industrial development started in 1950's continued. They exhibited a very important concentration on the wood-furniture, food and textile sectors. There were also some slight increases in electrical tools and nonmetal sectors. (Bademli.R, pp: 52)

3.1.2.3. Factors Determining the Spatial-Expansion and Development Patterns of the Industry In Ankara In 1960- 1970 Period:

- Public sector continued to establish new industries and extend industries that were already established.

- After 1956, another factor which was directed by the result of bottle-neck of exterior payments in private sector and the preferences of Five years development plants.

- The first examples of building cooperatives were seen in housing sector in 1935. Later on in 1950, it was continue in the small industrial estatement and changed the process of locational decision of the small entrepreneur.

- After the Jansen Plan, Yücel-Uybadin's plan put into practise after 1957, and it was opened new by-pass road according to the plan. This road lead to change accesibility relation in the city and that was effected decision of industrial location in Ankara. (Tekeli. İ, Şenyapılı.T, Güvenç.M, 1990, Ankara'da sanayi üretiminin tarihsel süreci ve mekansal örgütlenme biçimlerine ilişkin çözümler)

3.1.2.4. The Relation Between The City Macroform And Industry In the 1960-1970 Period: This was a transition period for the spatial movement of industries. While the tendency revealed by small industries, before 1960, continued which clustered around Ulus and Akköprü, they formed concentrations on single-independent firm level, or as the small industrial estates.

On the Northern sections of-Konya-Ankara-Samsun highway, there was a new industrial development which encouraged small firms to cometogether and to concentrate in this place.

Another slight movement, associated with the shift of Ulus center to the south towards Yenişehir, observed. As a consequence number of industries increased in and around Kızılay.

In this period, trades such as metal industry, printing and food gained importance when compaired to other sectors. When we analyse spatial distribution of these sectors we realize that, food sector was distributed amongst different districts of the city, printing industries were densely settled around Ulus, and metal industries concentrated in Akköprü.

Although number of plant was few, there was a tendency to locate along the west corridor of city. This could be seen as a first movement which will determine the future industrial landuse pattern.

Both the planned settlement and squatter areas of the city have shown a tendency of development towards north and south.

3.1.3. Development of Industry in The 1970-1980 Period:

3.1.3.1. Economic Decisions Influencing the Industry: The period is determined by import-substitution policies. Industrialization was dependent on the domestic market. The process of import substitution was depending on extentiveness and mobility of the domestic market. An important structural transformation has taken place from consumption goods to intermediary and investment goods. Besides, industrial investments were moving towards modern technology and optimum scales. (Boratav. K, 1988, Türkiye İktisat Tarihi)

However, the period ended with an economic crisis in 1977-80. Affected by the trends in the world economy, destabilized by rising oilprices, Turkish economy experienced a decrease in production and a crisis in economic growth as a result of decreasing foreign aid-after the Cyprus peace operation-instable political atmosphere and increasing inflation.

3.1.3.2. Statistical Data Demonstrating The Quality of Industry in the 1970-80 Period: According to the 1975 census, the population of the city was 1701004 while 18.85 percent of the working population

was employed in industry. This shows an increase of 49.2 percent as compared to the previous period.

Food industry was the most developed of all industries, and the number of plants operating in this trade accounted for 34.9 percent of the total.

This figure also indicates a 100 % increase when compared with preceeding period, followed by printing and metal industries. While the oil-crisis created bottle-necks in petroleum- dependent industries, textile industry managed to make a slight growth.

Besides, there was a significant increase in the number of factories with about 50-100 workers. When compared with previous period.

3.1.3.3. Factors Determining The Spatial-Expansion And Development Patterns of The Industry In Ankara In 1970- 80 Period:

. During that period, public sector has mobilized some resources through direct investments in national defense industry, which has entered into the agenda as a result of the bottle-necks experienced after Cyprus crisis. The decision made for the development of defence industries in the Capital Ankara-like in the first years of the republic-has been one of the important inputs of the developing industrial structure of the city.

. Medium and large scale plants among private industrial entreprises gained weight. Parallel to this fact, industrial developments on Istanbul, Konya and Çubuk highways has gained

importance. Indeed, some firms like "Hema" has located their plants in places far away from the city.

. Speculation on land is one of the factors strenghtening the tendency of medium, large and organized small industrial entrepreneurs to select locations far away from Ankara and to aggregate on important axes outside the city. The fact that the subject firms were operating in metal and machine manufacturing which didn't need close relation with consumer has also paved way to decentralization of industry.

. During this period, the tendency of small entrepreneurs to locate their plants in small-industrial estates and organized zones has increased. The most typical example is the development of OSTIM industrial site in a planned manner.

3.1.3.4. <u>The Relation Between The City Macroform And Industry During 1970-80 Period:</u> Important developments were foreseen on the western, southeastern and northeastern axes of the city according to the 1990 Ankara master plan prepared by the Master Plan Bureau established in 1969. Thus, it will be more meaningful to consider the role of the 1990 master plan in shaping the city macroform while discussing the influences of industry on the city macroform during this period. The consistence of the Master Plan's planning decision promoting the development of the city on the western corridor with the plant-location preferences of large, medium and organized small industries is one of the most important factors on the expansion of compact city macroform through the western axes.

Important structural changes in Ankara city macroform has been initiated both by tendency of industry towards decentralization and the policy promoting the organized (i.e cooperative-public housing-etc) settlement areas (Like Batıkent) outside the city supported by 1990 master plan. Thus, Industry began to select new locations around rural settlements outside city's macroform, thus giving it a new shape with various corridors developing in different directions originating from the oil-drop macroform. Villages like Ergazi, Eryaman, Susuz, Saray and Pursaklar not only provide the infrastructural demands of industries but also the necessary labour force and shelter for labour force as well. In this period, squattering around the industrial periphery has changed its shape. This change has structural thus, industry continued to develop on unplanned sites around rural settlement areas and at the periphery.

Beside the tendency of medium and large scale firms to expand through axes, the demands of small-industry entrepreneurs towards aggregation in small-industrial estates concentrated on the western axis of the city. They are mostly located at a 10 km distance, from the city center.

Spontaneous tendencies towards agglomeration turns into organized and planned location preferences within the period.

On the other hand, increase is observable for industry in the city centre (Ulus-Yenişehir), industrial mobility continues in İskitler, "Büyük and Yeni Sanayi" zones nearby Ulus.

3.1.4. Development of Industry In Ankara After 1980:

3.1.4.1. Economic Decisions Influencing Development of Industry After 1980: At the end of 1970's, radical long-term decisions were needed in Turkish economy to overcome the difficulties in payment balances. Finally "24 Ocak Programı", promoting the open market economy depending on private entrepreneurship was enacted.

Sectors like agriculture, mining and chemistry was opened to foreign companies in order to increase the foreign currency input. Establishment of free-trade zones can also be seen as a result of the effects to integrate Turkish economy to the world economy in the same period.

In all their history, metropolitan cities have been the arenas that the surplus capital experiences conversion into new investments. Thus, metropolitan cities should be able to provide all services demanded by the new capital to open into world-market. And this means a new identity, a new structural development for the metropolitan cities.

During the period, to establish small industrial estates and organized industrial zones by means of private entrepreneurs and especially by cooperatives had been a popular planning policy. As a result of the market environment suffering from inconsistency and inconfidence for both demand and supply side of the economy, during the period, the credits obtained were used for using the available capacity of the existing plants instead of establishing new ones.

3.1.4.2. Statistical Data Demonstrating The Quality of Industry After 1980: Industrial labour, between 1970-85 had increased more than two times in the same period.

Within the period, the role of industry in the economy of Ankara has decreased relatively. In this period, either the value-added point of view or from the employment point of view, the importance of public sector in large industries, were continuing in Ankara. According to 1984 Manufacturing Industry Statistics, 41 of 236 firms (employing more than 25 person) were from public sector and they were creating 56 percent of value-added. In 195 private firms, 17941 persons were working and producing 44 percent of value-added. More than half of this industry-either from the value-added point of view or from the employment point of view - consist of technical, knowledge intensive fields, like metal goods, machines and equipment, and transportation vehicles etc. (Tekeli. İ, 1990, Ankara'da sanayi üretiminin tarihsel gelişim süreci ve mekansal örgütlenme biçimlerine ilişkin çözümlemeler)

According to another research, there appeared more increase in machinery sector than in food sector for the year 1973. In this period, two new industrial sectors; transportation vehiches and measurement and control devices, have started to produce.

Food and metal industries have preserved their importances. The progress of machinery industry in this period is very much related with investments in defense industry and foreign credits. If we evaluate the firms according to the persons they employ, we see that most of them (70.6%)were the firms employing 0-50 persons. Again, according to the results of the same study, the number of firms (both types, firms employing more than 50 and less than 50 persons) decreased in 1963-1983.

3.1.4.3. Factors Determining the Spatial Expansion and Development Patterns of The Industry In Ankara After 1980:

. Public investments based on defense Industry have continued in this period, too. TUSAŞ Plane Industry has been established, but rocket industry has not been established yet. The location of TUSAŞ Plane industry was determined by military airport. It might be also the result of industrial sprawl on the Istanbul road.

An important public investment, Middle Anatolia Oil Refinery, has been established in this period, nearby Kırıkkale. This type of industrial location indicates a new type of industrial development in the hinterland of metropolitan area, and it is different from the developments along the major routes. Metropolitan hinterland covers an area which has a radius of 75-80 km, Elmadağ, Keskin, Kırıkkale as an industrial city, it is gaining more and more importance. Polatlı, Kızılcahaman, Beypazarı, and Şereflikoçhisar are in this area. The settlements on the highways connecting Ankara to other cities, like Gölbaşı, Çubuk, Kazan and Sincan form an interior ring in a radius of 20-25 km.

. The establishment of Sincan organized Industry site was an important investment for the reason that it has collected all the middle-size industries on that area. According to 1990 Development plan, the city of Ankara was going to develop on the west corridor. In relation with this a population of 100.000 people was proposed to be settled down on Sincan. Because of this, Osmaniye Organized Industry site was proposed as a light-industrial site. Now, in spite of completion of infrastructure and some amenities, the firms have not been established yet. Large firms can not expand regularly and according

to a plan. They locate and expand according to cheap urban land and availability of infrastructure.

. In this period there appeared a negative development which affects inner-city small industries. In the city centre, after 1985, important physical development decisions have been taken. Particularly, revitalization of Ulus centre and development of new centre in relation with west-corridor and renewal of small industrial manufacturing sites around Kazıkiçi Bostanları were important decisions. These decisions obliged small manufactures to change their places. Some of them moved to near sites and some others shifted to Ostim.

. 2015 macroform proposal will be an important input in determination of industrial locations in future. In fact, according to the policies of plan the residential areas will be decentralized in relation with the decentralization of industry. 'The decentralization in Ankara must be provided by enlarging existing settlements or strengthening coming projects in the ring having 35-40 kms radious'. (Tekeli. İ, 1987, Ankara 1985'den 2015'e) This new settlement policy of 2015 plan is an extention of the locational trends of industry in the radius of 75-80 km. likewise in the plan the proposed expressway and electrified commuter rail will operate in the direction of Elmadağ-Hasanoğlan and Kırıkkale for the first stage and for the second stage, Temelli-Maliköy-Polatlı will be connected.

3.1.4.4. <u>The Relation Between The City Macroform and Industry In Ankara After 1980:</u> According to industry-city interrelationship (labour, market, external economies, agglomeration economies, and infrastructure, etc) we can sperate Ankara into three industrial zones.

. The area in the inner-city, small industrial like city centre (Ulus-Kızılay), Büyük sanayi, Demir sanayi, Yeni sanayi and Siteler etc. from the first ring.

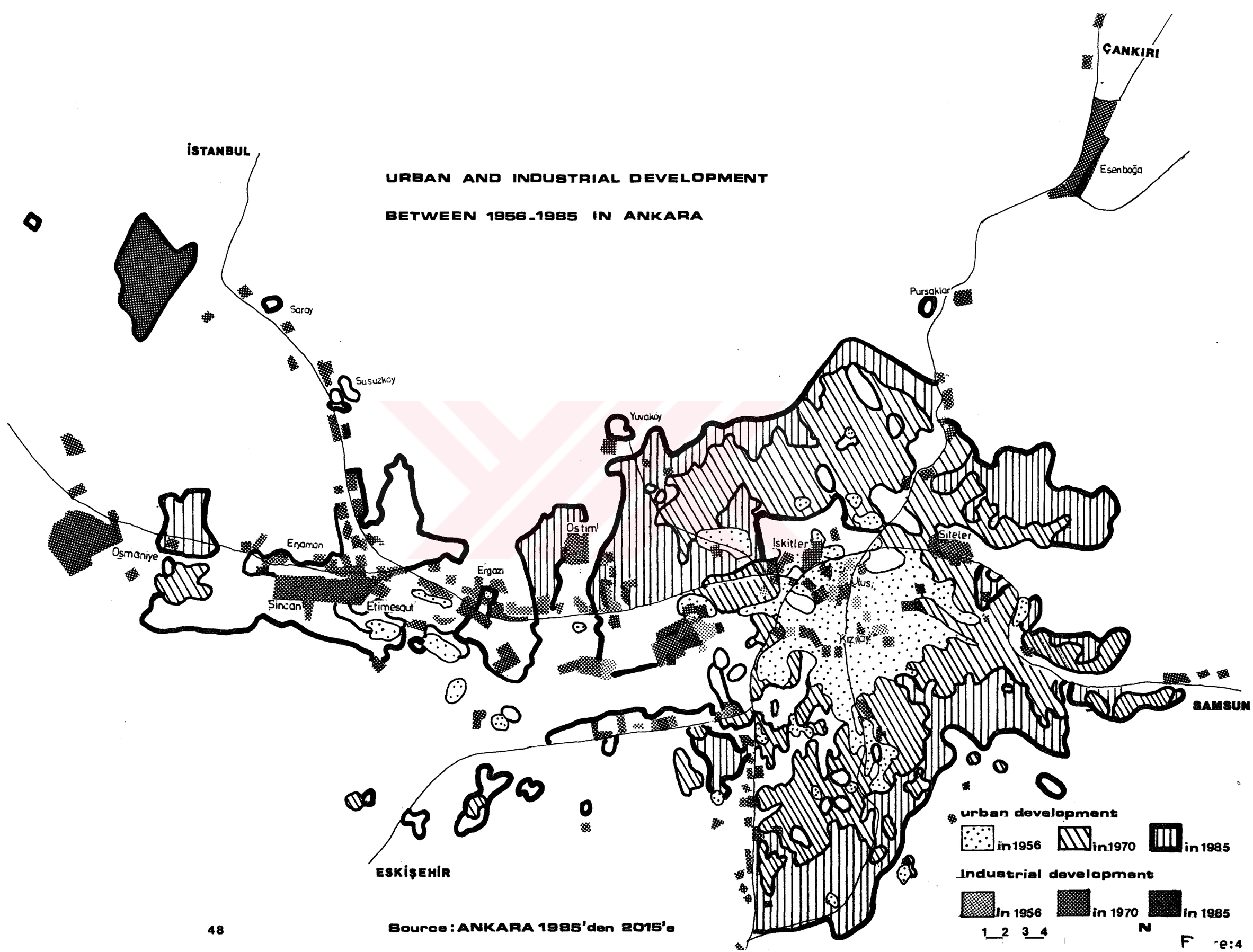
. The ring that extends 20-25 kms along the four main routes may be determined as the second ring. But, the area extending up to 10 kms from city-centre has a character of transition zone (particularly along the west-corridor.) This area may be defined as a near future industrial core of Ankara.

. According to a thesis study and Prof.İ.Tekeli, the industry in the area extending about 75-80 kms is under the hinterland of Metropolitan Ankara. This forms the external ring of industrial layout of Ankara. Based on, 1988 chamber of Ankara Industry Statistics, 53 percent of 1237 firms-being members of chamber-are located in the area extending 6 kms, and 26 percent are located in the area around OSTIM extending up to 10 kms. While going away from centre, the number of firms is decreasing on the other hand, 23 percent of employment is provided by firms that are settled more than 10 kms away from center. This proves that there are certainly different industrial zones around the Ankara.

TABLE 1. ANNUAL FIGURE OF WORKING POPULATION PERCENTAGE, DISTRIBUTION OF INDUSTRAL WORKERS AND POPULATION GROWTH IN ANKARA

	1955	1960	1965	1970	1975	1980	1985
Working Population in Ankara	203162	266550	335105	393105	560366	583894	650247
Industrial Working Population % in Ankara	12.87	13.76	13.63	13.37	18.85	15.95	20.79
Population of Ankara	451241	650067	905660	1236152	1701004	1877755	2251533

URBAN AND INDUSTRIAL DEVELOPMENT BETWEEN 1956-1985 IN ANKARA



Source: ANKARA 1985'den 2015'e

Figure:4

3.2. THE TENDENCIES OF INDUSTRIAL MOBILITY IN ANKARA:

The aim of medium and large size industry locating on main roads out side the city, and organized location tendency of small industry by cooperatives - clustring together - and settled around the center and also decentralize around the main axis, especially on west - corridor of Ankara. Both of them have given form to the industrial geography of city of Ankara, today.

If we examine the developments at this process in detail, we can put forward the factors that are influential on today's industrial geography of Ankara.

3.2.1. The Tendencies of Industrial Location On The Main Roads:

From the beginning of 1950's till now, Istanbul road has been prefered location by large size industry because of easiness of obtaining electricity and major services.

Dating from middle of 1970's, increase in location tendency of industry, either organized or individually throughout the main roads was realized. Aselsan, came into operation in 1975 TUSAŞ in 1978, are defence industry establishments of public sector and examples of above mentioned location tendency on Istanbul road.

At the same time, large size industrialists of private sector decided to establish an organized industrial zone at OSMANİYE nearby SİNCAN district but it could not been completed yet.

In 1983, number of establishments which have more than 8 workers were nearly 673146 of these establishments were located on main roads

or nearby areas of these roads. Which connect the city of Ankara to other settlements. There were 83 establishments at 4 main zones, Istanbul Road, Ayaş Road, Sincan area and Ostim with the most concentrated development of industry in the west corridor of the city. Together with Istanbul Road, second concentration zone was Esenboğa Road with 24 industrial establishment on it.

Other zones were, according to concentration degree, Eskişehir Road with 16, Gölbaşı area with 15 and its extension Konya Road with 2 and Samsun Road with 10 industrial establishments.

The concentration of industries on main roads has led to formation of an industrial belt at 20-25 kms far from the city. Most of the villages that took place in this belt with influence of the industry had lost their rural characteristics and became centers which give necessary services for industrial workers. (e.g. Susuz, Saray, Macunköy, Sincan, Ergazi, Eryaman on Istanbul Road; Pursaklar on Esenboğa Road; Lodumlu, Beytepe on Eskişehir Road). (Tekeli. İ, 1990, Ankara'da Sanayi Üretiminin Tarihsel Gelişim Süreci ve Mekansal Örgütlenme Biçimlerine İlişkin Çözümler).

Large and medium size industries, still, continue to their tendency of locating far from the city and on the main roads with the aim of land prices and speculation on land.

3.2.2. Locational Tendencies of Small Industrial Estates In Ankara:

For industrial firms, "clustring" or "Grouping" is as much important second way as "Concentration " to obtain external economies of

site. Beside the technic, social, economic relations between the firms became stronger, also market area enlarges, growth of firms and to obtain services become easier. From this point of view, clusters that are formed in time by small industrial firms at the city center and its surrounding area are evaluated as "INCUBATION ZONE".

In 1950's - 60's, small industrial estates were accepted as a tool clearing handicrafts and small manufacturers from the city center. This kind of establishments mostly, were taking place at empty areas around the city center. These organized small industry clusters were accumulated in time and became a part of slum areas which surround the city center. Locating the later established small industry sites on outskirts of the city as much as land prices this experience also had share in planning process . (Bademli. R, 1986. Planlama Dergisi)

Small industrial estates becoming influential in physical planning process, doubtless, is result of credits given to small entrepreneur and economic policies which encourage them for development of industrial sector. It can be said that small industrial estate concept is influential for the whole country. Based on 1985 data, number of worker in industrial sector was 1500000 and 30 percent of it was working in small industrial estates.

First examples of spontaneously developed industrial estates in Ankara appeared in 1950's. Where as, at the earliest, after 1964, a concessionary policy was applied for development and extension of small industrial estates all over the country, and estates were credited with funds was transfered from the Ministry of Industry and Technology. (Tekeli. İ, 1990, Ankara'da Sanayi Üretiminin Tarihsel Gelişim Süreci ve Mekansal Örgütleme Biçimlerine İlişkin Çözümler)

At this period five industrial estates had been established. Yeni Sanayi, Büyük Sanayi, Ata Sanayi, Demir Sanayi and Siteler. The first four of these industrial estates had developed around the city-center-Ulus-and Akköprü-İskitler area had been transformed into a small manufacturing zone.

However, Siteler was established as timber merchants cooperative on the Samsun Road which is extension of İskitler street, in 1959. With the addition of Furniture Makers Cooperative in 1969 and Marble Cutters cooperative in 1978, Siteler became one of the most concentrated manufacturing centre in Ankara.

Second generation industrial estates, Ostim, is located 14 km. far from the city center. While, city center was becaming developed and more crowded, car repairing shops had not been able to give needed service anymore. Because, increasing volume of work had caused work places to be closely pressed together and at the same time insufficiency of services, infrastructure made these places either uncomfortable or unhealthy. Automobile reparing craftsmen came together in organized manner for clear out this over-pressed area and brought a land piece, which is 12 kms away from the city, on Istanbul Road. Although, construction had been completed in 1985, it couldn't attracted automobile-craftsmen". (Tekeli. İ, 1990, Ankara'da Sanayi Üretimin Tarihsel Gelişim Süreci ve Mekansal Örgütlenme Biçimlerine İlişkin Çözümler).

OSTIM had attracted other industrial estates to its surrounding area and gained a focus function.Industries such as scrap merchants, metal workers were located nearby OSTIM, caused the area become a very concentrated industrial zone.

Another axes of concentration for new small industrial estate establishment trials is Ankara-Istanbul Road. The closest one to the city is Erciyes small industrial estate (1980) which is located at 10 th km. Başkent small industrial estate (1983) is 12 km far from the city centre. The other one is GERSAN furniture makers cooperative and located at 13 th km 22 kms far from the city center, agricultural chemical producers were permitted to establish an industrial estate. Also metal workers industrial estate were established (1971) in Osmaniye organized Industrial zone which is located at 25 th km. (Tekeli. İ, 1990, Ankara'da Sanayi Üretiminin Tarihsel Gelişim Süreci ve Mekansal Örgütlenme Biçimlerine İlişkin Çözümlemeler)

If we summarize the location tendencies of small industrial estates from 1950 up to now: at the begining, small producers had clustered at the city center in a marginal condition, after this phase, they had clustered spontaneously or unorganized way in the slum areas which surround city center, after 1970's, location tendencies, mostly, tranformed into form of organized small industrial establishments far from the city center, on the periphery rings of th city.

CHAPTER 4

4. INDUSTRIAL MOBILITY IN ANKARA

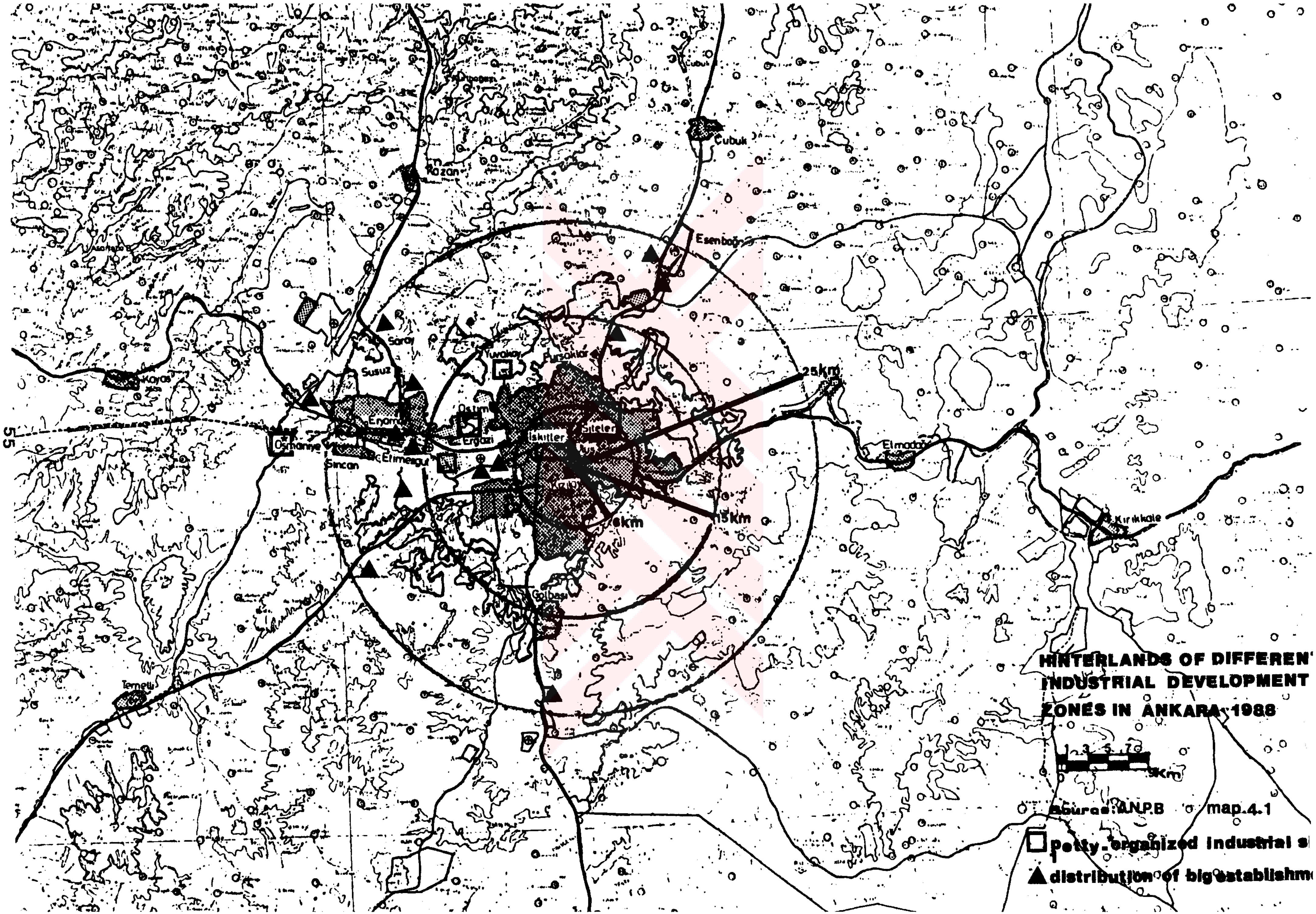
The evolution of industrial geography of Ankara is summarized in last part of the study. This part emphasizes the features of spatial development of industry in Ankara metropolitan area.

Recent industrial landscape is studied under three concentric zones from geographical centers' of Ankara. These zones differentiate with respect to indicators of industrial production activity.

The inner zone which covers areas up to 6 kms, is a densely populated area of the city.

The second ring or "peripheral industrial ring" is rich in industries along the the western corridor of Ankara and it covers areas between 6th and 15th kilometers from the center.

The third ring extending between 15 km and 25 km is defined as the outer zone of spatial development of industry in Ankara. These three zones can be followed from the map 4.1.


HINTERLANDS OF DIFFEREN
INDUSTRIAL DEVELOPMENT
ZONES IN ANKARA 1988
Source: ANPB
map.4.1
petty-organized industrial s
distribution of big establishm
25km
15km
6km
Çubuk
Kazan
Esenboğa
Saray
Susuz
Kayaş
Yuvaköy
Pursaklar
Ostim
Ergazi
Etimesgut
Sincan
Osmanlı
İskitler
Siteler
Gölbaşı
Elmadağ
Kırıkkale
Temelli

4.1. RECAPITULATION OF THE HYPOTHESIS ABOUT RELOCATION OF INDUSTRIAL ACTIVITY IN THE METROPOLITAN AREA

In this part of the study, the results of empirical studies in advanced countries are summarized for realizing and comparing the empirical results of industrial mobility and its spatial structure in Ankara.

Industrial mobility at the level of metropolitan areas or small regions is a different subject from the study of the same phenomenon at the interregional level. In the first case, industrial mobility is studied as a component of the problem of the growth or recently decline of urban areas while in the second, industrial mobility is usually related to the problem of regional development.

Local or metropolitan industrial movement is generally a very important phenomenon, and has been studied by several geographers (Cameron, Keeble, Townroe, Mason, Struyk and James). All of them pointed out that, industrial movement can be considered as part of a more general phenomenon of industrial growth negative growth-at the metropolitan level.

They defined two types of industrial movement:

- industrial relocation, which is defined the shift of an establishment from one location to another (This type of movement is accepted in following parts of the study).

- Branch movement, a new local unit, linked with a pre-existing unit which is not eliminated, is set up. (Ortona.G, Santagata.W, 1983, Urban Studies pp:59)

Townroe found (1973) that the movement of manufacturing plants could be related to industrial characteristics such as growth, average plant size, transport costs and percentage of women in the labour force.

The main cause of movement has been identified as shortages of productive capacity or labour supply in existing location.

Characteristics of an industry's capital equipment may also affect its mobility. A priori more capital intensive industries seem less likely to more.

Plant size may also affect mobility. Although small plants might be expected to be more mobile. (Thomson.L, 1981, Urban Studies pp:231)

However smaller establishments tend to be more confined than those of larger establishments, and they tend to move shorter distances.

The greater market power of larger establishments, and their greater ability to maintain established relations with suppliers and markets, oblige smaller establishments to move short distances creates a degree of inertia in the spatial distribution of economic activity. (Struyk. James, 1976, pp:)

Access to urban agglomeration economies constitutes an important factor in locational choices of firm. In Seoul, a recent empirical survey revealed that communication and transfer economies would be the most important reasons for the locational choice. Where, Moseley defines in transfer economies, as all those savings which derived from proximity between firms buying from or selling to one another

economies which relate to the cost both transporting goods and materials and of communicating information.

The second important determinant of industrial location in the Seoul case, stem from the personal preferences of workers for metropolitan living. Firms and industry may well decide to locate where this human talent wants to live. Naturally entrepreneurs prefer areas with amenities, especially social, educational and recreational facilities. Thus, new location factors are likely to relate the location of production to human resources.

Thirdly, determinants such as, easy access to raw materials market and labour pool raw material are found to be important for heavy industry, where as the availability of cheap labour arises as an important factor for light industry. (Kwon.W, 1981, Urban Studies pp:75)

Geographers who wish to understand the location choices of (both new and relocated) firms rely upon the incubator hypothesis as the theoretical basis of their work. (Kurre.J, 1986, Urban Studies, pp:429) Especially they use complex part of the hypothesis which takes growth and relocation patterns of new firms. Spatial investigations concentrate on the characteristics of incubation environment. Areas which best provide for the incubator function will be characterised by relatively high establishment birth rates and by successful out-migration, for sufficiently matured establishments seeking space for expansion. (Struyk.R, Leone.R, 1976, Urban Studies, pp:325)

The hypothesis is based on the idea that as the firm matures and grows it becomes less dependent on external economies, needs more

space for expansion, and is more able to achieve internal economies of scale in a modern single-storey factory built on cheaper land in the outer suburbs. (Fagg, 1980, Urban Studies, pp:35)

The incubator hypothesis, states that new manufacturing establishments are attracted to centralized locations because of essential services and agglomeration economies provided there.

The central industrial district in a metropolitan core may act as an incubator for new businees. The concentrated availability of business services and suppliers and of the production space for rent on these areas is considered to release new establishments from considerable capital requirements, and thus to enhance their changes for viability and growth .

However the incubation process is not necessarily tied to central city areas, it may proceed at diverse types of locations.

Traditional manufacturing locations within suburban areas may also perform this incubation function. (Struyk.R, James.F, 1976, pp:)

Small firms in certain kinds of industry, particularly printing and womens' clothing, find their optimal location in the inner city. The hypothesis states that, there will be new firms in other industries but these will later migrate outwards or go out of business. Thus in any group of manufacturing establishments set up at any given time, the proportion of industries other than printing and clothing will tend to decline overtime as firms in these industries migrate, while, establishments in printing and clothing are already at an optimal location and therefore have no incentive to migrate.

Nicholson, Brinkley and Evans identified these industries as "inner-city industries" and "non-inner city industries". (Nicholson, Brinkley, Evans, 1981, Urban Studies, pp:61-63)

There are several certain kinds of industry which have propensity to locate at the center. Such as news papers and apparel fit the mold of core-oriented industries that rely on rapid communications. Also the durable manufacturing industries had no births in the CBD. (Kurre.J, 1986, Urban Studies, pp:432)

4.2 THE SPATIAL PATTERN OF MANUFACTURING INDUSTRY IN ANKARA

General characteristics of the industrial land use patterns have been drawn by using production factors such as labour and capital distribution in whole city.

In the case of Ankara, distribution of production factors and the number of industrial establishment are searched by one km wides co-centring rings from the geographical center of the city. (The center is taken up as the Sıhhiye square, which is undoubtedly within the CBD area of the city.

According to table 4.1, 90 % of industrial firms, 80 % of the industrial employment and 67 % of the total industrial capital is concentrated around the 15th kilometers away from the centre. However, 50 % of industrial firms, 37 % of total industrial employment, and 21 % of total industrial capital are located in the CBD and traditional industrial zone of Ankara. The boundary of this area will be drawn by a six kilometers circle from the geographical center of the city. (Capacity Report Files: Chamber of Industry and Commerce: Ankara, 1988)

It shows, that the overall spatial pattern of manufacturing firms shows a clear orientation towards central area of Ankara. This confirms Pred's locational classification of industries in the Metropolis. He proposes that; centrally located industries are mainly labour, market oriented and CBD oriented and that these industrial features of characterize mostly firms that tend to close center of the metropolis.

Table:4.1
DISTRIBUTION OF THE NUMBER OF INDUSTRIAL FIRMS, EMPLOYMENT AND CAPITAL BY CONCENTRIC CIRCLES FROM THE CBD OF ANKARA.

CONCENTRIC CIRCLES FROM CBD. km.	NUMBER OF PLANTS	%	CUM. TOT.	INDUSTRIAL EMPLOYMENT	%	CUM. TOT.	TOTAL CAPITAL [000]TL	%	CUM. TOT.
0-1	98	7.37	7.37	1561	3.04	3.04	9197818	2.00	2.00
1-2	125	9.41	16.78	2343	4.57	7.61	3918921	0.85	2.85
2-3	109	8.20	24.98	3093	6.03	13.64	8513466	1.85	4.7
3-4	115	8.65	33.63	4013	7.82	21.46	20323583	4.43	9.13
4-5	196	14.75	48.38	6937	13.5	34.96	50126019	10.93	20.06
5-6	21	2.33	50.71	1051	2.05	37.01	6778408	1.47	21.53
6-7	23	1.73	52.44	474	0.92	37.93	1684990	0.36	21.89
7-8	43	3.23	55.67	889	1.73	39.66	5139512	1.12	23.01
8-9	17	1.28	56.95	187	0.36	40.02	451682	0.09	23.1
9-10	343	25.82	82.77	9072	17.70	57.72	94104188	20.52	43.62
10-11	7	0.52	83.29	160	0.31	58.03	1454240	0.31	43.93
11-12	27	2.03	85.32	2312	4.51	62.54	15857010	3.45	47.38
12-13	4	0.30	85.62	256	0.49	63.03	2614645	0.57	47.95
13-14	36	2.71	88.33	3327	6.49	69.52	14153077	3.08	51.03
14-15	6	0.45	88.78	699	1.36	70.88	2574834	0.56	51.59
15-16	17	1.28	90.06	2910	5.68	76.76	37142888	8.10	59.69
16-17	13	0.97	91.03	1910	3.72	80.48	37473250	8.17	67.86
17-18	29	2.18	93.13	3812	7.43	87.91	46618898	8.86	76.72
19-20	2	0.15	93.28	49	0.09	88.00	483290	0.10	76.82
20-21	22	1.65	94.93	1556	3.03	91.03	7909932	1.72	78.54
21-22	12	0.90	95.83	1034	2.01	93.04	18460445	4.02	82.56
22-23	18	1.35	97.18	1513	2.95	95.99	11975836	2.61	85.17
23-24	11	0.82	98.00	370	0.72	96.71	1709854	0.37	85.54
24-25	5	0.37	98.37	414	0.80	97.51	49713133	10.84	86.38
25-26	2	0.15	98.52	435	0.84	98.35	9245000	2.01	98.39
28-29	4	0.30	98.82	187	0.36	98.71	4984112	1.08	99.47
29-30	2	0.15	98.97	245	0.47	99.18	297873	0.06	99.8
30-31	1	0.07	99.04	26	0.05	99.23	70000	0.015	99.815
34-35	9	0.67	99.71	257	0.50	99.73	1394955	0.30	100.11
36-37	2	0.15	99.86	53	0.10	99.83	48759	0.01	100.12

Source:
This is based on the comparison of 1974 Industrial Guide Book: Chamber of Industry; and Capacity Report Files: Chamber of Industry and Commerce: Ankara.

Three indicators could be used to clarify the major features of the industrial landscape in and around Ankara. The indices are;

- Average plant size in terms of employment
  (Total Industrial employment/Number of establishment)

- Intensity of capital used in Production Process
  (Total capital/Number of workers)

- Average plant capital
  (Total capital/Number of industrial establihments)

The spatial behaviour of these indicators are illustrated in the table 4.2 we see that all of them, (average plant capital and in average plant size indices)increase with distance from the metropolitan center. It means that, the small firms concentrate at the center and the big ones on the periphery.

The table enables us to distinguish between labour and capital intensive zones. But this indicator does not have an easily interpretable variation with distance. While up to 10 kms from center, labour intensive firms are settled, they are highly dependent upon the labour pool around the center area. After that point, there are no significant differences between capital and labour intensive zones. Both types of plants should coexist in the periphery and the outer zones. According to the last index two points will be discussed; the capital intensive firms will create some external economies for the labour intensive firms. Also we can say that vertical linkages exist between the industries which are clustered beyond the inner core area.

Table: **4.2**
AVERAGE PLANT SIZE, CAPITAL/EMPLOYEE AND AVERAGE PLANT CAPITAL INDICES BY CONCENTRIC CIRCLES FROM THE CBD OF ANKARA.

CONCENTRIC CIRCLES FROM CBD. km.	AVERAGE PLANT CAPITAL AV.=345186	AVERAGE PLANT SIZE AV.=38.6	INTEN. OF CAP USED IN PROD. PROC. AV=8944
0-1	93855	15.9	5892.2
1-2	31351	18.7	1672.6
2-3	78105	28.3	2752.4
3-4	176726	34.89	5064.4
4-5	255745	35.39	7225.8
5-6	218658	34.00	6449.4
6-7	73260	20.60	3554.8
7-8	119523	20.60	5781.2
8-9	26569	11.00	2415.4
9-10	274356	26.40	10373
10-11	207762	22.80	9089.6
11-12	587296	85.60	6858.5
12-13	653651	64.00	10213.4
13-14	393141	92.40	4254
14-15	429139	116.50	3683.5
15-16	2184785	177.50	12307.1
16-17	2882557	146.90	19619.5
17-18	1450675	136.10	10655.5
18-19	241645	24.00	9863
19-20	359537	70.7	5083.4
20-21	1539037	86.10	17861.1
21-22	665324	84.00	7915.2
22-23	155350	33.60	4618.5
23-24	9942626	82.80	120080
24-25	4622500	217.50	21252.8
25-26	1241028	46.70	26546
28-29	148936	422.5	1215.8
29-30	70000	26.00	2692.3
30-31	154995	28.50	5427.8
34-35	24379	26.5	919.9

Source:
Capacity Report File: Chamber of Industry and Commerce: Ankara.

Spatial distribution of land allocated to industrial production in Ankara shows that, the intensity of uncovered land increases significantly with distance while the demand for covered area decreases. (Table 4.2, Capacity Report File: Chamber of Industry and Commerce, Ankara, 1988)

Industrial geographic literature explains this tendency as a consequence of high land prices and tight linkage structures need to be close to the center and maximally fluid labour market which relations, held industrial complexes together on the high cost land at the core of the city, although land costs may be high. Nonetheless, property costs may still be kept low due to the poor condition or layout of small, old and often multi storey buildings. (Nicholson, Brinkley, Evans, 1981, Urban Studies, pp:58).

Consequently, firms which use capital and land inputs, intensively will seek out cheap land and go relatively in accessible peripheral locations.

Notice also that, the quantity of land inputs show some variation according to the requirements in different trades.

Table 3 shows also the age structure of firms in the different zones. Within the first 6 kms it is possible to find young (below than 5 years), mature firms (below + 10 years) and old firms (over 10 years). Thus, young, mature, and old firms are highly concentrated or grouped in the inner zone where is the center of the city. This zone can be defined as an "incubator" area. The age composition of the other zones have not significant differences. However, when the age structure of firms below than 5 years are compared we see that most of them are settled at the periphery.

Table: **4.3**

THE CHARACTERISTICS OF INDUSTRIAL DEVELOPMENT RINGS AROUND INNER METROPOLITAN AREA OF ANKARA.

A R E A		A ZONE WITHIN 6 km. BELT FROM CENTER POINT (75 QUARTERS)	A ZONE WITHIN 15 km. BELT FROM CENTER POINT (51 QUARTERS)	A ZONE WITHIN 25 km. BELT FROM CENTER POINT (30 QUARTERS)	TOTAL
NUMBER OF INDUSTRIAL FIRMS		644	500	129	1273
TOTAL EMPLOYMENT		15095	21147	10015	46257
TOT. EMPLOYMENT/NO. OF FIRMS		32.43	42.29	77.63	
AV. TOT. CAPITAL/NO. OF WORKERS		4853	5563	11348	
AV. TOT. CAPITAL/NO. OF FIRMS		106949	408661	964536	
LAND IN USING PRODUCTION	OPEN AREA m^2	734	13867	50668	
	BUILT-UP AREA m^2	363	2021	3395	
	BUILT-UP/OPEN AREA	0.50	0.15	0.06	
AGE STRUCTURE OF FIRMS	BELOW ± 5 YEARS %	40.35	48.87	10.78	
	BELOW ± 10 YEARS %	77.66	16.55	5.79	
	OVER 10 YEARS %	54.1	33.40	12.50	

Source: Capacity Report Files: Chamber of Industry and Commerce: Ankara 1988.

4.2.1 Components of Industrial Change In Ankara:

Changes taking place in the industrial landscape of any city depict the net effect of following three main demographic process:

. Birth

. Death

. Migration

These demographic trends are studied in different industrial zones in Ankara.

Maps (4.2 to 4.4) show the location of birth, defunct and shifted firms in Ankara. These maps clearly show that most of these components of industrial change are important in the inner zones of the city. The center has therefore a very dynamic industrial structure and acts as an incubator for new firms.

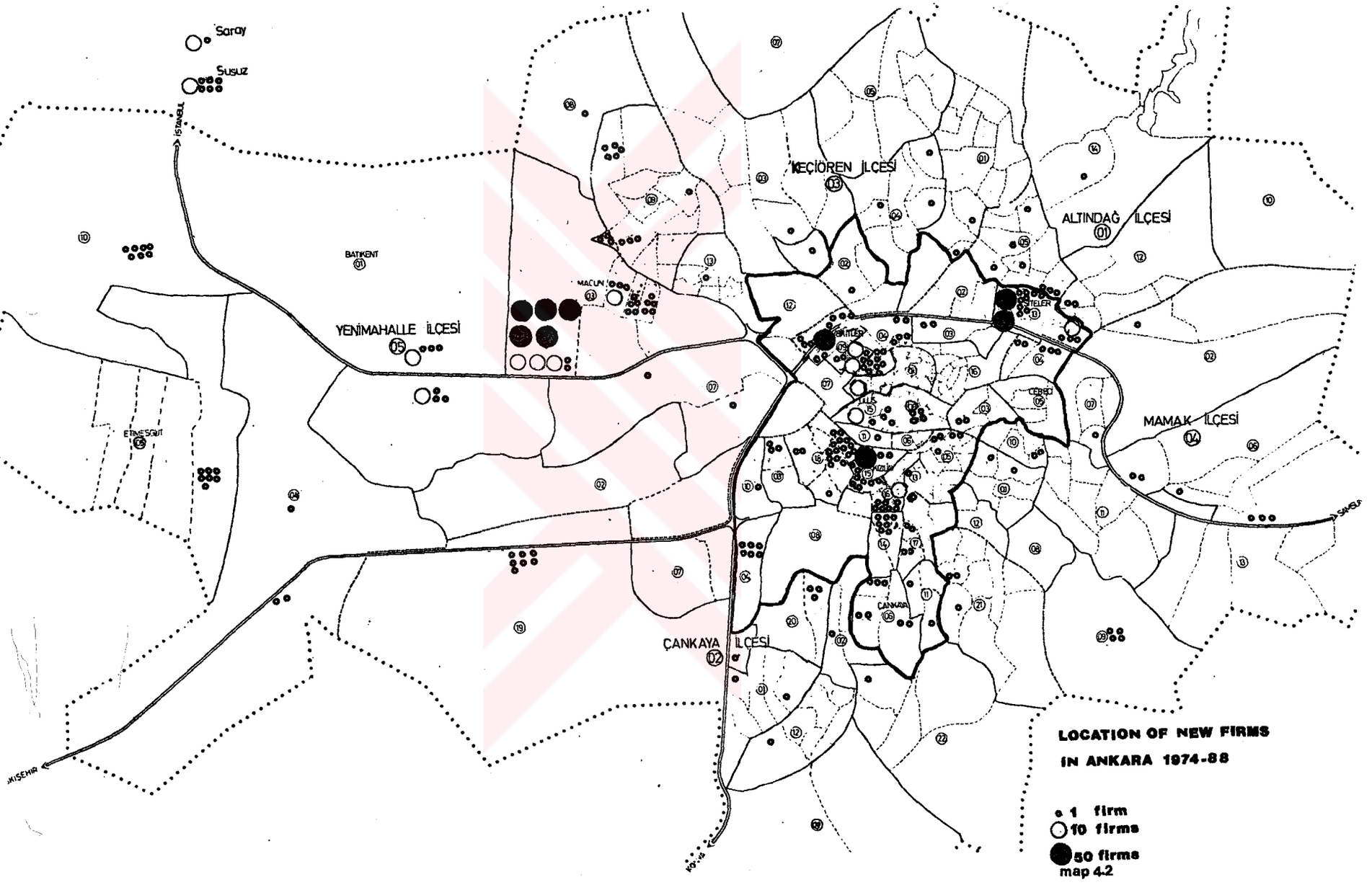
We also see that there exist other centers at in the periphery for the new and the relocated firms. According to a recent industrial research in Ankara; industrial location demands are highly concentrated around İskitler (23.3%), Demetevler (22.3%), Siteler (11.4%) and Ulus (9.8%) most of these places provide agglomeration economies. (İ.Tekeli, Şenyapılı.T, Güvenç.M, 1990)

The characteristics of firms determines also the industrial landscape of the city. According to the findings of the same research, the location tendency of firms is to be close to the CBD, relates to its high accessibility. This property is an indicator of small scale plants requirements for direct market relations which also characterizes general industrial landscape of Ankara.

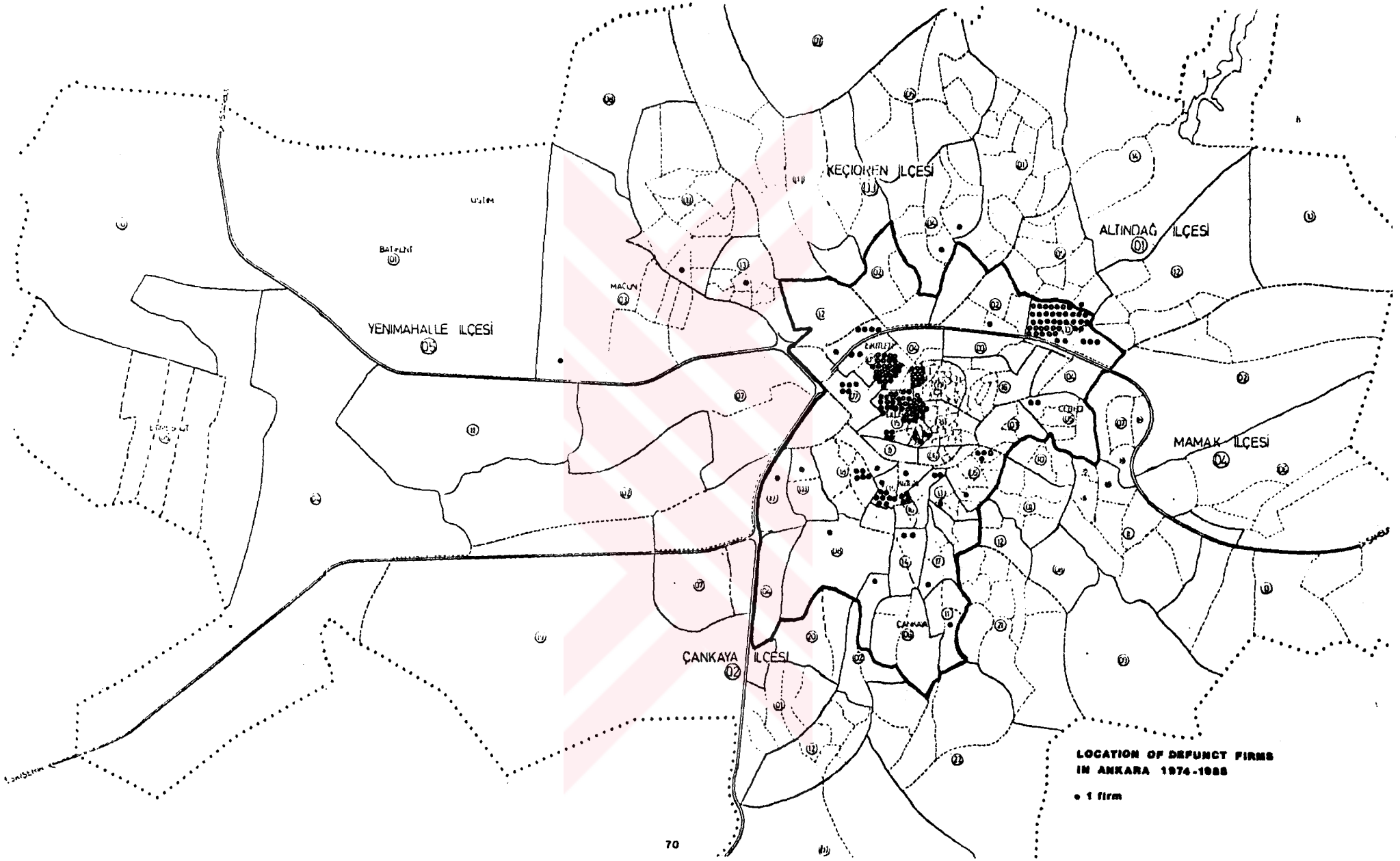
It also confirms that, attraction of the center does not decrease. But, when a firm decides to grow it faces difficulties stemming from insufficient land for expantion and high land values. These factors encourage locations at the periphery. And the firm locates away from the CBD, according to its economic strength and its degree of dependence to the urban center.

Also the same research underlies that; land is an crucial factor for the development of the firm. The inescapable result of growth turns out to be the relocation of establishment. (İ.Tekeli, Şenyapılı.T, Güvenç.M, 1990)

For Ankara, the origin and the destination of industrial shifts display that, Ostim constitutes an important destination. Beside Ostim, there are 20 destination places and 11 zones of origin where industrial activities decrease. The impact of out migration is found to be extremely important in Ulus and İskitler districts.


Saray
Susuz
İSTANBUL
BATIKENT
01
MACUN
03
YENİMAHALLE İLÇESİ
05
ETİMESGUT
08
KEÇİÖREN İLÇESİ
13
ALTINDAĞ İLÇESİ
01
ÇANKAYA İLÇESİ
02
MAMAK İLÇESİ
14
ÇANKAYA
06
AKŞEHİR
KONYA
SAMSUN
LOCATION OF NEW FIRMS
IN ANKARA 1974-88
1 firm
10 firms
50 firms

map 4.2


KEÇIÖREN İLÇESİ
ALTINDAĞ İLÇESİ
YENIMAHALLE İLÇESİ
MAMAK İLÇESİ
ÇANKAYA İLÇESİ
MAĞUN
LOCATION OF DEFUNCT FIRMS
IN ANKARA 1974-1988
• 1 firm

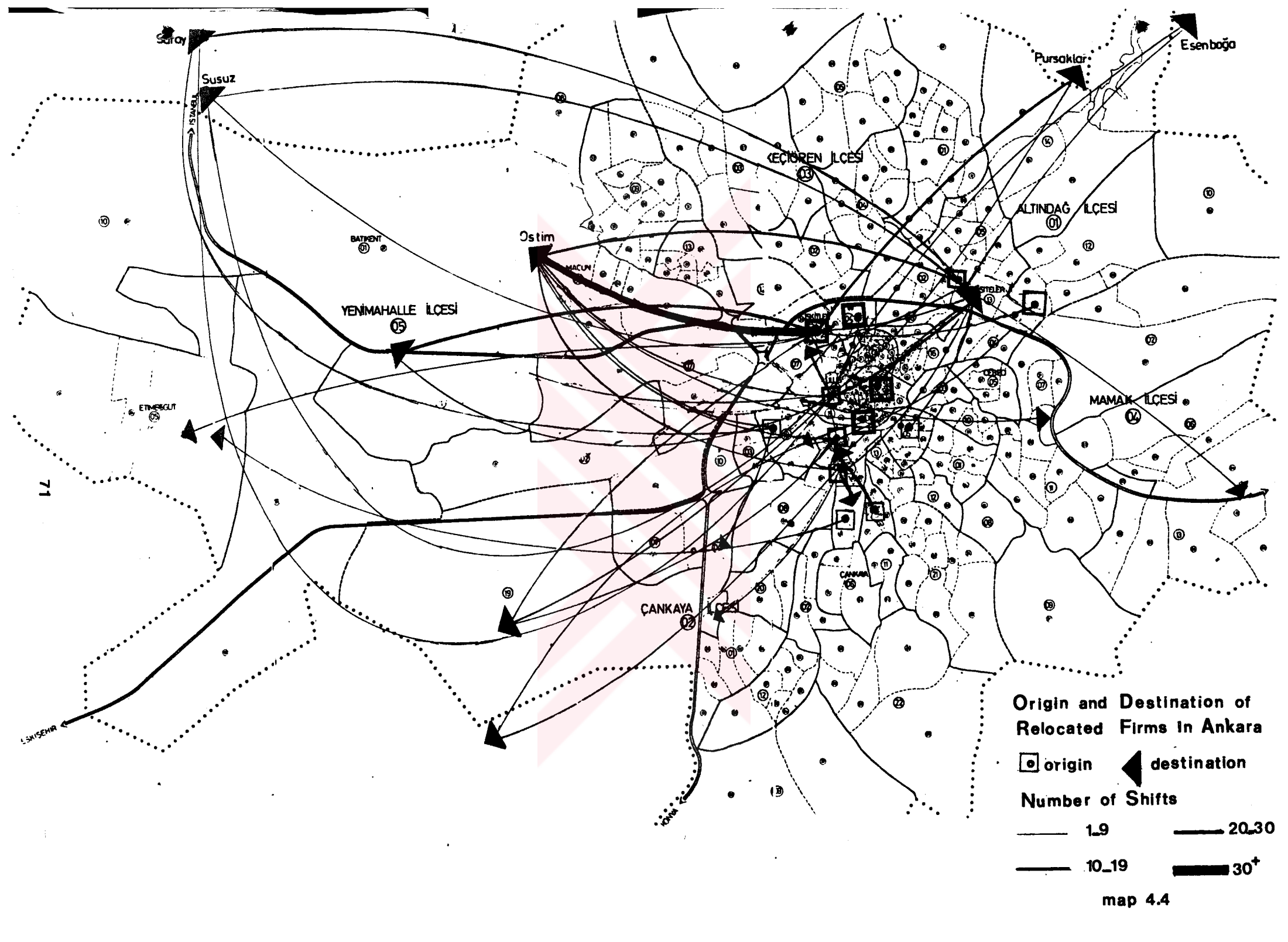

Süloy
Susuz
İSTANBUL
Pursaklar
Esenboğa
ÇEÇİREN İLÇESİ
03
ALTINDAĞ İLÇESİ
01
BATIKENT
01
Ostim
MACUN
YENİMAHALLE İLÇESİ
05
ETİMESGUT
25
MAMAK İLÇESİ
04
ÇANKAYA İLÇESİ
02
ESKİŞEHİR
KONYA
71
Origin and Destination of Relocated Firms in Ankara
origin
destination
Number of Shifts
1_9
10_19
20_30
30+
map 4.4

Table 4 below gives an idea of locational change of industry in Ankara, according to different zones.

Table 4.4 : Components of Industrial Change According to Industrial Rings Around Ankara

Components of location change -number of firms	INNER ZONE	PERIPHERY ZONE	OUTER ZONE	TOTAL
BIRTH firm estab. After 1974	46% 288	43,4% 272	9.98% 62	622
IN MOVERS	34% 53	48.7% 76	17.30% 27	157
OUT MOVERS	96% 132	3.6% 5	-	137
DEATH	98% 173	1.73% 3	-	176
NON-MOVERS	66% 212	23.39% 76	9.81% 33	321

Source: The data based on the comparison of 1974 Industrial Guide Book: chamber of industry; and capacity report files: chamber of Industry and Commerce; Ankara

In the analysis of the inner zone, reveals that 46 percent of new firms, 34 percent of in movers, 96 percent almost of all outmovers, 98 percent of defunct firms and 66 percent of non mover firms are or were located there. For the inner zone out migration is an important element which gives the pattern of locational change of industry in Ankara.

The composition of data for the periphery shows that, 43 % of the new firms, 48 % of inmovers, 3.6 % outmovers, 1.73 % of defunct

firm and 23.39 % of non-mover firm are located in and around this zone. The periphery zone gains establishments both from new formation and from migration. It has highest ratio of distribution of inmovers among the other zones. Thus newly established and inmigrant firms from the characteristics of this zone,

The table also illustrates that the outer zone accounts for 9.9 percent of births, 17 percent of in movers, and 9.8 percent nonmover establishments.

Thus this zone consists the propensity of relocated firms are dominated the characteristics of industrial locational change in the outer zone.

Thus the number of industrial firms at the outer zone increases more with in-migration than births.

These findings suggest, that relocation arises as a leading component of industrial change in Ankara.

Table 5 can also be adjusted to account for the "net change" process for comparing shares of gains and losses in these three zones in terms of relocated firms.

Net change in the inner zone is equal to-96. In the periphery is +74, and in the outer zone is +26. The sum of the periphery and, outer zones are equal to 100. Notice that this result is very close to net change in the inner area.

The tables 4 and 5 illustrates that the relocation tendency of industry is a crucial aspect in spatial development of industry in Ankara.

Table:5 TOTAL GAINS AND LOSSES OF THE ALL ZONES INTERMS OF RELOCATED FIRMS

ZONES & CODE NUMBER	GAINS	LOSSES	RESULT
INNER ZONE			- 96
1.1.1	1	2	- 1
1.2.2	0	1	- 1
1.3.2	0	0	0
1.4.1	1	0	+ 1
1.4.2	3	18	-15
1.4.3	1	1	0
1.4.4	0	1	-1
1.4.6	-	-	0
1.5.4	-	-	0
1.5.5	-	-	0
1.5.6	-	-	0
1.5.7	-	-	0
1.7.1	-	1	- 1
1.8.2	-	-	0
1.9.1	3	21	- 18
1.9.2	1	1	0
1.9.3	6	22	- 16
1.11.1	-	1	- 1
1.12.6	3	-	+ 3
1.13.1	12	13	- 1
1.13.2	6	2	+ 4
1.15.1	-	13	- 13
1.15.2	-	7	- 7
1.15.3	1	5	- 4
1.15.4	-	-	0
1.15.5	-	2	- 2
1.15.6	-	-	0
1.15.7	-	2	- 2
1.15.9	-	-	0
1.15.10	-	-	0
1.15.11	-	1	- 1
1.15.13	-	-	0
1.15.14	-	-	0
1.15.16	-	1	- 1
2.2.1	-	-	0
2.2.3	-	-	0
2.3.1	-	-	0
2.3.2	-	-	0
2.4.1	3	-	+ 3
2.5.1	1	1	- 3
2.5.5	1	1	0
2.5.6	-	-	- 1
2.5.7	-	1	0
2.6.1	-	-	- 1
2.6.2	-	-	0
2.6.3	-	-	0
2.10.1	-	-	0
2.13.4	-	-	0
2.13.6	-	-	0
2.14.1	1	1	0
2.15.1	1	1	0

* continue

ZONES & CODE NUMBER	GAINS	LOSSES	RESULT	
INNER ZONE				+ 74
1.17.1	-	-	0	
1.17.3	7	-	7	
2.1.5	-	-	-	
2.7.2	1	-	1	
2.1.6	-	1	-1	
2.4.2	1	-	1	
2.9.1	-	-	0	
2.11.1	-	-	0	
2.12.2	-	-	0	
2.12.6	-	-	0	
2.15.2	2	6	-4	
2.15.3	1	1	0	
2.15.4	-	1	-1	
2.16.1	-	1	-1	
2.16.2	1	-	1	
2.16.3	-	2	-2	
2.16.4	-	5	-5	
2.17.1	-	-	0	
2.17.3	-	-	0	
2.18.2	1	3	-2	
2.18.3	2	4	-2	
2.18.4	-	-	0	
2.18.5	-	1	-1	
2.19.1	1	-	1	
2.21.5	-	-	0	
2.21.7	-	-	0	
2.23.1	2	-	2	
3.1.5	-	-	0	
3.1.6	-	-	0	
3.2.3	1	-	1	
3.3.3	-	-	0	
3.4.2	-	-	0	
3.4.7	-	-	0	
3.4.9	-	-	0	
3.5.5	1	-	1	
3.6.2	-	-	0	
4.1.1	-	-	1	
4.2.1	-	-	0	
4.3.1	1	-	1	
4.4.1	-	-	0	
4.4.2	-	-	0	
4.5.2	-	1	-1	
4.6.2	1	-	1	
4.6.4	-	-	0	
4.7.2	1	-	1	
4.9.1	-	-	0	
4.10.2	-	-	0	
4.13.4	-	-	0	
5.1.1	10	-	10	
5.3.2	-	1	-1	
5.3.3	1	-	1	
5.3.4	-	-	0	
5.3.5	48	2	46	
5.4.1	-	-	0	
5.7.1	-	-	0	
5.7.2	1	-	1	
5.8.1	-	-	0	
5.9.3	-	-	0	
5.9.8	1	-	1	

Continue

ZONES CODE NUMB.	GAINS	LOSES	RESULT
OUTER ZONE			+26
2.15.1	1	1	0
4.14.7	1	-	1
5.4.2	-	-	0
5.5.2	1	-	1
5.10.1	1	-	1
5.14.1			
5.14.2			
5.14.3	2	-	2
5.14.9			
5.14.10	10	-	10
5.14.16			
5.15.1	1	-	1
5.15.4			
5.15.5	1		1
5.15.20			
5.15.25	3		3
10.1.19	6		6
10.1.61	-	-	0
10.2.1	1		0
10.17.3			0

4.3. THE FEATURES OF RELOCATED INDUSTRY IN ANKARA

So as to analyze the features of relocated plants, we have identified two basic factors which relate to size of employment and its production sector.

Table 4.6, produces the production environment, the direction of the movement and the production sector of firms according to size in terms of employment in the eight category. Plants with 0 10 operatives changed their production environment from one petty industrial estate to another one at the "periphery". They operate in trades such as machinery, and tools, and in the production of electrical devices. In this category, ages of firms is mostly below 10.

Firms with 10-25 employees are located in independent addresses and within small industrial estates. Their destination places spreaded equally between inner zone and periphery. Plants in this category operate mainly in machinery and tools, chemicals iron and steel, sectors.

Plants with 25 - 50 employees opt mostly for independent addresses. The origin of firms in this category varies, as well as their destinations.

Plants operating in textiles and garment and machinery and tool manufacturing trades have the highest propensity to move to adjacent sectors. The last four size categories depict similarities in terms of relocation behaviour.

On the other hand, table 4.6 illustrates the fact that, the

Table 4.6 ATRIBUTES OF THE RELOCATED INDUSTRIES BASED ON LABOUR SIZE.

LABOUR SIZE	PRODUCTION ENVIRON. (Number of Firms)				ORIGIN/DESTINATION OF TRANSFERS (No. of Firms)					SECTORS (Number of Firms)							
	0	1	2	3	1→1	1→2	1→3	2→1	2→2	31	32	33	34	35	36	37	38
0<10	7	20	1	2	9	10	3	1	-	-	-	1	1	4	1	3	20
10<25	32	30	1	-	26	20	8	1	-	4	2	-	5	8	5	10	29
25<50	23	12	1	-	10	16	7	-	3	0	-	-	2	1	-	5	19
50<100	17	4	-	-	7	11	3	-	-	5	1	-	-	3	1	1	10
100<250	7	3	-	-	2	6	2	-	-	-	1	1	-	-	-	-	7
250<500	1	1	-	-	1	1	-	-	-	-	-	-	2	-	-	-	-
500<1000	1	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-
1000+	1	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-

Source: The table is based on the comparison of 1974, Industry Guide Book: Industry Chamber; and Capacity Report Files: Chamber of Industry and Commerce: Ankara.

Table: 7 RELATIONS OF AGE AND SIZE OF FIRMS WITHIN RELOCATED INDUSTRIES.

Establishment Years	LABOUR SIZE (Number of firms)							
	0<10	10<25	25<50	50<100	100<250	250<500	500<1000	<1000+
1983-88	3	9	4	-	-	-	-	-
1978-83	4	13	3	4	4	-	-	-
1973-78	5	14	11	6	-	-	-	-
1968-73	9	13	9	5	1	1	1	1
1956-68	7	11	8	6	5	1	-	-

Source: The table is based on the comparison of 1974, Industry Guide Book: Industry Chamber; and Capacity Report Files: Chamber of Industry and Commerce: Ankara.

environment changes directly with the size of firms. The firms with 0-50 employees are located mostly in industrial estates, while those having a larger employment size are more likely to be located in independent addresses. Thus when the size of firms increases a paralel increase is observed in their ability to locate away from the center. In each category plants operating in machinery and tool manufacturing trades accounts for the greatest share in terms of relocated industries. Other sectors rank as follows, iron and steel, chemical industries, food stuff, and printing.

Table 8 shows the direction of industrial relocation in different sectors.

The table also enables us to define center, market and labour oriented industries. Amongst the relocated plants we observe 18 shifts in the food related trades. 8 of these shifts are made within the inner zone. The same is true in the textile industry, in spite of the limited number of shifts all of them took place within the inner zone. Printing is another industrial sector which illustrates a clear tendency for CBD orientation. Notice that 6 out of 8 relocations observed in the sector, took place within the limits of the inner zone.

Machinery and tool sector, can be taken up as an example which is independent from central locations. We have defected 43 plant movements in this sector and no less than 35 of these movements were towards sites that are located away from the center. It is possible to suggest that through their economic strength, these plants have a lower degree of dependence to center.

Table: **4.8**

DIRECTION AND NUMBER OF PLANT MOVEMENTS IN DIFFERENT SECTORS.

INDUSTRIAL GROUP	Number of Shifted Firms	SHIFT IN INNER ZONE		TOTAL SHIFT FROM INNER ZONE TO OUTER	SHIFT TO INNER ZONE	SHIFT FROM INNER ZONE TO PERIPHERY	SHIFT FROM INNER ZONE TO OUTER ZONE	SHIFT FROM PERIPHERY TO INNER ZONE	SHIFT FROM PERIPHERY TO OUTER ZONE
		in District	Between District						
METAL WARE	8	-	4	4	-	4	-	-	-
ELECTRICAL	27	1	10	16	-	15	1	-	-
MACHINARY AND TOOL	43	1	5	35	-	30	5	-	2
PLASTIC	7	1	3	3	-	3	-	-	-
CHEMICAL	10	-	3	7	-	2	4	-	-
PRINTING	8	2	4	2	-	2	-	-	-
WOOD WORKS	2	-	-	1	1	1	-	-	-
STONE & SAND	7	-	1	6	-	1	5	-	-
IRON WORKS	9	-	1	8	-	7	1	-	-
MELTING AND ROLLING	4	-	-	4	-	4	-	-	-
CASTING	9	-	3	6	-	3	2	-	1
TEXTILE WEAR	5	-	3	2	-	2	-	-	-
FOOD STUFF	18	2	6	10	-	4	5	1	-

Source: The table is based on the comparison of 1974, Industry, Guide Book: Industry Chamber; and Directory Report Files: Chamber of Industry and Commerce: Adana.

Table: **4.9**

THE CHARACTERISTICS OF PRODUCTION ENVIRONMENT FOR RELOCATED PLANTS IN DIFFERENT SECTORS.

INDUSTRIAL GROUP	SMALL INDUSTRIAL ESTATES		INDEPENDENT ADDRESS TO INDUSTRIAL ESTATE		INDUSTRIAL ESTATES TO INDEPENDENT ADD.		INDEPENDENT ADDRESS TO INDEPEND. ADDRESS		
	in the same zone	in the diff. zone	in the same zone	in the diff. zone	in the same zone	in the diff. zone	in the same zone	in the diff. zone	TOTAL
METAL WARE	1	2	2	1		1	1		8
ELECTRICAL		3	5	9	1		5	4	27
MACHINARY AND TOOL	2	17	2	8	1	11		2	43
PLASTIC			2	1		1	2	1	7
CHEMICAL			3	1		2	1	3	10
PRINTING			1			1	5	1	8
WOOD WORKS				1				1	2
STONE & SAND			1			2		4	7
IRON WORKS		5		2		1	1		9
MELTING AND ROLLING						3		1	4
CASTING					3	5		1	9
TEXTILE WEAR							3	2	5
FOOD STUFF			1	3		2	2	10	18
TOTAL	3	27	17	26	5	29	20	30	157

Source: The table is based on the comparison of 1974, Industry Guide Book: Industry Chamber; and Capacity Report Flies: Chamber of Industry and Commerce: Ankara.

The effect of production environment is studied for different relocated industries. The results derived from this study are summarized. In table 9 does not show significant sectoral differences.

Here we see that market oriented firms are located in independent addresses and electrical industry is concentrated in petty industrial estates.

The tendency of relocated plants to locate in independent addresses or in small industrial estates seems to be related to their market share. Where those having negligeable or small shares concentrate in petty industrial districts and others opt for decentralized independent sites.

According to Table. 10 the characteristics of relocated firms in the different manufacturing sectors identify that:

SECTOR CODE.31. - The relocated firms within the inner zone in this sector are capital intensive industries. Firms which shift from the inner to the periphery zone, are small scale industries when we compare them to with the other shifted firms in the different zones. Firms have escaped from high rents and land price in the center. But they are still highly dependent to the center and for these reason they locate around the periphery for keeping their relations with the center.

SECTOR CODE.34. - The firms which relocated within the inner zone, are labour intensive - small scale establishments. The firms which relocated from the inner to the periphery, are capital intensive and large - organized and also young establishments.

SECTOR CODE.35. - Firms within the chemical sectors are small scale labour intensive, can change place within center and the industrial estates are being their new addresses.

Also, young firms, capital intensive large scale industries, can be move away from the city by breaking out from the center.

SECTOR CODE.36. - The reason of characteristics of production process, most of the relocation tendencies of firms to the outer industrial zone of Ankara.

SECTOR CODE.37. - There are labour intensive firms in each zones of Ankara in this sector. Because the structure of industrial production in this sector requires more labour than capital - equipment. Firms shift from the inner zone to the periphery, mostly relocated in industrial estate and most of them are relatively young.

SECTOR CODE.38. - This sector has shown the highest mobility among other sectors in Ankara. It is an highly dynamic sector within the economic structure of Ankara Mobility of firms in the inner zone seems to have the same characteristics with the other sectors in the inner zone. Tendencies of relocation of firms among the inner zone and from the inner zone to periphery show the same locational decision in which setting the industrial estates.

Briefly, the small scale and labour intensive industries can move only within the inner zone accept some special industries, (31, 37, 38-3.1, 38-3.3).

Since they are labour oriented and market oriented industries. They can survive only by using opportunities of the central area.

In general meaning, the inner zone of Ankara has played and incubation role for these sectors.

TABLE **10.** THE ATTRIBUTES OF RELOCATED FIRMS IN DIFFERENT SECTORS ACCORDING TO THREE INDUSTRIAL ZONE IN ANKARA, 1988

ORIGIN DESTI-NATION OF SHIFT	MEDIAN AGE OF FIRMS	CAPITAL FIRM	EMPL. FIRM	CAPITAL EMPLOY.	AVR. CLOSED AREA	AVR. OPEN AREA	T.AREA EMPLOY.	INDUSTRIAL ESTATE AS A DESTINATI-ON PLACE OF PRODUCTION-ACTIVITY
MANUFACTURING SECTOR 31								
1 1	22	1620814	48.2	35235	3764	51387	149.8	25 %
1 2	24	193726	33	5870	1940	6097	60.8	-
1 3	16	1276225	204	6231	7305	50740	56.6	-
NOTE: AV. CAPITAL/EMPLOYMENT : 6636								
34								
1 1	21	255735	81.6	3131	3066	-	6.25	16 %
1 2	11	16950599	205	82685	14550	133750	36.1	-
NOTE: AV. CAPITAL/EMPLOYMENT : 11185								
35								
1 1	18	4580	13.3	343.5	665	550	30.3	66.6 %
1 2	16	388238	23.5	16520	3586	7291	231.4	-
1 3	13	162756	9.2	17595	1205	10693	321.5	-
NOTE: AV. CAPITAL/EMPLOYMENT : 3156								

ORIGIN DESTI-NATION OF SHIFT	MEDIAN AGE OF FIRMS	CAPITAL FIRM	EMPL. FIRM	CAPITAL EMPLOY.	AVR. CLOSED AREA	AVR. OPEN AREA	T.AREA EMPLOY.	INDUSTRIAL ESTATE AS A DESTINATI-ON PLACE OF PRODUCTION-ACTIVITY
MANUFACTURING SECTOR 36.9.2 - 36.9.9								
1 3	13	343627	31.2	11013	2990	14161	109.9	20 %

NOTE: AV. CAPITAL/EMPLOYMENT : 7131

37.1.0								
1 1	19	43272	13	3328.6	617	511	21.70	-
1 2	11	570896	14.5	3937.2	531.4	566	7.56	90 %
1 3	20	240229	37.6	3989.4	1583	8666	90.69	-

NOTE: AV. CAPITAL/EMPLOYMENT : 5242

38.1.1 - 38.1.2 - 38.2.2 - 38.4.2 - 38.4.3								
1 1	16	70880	17.3	4089	472	522	9.55	66 %
1 2	13	375287	37.4	10034.4	1538	120767	12.13	73 %
1 3	18	206948	52.2	3964	24526	17506.4	76.47	-
2 3	15	494330	39.5	12514.6	2685	7133	124.27	-

NOTE: AV.CAPITAL/EMPLOYMENT : 5199

ORIGIN DESTI-NATION OF SHIFT	MEDIAN AGE OF FIRMS	CAPITAL FIRM	EMPL. FIRM	CAPITAL EMPLOY.	AVR. CLOSED AREA	AVR. OPEN AREA	T.AREA EMPLOY.	INDUSTRIAL ESTATE AS A DESTINATI-ON PLACE OF PRODUCTION-ACTIVITY
MANUFACTURING SECTOR 38.3.1 - 38.3.3 - 38.3.9								
1 1	17	79536	26.5	29996.2	975	1302	7.79	45 %
1 2	11	683215	53.2	12821.7	8346	8031	21.9	85 %
1 3	15	905300	97	9332	7000	49000	577	-

NOTE: AV.CAPITAL/EMLOPMENT : 3359

38.1.9								
1 1	14	36300	20.7	1749	750	-	9.03	75 %
1 2	14	267335	24.2	11024	1663	5836	77.3	75 %

NOTE: AV.CAPITAL/EMPLOYMENT : 9546

Source: The data is based on comparison of 1974 Industrial Guide Book: Chamber of Industry; and Capacity Report File: Chamber of Industry and Commerce: Ankara, 1988

Finally, we study the characteristics of relocated firms according to their average shift. In this manner, the industrial mobility shows spatial concentrations and dispersions. The average distance among origin and destination nodes of total shifted industries is found as 6.2 km in Ankara case. This average mobility is found as 9 km for the industrial dispersions. Also industrial concentrations depict 3.75 km average shift. 80 % of total relocated industries have concentration and clustering tendencies. Maps, 4.5 to 4.7 show the spatial concentrations and dispersions of firms in Ankara.

As a result, we classify relocation of firms according to their average distance movement which can be seen from table 11. The table depicts that, the size of firm and uncovered land uses of firm increase directly with their average distance of shift. Notice that, big and labour intensive firms have ability to move more than 9 km distance from their origins. Also small and labour intensive firms can only move around 3 km away from their origins.

We also analyse the features of relocated industries in different sectors according to their average shift. Following results identify that: Chemical (35) and metallic good producers (36) have highest average shift within the other industrial sectors (table 12), because of their production factors. Other industrial sectors such as machinery and tools (38), food stuff (31), wood works and furniture (33), casting and iron works (37) have 5.5 km average shift.

The production features of the sector, size of establishment and market and customer relations are important factors which effect average shift of firms. (Table 12)

Table:4.11 THE CHARACTERISTICS OF RELOCATED FIRMS ACCORDING TO THEIR AVARAGE SHIFT

	Total number of firms	% of firms within shifted firms	Avr.firm size (labour)	Intensity of capital used in production process		Median age of firms	T.buildup / T.open area	Avr. open area (m)	Avr. buildu area (m)
				% C	% L				
Avarage shift more than 9 kms	30	.19	80	.40	.60	71	0.155	22836	3559
Avarage shift Between 9-3.75 kms	50	.31	48	.55	.45	74	0.222	11105	2476
Avarage shift less than 3.75 kms	77	.49	34	.35	.65	73	0.56	2581	1469

Source: This is based on the comparison of 1974 Industrial Guide Book; Chamber of Industry;and Capacity Report Files; Chamber of Industry and Commerce; Ankara.

These factors are also important, especially in relocation of printing (34) and textile (32) industries. Table 12 illustrates that the average shift is 2.5 km for sector 32 and 1.7 km for sector 34. Market and communication oriented characteristics of printing and textile industries in Ankara show paralellity with the empirical results which are taken in western case studies.

Table 4.12 THE FEATURES OF RELOCATED FIRMS IN DIFFERENT SECTORS ACCORDING TO THEIR AVERAGE SHIFT.

Average movement	Total num. of firm	% of tot. firm	AVR Plant size interms of employment	Intensity of capital used in production process %Cap.	%Labour	Median Age of Establishment
38.1.1 - 1.2 - 2.2 - 4.3					AVR = 6.6 km*	
MORE Than 9 Kms	7	15.2	87	.60	.40	69
Between 9 - 3.75 Kms	21	45.6	45	.57	.43	71
Less Than 3.75 Kms	18	39.2	15	.45	.55	76
38.3.1 - 3.3 - 3.9					AVR = 4 km	
More 9 Km	3	10.7	116	.40	.60	73
9-3.75	13	46.3	53	.53	.47	76
Less Than 3.75 km	12	43	25	.58	.42	73
38.1.9					AVR = 2.7 km	
More Than 9 km	-	0	-	-		-
9-3.75 km	1	12.5	19	.100	-	84
Less Than 3.75 km	7	87.5	23	.29	.71	74

* AVR = Average shift of relocated industries.

31 = AVR* = 6.1 km

Average movement	Total num. of firm	% of tot. firm	AVR Plant size interms of employment	Intensity of capital used in production process %Cap.	%Labour	Median Age of Estab-lishment
More Than 9 kms	6	35.2	183	.20	.80	71
Between 9-3.75 kms	3	17.6	20	.60	.40	73
Less Than 3.7 km	8	47.2	45	.75	.25	66

32 = AVR = 2.5 km

More Than 9 kms	0	-	-	-		-
Between 9 -3.75	1	20	83	.100	-	70
Less Than 3.75	4	80	187	.50	.50	78

33 = AVR = 5.4 km

More Than 9 kms	0	-	-	-		-
Between 9 -3.75	2	100	57	-	.100	75
Less Than 3.75	-	-	-	-	-	-

*AVR = Average shift of relocated industries.

35 = AVR* = 18.7 km

Average movement	Total num. of firm	% of tot. firm	AVR Plant size interms of employment	Intensity of capital used in production process %Cap.	%Labour	Median Age of Estab-lishment
More Than 9 kms	5	29.4	21	.40	.60	77
Between 9-3.75 km	3	17.6	34	.60	.40	72
Less Than 3.75 km	9	53	15	.22	.78	71

37 = AVR = 5.8 km

More Than 9 kms	4	22.2	40	.25	.75	69
Between 9-3.75 kms	4	22.2	14	-	.100	73
Less Than 3.75 km	10	66.6	13	.10	.90	75

36 = AVR = 17.8 km

More Than 9 kms	5	71.4	31	.40	.60	75
Between 9-3.75 kms	0	-	-	-		-
Less Than 3.75 km	2	28.6	18	.50	.50	72

* AVR = Average shift of relocated industries.

34 = *AVR = 1.7 km

Average movement	Total num. of firm	% of tot. firm	AVR Plant size interms of employment	Intensity of capital used in production process %Cap.	%Labour	Median Age of Establishment
More Than 9 kms	0	-	-	-		-
Between 9 -3.75	1	12.5	377	.100	-	69
Less Than 3.75	7	87.5	75	-	.100	68

*AVR = Average shift of relocated industries.

Source: The data is based on comparison of 1974 Industrial Guide Book: Chamber of Industry; and Capacity Report File: Chamber of Industry and Commerce: Ankara, 1988

4.4. THE COMPARATIVE STUDY OF LOCATION TENDENCIES BETWEEN NEW AND RELOCATED ESTABLISHMENT.

The analysis considers the growth of an industrial area as being related to births and inmigration. Of course suitable locations for different industries vary in the city. But some areas will more prove attractive than the other sites and act as an "incubator".

Table 13 depict, the origin and destination of relocated industries, in the three main zones. Thus we see that the number of newly established plants in the inner zone exceed by the number of relocated plants directed towards this sector. As expected in other zones the percentage of new establishments decreases, consequently shifted firms account for a larger share.

Thus new firm formations, highest percentage is observed at the inner zone and periphery follows with 42 percent. The results obtained from this study support theoretical suggestions in that the inner areas provide the necessary cheap premises, business services required by the newly established plants.

Table 4.14, produces the age distribution of all establishments and of those which relocated. This table is derived from Leone and Struyks' work on the incubator hypothesis. Those outhors show that, younger plants are indeed more likely to relocate. In the case of Ankara the plants around 10-15 years have higher propensity to move.

In the case of Ankara we see that 46 percent of relocated firms are located in industrial estates and 53 percent of the firms in the independent address. The new establishments prefer mostly (44 percent)

Table: **4.13**

COMPARISON BETWEEN ORIGIN OF NEW FIRMS AND DESTINATION OF SHIFTED FIRMS.

AREA	ORIGIN OF NEW FIRMS		DESTINATION OF SHIFTED FIRMS	
	NUMBER	PERCENTAGE	NUMBER	PERCENTAGE
6 km FROM CENTER	397	47.65	58	40
15 km FROM CENTER	355	42.63	64	44.14
25 km FROM CENTER	81	9.72	23	15.86
TOTAL	833	100	145	100

Table: CHI-SQUARE TEST OF TABLE 4.13

AREA	ORIGIN OF NEW FIRMS	DESTINATION OF SHIFTED FIRMS	TOTAL
6 km FROM CENTER	397 (388)	58 (67)	455
15 km FROM CENTER	355 (357)	64 (62)	419
25 km FROM CENTER	81 (89)	23 (15)	104
TOTAL	833	145	978

* Degrees of freedom = 2

Application of the Chi-square test shows that frequencies are significantly different at the 0.5 level.

Table: **4.14**

COMPARISON OF ALL MANUFACTURING AND RELOCATED FIRMS BASED ON AGE STRUCTURE.

DATE OF FIRM FORMATION	ALL MANU-FACTURING FIRMS [1]	MOVERS [2] MOVEMENT YEAR 1974-84	84-88	TOTAL	[3] % OF ALL MANUFACTURING	[4] % OF MOVERS	RATIO OF 4/3	RUNNING AVERAGE
1956	41	6	4	10	3.4	7.3	2.1	2.2
1957	8	3	-	3	0.6	2.2	3.6	2.0
1958	9	1	1	2	0.7	1.5	2.1	1.6
1959	4	-	-	-	0.3	-	0.0	--
1960	7	-	1	1	0.6	0.7	1.1	1.6
1961	7	2	2	4	0.6	2.9	4.8	1.8
1962	10	1	-	1	0.8	0.7	0.8	2.0
1963	7	-	1	1	0.6	0.7	1.1	1.3
1964	12	2	1	3	1.0	2.2	2.2	1.5
1965	14	1	1	2	1.2	1.5	1.2	1.8
1966	12	1	2	3	1.0	2.2	2.2	1.7
1967	21	-	1	1	1.7	0.7	0.4	1.7
1968	28	3	4	7	2.3	5.1	2.2	1.8
1969	21	3	4	7	1.7	5.1	3.0	1.8
1970	29	1	3	4	2.4	2.9	1.2	1.8
1971	22	2	1	3	1.8	2.2	1.2	1.6
1972	24	-	8	8	2.0	5.8	2.9	1.6
1973	24	-	1	2	2.0	1.5	0.7	1.6
1974	27	-	2	7	2.2	5.1	2.3	1.2
1975	43	-	7	7	3.5	5.1	1.4	1.2
1976	54	-	7	10	4.5	7.3	1.6	1.0
1977	59	-	10	6	5.0	4.4	0.8	0.8
1978	70	-	6	4	5.8	3.0	0.5	0.8
1979	65	-	4	6	5.4	4.4	0.8	0.7
1980	41	-	6	5	3.4	3.6	1.0	0.7
1981	41	-	3	3	3.4	2.2	0.6	0.7
1982	77	-	10	10	6.4	7.3	1.1	0.5
1983	74	-	6	6	6.1	4.4	0.7	0.4
1984	83	-	3	3	6.9	2.2	0.3	0.2
1985	88	-	6	6	7.3	4.4	0.6	--
1986	74	-	1	1	6.1	0.7	0.1	---
1987	76	-	-	-	6.3	--	0.0	---
1988	31	-	-	-	2.5	--	0.0	---

Source: This is based on the comparison of 1974 Industrial Guide Book: Chamber of Industry; and Capacity Report Files: Chamber of Industry and Commerce: Ankara.

central areas. Notice however that 21 percent of the new firms are located in petty industrial estates. And also the center attracts a non negligeable part of the relocated firms. Our survey reveals that 31 percent of relocated firms choose the inner zone as their destination.

Thus, in the Ankara case both central areas and industrial estates provide the production environment required for relocated and newly established firms.

The spatial distribution of the relocated firm in Ankara shows that the inner zone constitutes both the origin and destination of no less than 44 plant movements. We have also found that 31 of firms shifted from the inner zone to Istanbul road. 19 firms shifted from inner zone to Esenboğa road and 6 firms shifted from the inner zone to Eskişehir road. The presence of, Ostim as a large industrial concentration on the Istanbul road, is undoubtedly a factor which increases the attractivity of the latter.

This analysis of the spatial distribution of the new firms in Ankara between 1974 - 1988 shows that some 450 (49 %) new firms located in the inner zone, some 383 (41 %) along the Istanbul road. Percentage shares of other sectors are as follow, 37 firm (5 %) southern sector, Northern sector; 19 new firms (2.2 %), Eskişehir road 17 (1.8 %), Eastern sector 9 (1 %) were settled down in the city. Notice that OSTİM accounts for no less that 74 percent of new plant establishments along Istanbul road.

As a conclusion industrial geography of Ankara can be considered to be shaped by the locational tendencies of relocated firms and new

firms. The study clearly shows that, both as a destination for relocated firms and origin of new firms, Ostim petty organized industrial estate and inner zone Ankara, arise as major industrial concentration areas. These are the two main centers for industrial activities followed by major highways around Ankara.

4.5. CENTROGRAPHIC ANALYSES ON THE DECENTRALIZATION OF METROPOLITAN POPULATION AND BASIC EMPLOYMENT.

In this section we have studied changes in the spatial distribution of metropolitan population and industry through locational shifts of centers of gravity. According to glossary of geographical terms, "centrography" is directed towards the establishment of laws of distribution of phenomena and based on the relationships and migrations of their "centers of gravity", and acconding to the dictionary of Human Geography "the study through descriptive statistics, for measuring the central tendency and dispersion accross space of point patterns". (the dictionary of Human geography, 1981)

It could also be used as a simple and useful analytical tool to describe evolution of spatial distributions through time.

The centers of gravity are computed as weighted arithmetic means in a two dimentional euclidean space as follows:

. Centers of gravity of each neighborhood are found and ploted on Ankara district map. (1)*

. Population share Pi accounted by each district is computed.(2)*

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1 . The map consist of 1990-Subareas of Metropolitan Planning Bureau, neighbourhood boundaries and E.G.O Traffic zones. And an additional map was used to determine the centers of gravity of 2015 districts in Ankara.

2 . The same calculation was done to find the centers of gravity of basic employment.

. Xi and Yi coordinates (which are founded in first step by putting each center of gravity point on the euclidean space) of the centers of gravity of different neighborhoods are multiplied separately by their respective population shares Pi. (Pi=1.0)

Summation of these weighted coordinates of all districts are yielded coordinates of the center of gravity, for the population distribution. The same procedure could be used for the computation of gravity centers for other industrial attributes as well.

4.5.1. Shifts of The Weighted Center of Gravity of Total Metropolitan Population In Ankara:

As changes in population shares of different geographical components of the metropolis will rarely be uniformly distributed, such changes will cause a shift in the location of the center of gravity of population distribution. The weighted center of gravity will shift in the direction of the geographical component. Whowe population share is increasing, and away from those sectors loosing population (in relative terms). (Güvenç.M., 1989,).

Centers of gravity are particularly sensitive to changes in shares of neighbourhood population distribution and its movement will display the direction of urban growth. There are of course several factors which affect the direction of shift of weighted center of gravity.

. When some of the neighbourhoods gain relatively more population than other neighbourhoods, the direction of the shift of the

weighted center of gravity will be towards neighbourhoods which show a higher population increase.

. Also population increases observed in neighbourhoods extremely far from the center of city will have a greater gravitational force on the center of gravity.

. Changes in land-use and planning policies also effect the distribution of population even if the total population of city remains the same. So, new population distribution lead to changes in the location of weighted center of gravity.

. Finally, it is possible that, we don't observe any shift of wheighted center of gravity of population, while total population of city incerases. This could be possible if and only if the development takes place in every direction with the same intensity.

Position of Weighted Center of Gravity of the Spatial Distribution of Ankara Metropolitan Population and Basic Employment in Different

Years:

YEARS		Neighborhood level, area codes, where code of the areal unit the weighted center of gravity is found. POPULATION		EMPLOYMENT
*				
1965	(Altındağ-Hisar-Kılıçaslan)	1/8.09		-----
1970	(Altındağ-Ulus-Şenyurt)	1/15.14	(A-U-Fevzi)	1/15.3
1985	(Altındağ-İskitler-Yenidoğan)	1/9.02	(A-H-Akbaş)	1/8.1

In the period 1965 - 1970, the weighted center of gravity of population distribution moved 250 meters towards north-west. While the net population increase is about 330492 inhabitants. Average yearly speed of this shift is found to be some 50 meters/year. This movement is the result the unevenness in the spatial distribution of some 66098 inhabitants which added to urban population in each year. This result suggests that the highest development took place on the north-west sectors of the city.

In the period 1970 - 85 the weighted center of gravity of population distribution continued to a shift in the same direction.

In this period population of Ankara increased by more than one million. Annual increase of the population is around 67692 inhabitants. The average yearly speed of the shift of the weighted center of gravity 34 meters/year. There is therefore no significant change in the annual population increase, and in the direction of the

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* The center of gravity of population in 1965 year has been obtained from Tuğrul AKÇURA's study. (Akçura.T, 1971, Ankara, pp:114)

shifts of the weighted center of gravity towards north-west. However we see that the speed of the shift decreased.

This can be explained by the development of new neighbourhoods on the north and west part of the Ankara during this period. Generally when we look at last two decades, weighted center of gravity of population distribution shifts by 750 meters in the north-west direction. This can be taken as a growth indicator of the shape of compact macroform of Ankara.

Notice also that average yearly speed of this shift is found to be around 37.5 meters associated with annual increase is 67293 inhabitants.

4.5.2. Shifts of The Weighted Center of Gravity of Basic Employment In Ankara Metropolitan Area:

Centrographic method was used in order to test whether industry attracts the urban development or not? To this end both the weighted center of gravity of population and employment distribution were examined in period 1970 - 1985.

Between, 1970 - 85, the shift of weighted center of gravity of the employment distribution was around 750 meters and the direction of movement was in the direction of South-east. Notice that in the same period the weighted center of population distribution shifted by a similar distance but on the opposite direction.

The weighted center of gravity of population distribution indicates locations with high accessibility. The area around this point will be attractive for all types of urban activities including industrial production. However it is evident that these urban function have unequal bidding possibilities in this competition. The weighted center of gravity of population in 1985 that appeared in "Kazık İçi Bostanları". Today planners want to change the existing land-use function of this area (industrial) to accomodate future CBD functions of Ankara. It seems that this is not a coincidence, the weighted gravity center of 1985 proves this for Ankara.

The location of the weighted center of gravity employment distribution will of course tend towards labour intensive industries. In 1985, patter center was around "Ulucanlar district". Surrounded by labour intensive industries. As we know, labour intensive industries tend to be located not far from their labour pools. It is therefore not a coincidence that these areas host large amounts of industrial labour.

CONCLUSION

The study analysis the industrial mobility in the metropolitan area of Ankara with reference to relocation tendencies of the firms. Also, the new and the death industrial establishments were studied to examine the industrial landscape of Ankara in 1988.

In advanced countries, while core of the metropolis was loosing its manufacturing establishments and employment, decentralization tendency of industries increased and they moved to the periphery. This industrial relocation tendency, especially, in the case of advanced countries was observed after 1970 by the new technological innovations and changes in the division of labour. In Ankara case, industrial relocation could not be identified as "decentralization". Because, the dispersion of industries is restricted by short distance movement, and size of establishments. Also for the new firms center of the city is still attractive. All these facts made Ankara a different case when compared with the general western model of peripheral development in the metropolitan areas.

In Ankara, core of city continued to attract some labour while it is also loosing some. According to empirical results of the study, the center area can (it is called in the study as inner zone) be defined

as incubation area in the city. Also according to the results of the study, there exist other industrial sites which are located on Istanbul road and had caused incubation effect for the small firms.

The study mainly clarifies the features of relocated industries in Ankara. According to the analysis, size of the firm is the most important determinant in relocation process of industry; especially the labour size between 10 - 25 of firms have higher propensity of relocation in Ankara. And bigger firms interms of labour size tend to move longer distances from the center. In general, labour intensive firms are expected to move around center area where external economies and pool of skilled labour is available. In this case study of Ankara, this situation is in contrast to our expectations. There exist big - labour intensive firms more than the capital intensive ones in the periphery. This is an other difference from the tendencies which is observed in advanced countries. This difference between two industrial tendencies is based on the location of labour supply. In Ankara case, there is more labour supply which generates from, squatter areas and small villages in the periphery of the city.

Another characteristic examined in the relocated industries, is that need for open space increase in paralel to avarage shift to industries. The firms are forced to move to the edge of city, because of shortage of land which does not give possibility of expansion to plants. Also high land price in central area of the city is effective for going out. Another reason for demanding larger areas in the periphery is speculative behaviour of enterprises.

Industrial relocation indicates a differenciation according to the sectors in Ankara. Factors like the newness of the sector direct

accesibility from the inner zone to the consumer, the agglomeration of firms that produce the same product in a point in the city are affecting this differenciation.

This study determined industrial sectors which have higher propensity to shift. These industries are activating in machinery and tool, electrical, food stuff and chemical sectors. The shift of these industries can be put in order according to their average movement from their origin to their destination node. For the machinery and tools the average shift is 6 km, same for the food stuff industries, for the electrical industries average shift is 4 km and for the chemical industries it is 18.7 km except chemical industries, others move benefits to be near to the core. Also paper - printing and textile type of industries couldn't escape from the core areas. These industries called "inner-city industries". Their locations change only with the changes of dimension of center area. The average shift is found to be 2.5 km for paper - printing and 1.7 km for textile sectors. The results of study supported the tendencies of inner - city industries for Ankara. 49 % of industrial relocation in Ankara metropolitan area have approximetly 4 km average shift between the origin and the destination nodes.

On the otherhand, 45 % of relocated industries were settled in small industrial estates. Industrial relocation in central area constitutes 35 % of the total mobility of industry in Ankara.

This shows that the industry in Ankara maintain its structure which is depended on external economies, market relation and labour pool of the center.

We have faced with the dual structured industrial development pattern; dependency of relocated firms to the center and concentration and clustering tendencies of firms are the dominant characteristics of this structure.

If we look at the process from the view point of production environment which is supplied by these areas to the firms, in fact, they posses function of incubation for newly established firms.

As well as, spontaneous concentrations which emerged along the main roads at the urban fringe had caused external economies and this became an important attraction factor for other firms.

Briefly, the small industries move to the edge of the city by small industrial sites and some of them continue to cluster in the center of city. Especially, the big industries' concentration on the Istanbul road give shape to development of industrial landscape in Ankara.

We should make critics about some of the related topics which are not taken into consideration in the main part of the thesis. The study predominantly concerns sectoral features of relocated industries and geographical distributions of relocated firms on the map.

However the study will enrich by further researches on the patterns of workplace - residence relation and the effect of accessibility factor in firms relocation. To compare the firms initial and final production capacity, capital, number of employees, area of the plant and to questionize whether relocation affected workplace - residence relations of the employees can also be suggested.

Empirical research on measurements which are taken into consideration by the firm while making their location decisions for inner metropolitan areas, indicate that location decisions of industry can be taken independently neither from the pattern of population distribution and location of central business and transportation facilities.

Another important criteria that is not emphasized in the context of this study is the linkage between labour market and relocation of the firm. For realising decentralization of the industry and the industrial area chosen, the pattern of interrelation between residence and workplace should be searched before location of the industry. And structures and limits of labour market in the city must be known.

For clarifying this point, the results of a research showing the urban - sectors that the labour force is oriented and differentiated in Ankara is summarized.

When industrial firms production levels thereof show a fluctuation are considered, it is observed that such firms are located along Ankara - Samsun highway. The majority of the blue - collar labor force (77.4%) employed in this industry complex are directed to northern and western parts of the city and an important parting of the white - collar labor force (62%) are directed to southern part of the city.

When residence - workplace relations among the industrial firms production levels thereofs are constant, are considered it is highly observed that all labour force categories except the foremen are directed towards southern parts where regular and irregular

settlement areas are found. Thus while planning decentralization of industry in Ankara city, the limits of labor force mobility and the new labor market and potentials to be formed in rural settlements in the fringe of the city should be determined.

Another point that wasn't mentioned in the study is the reasons that relocated firms moved from their ex-locations. A research realized in Ankara lists the phenomena that can be used for a general evaluation as such. 64 % of the relocated firms referenced to a desire to expand and 17.9% referred to "high rents" as the primary cause that made them move. The secondary reasons are to make better infrastructure (32%) and to expand the business (18%) when these two use of a findings are evaluated together the relation between relocation and the desire to expand the business appears more clearly.

As a conclusion, another important subject which will be discussed in this thesis is incubation effect of petty industrial estates. New attraction centers created by urban development framework of small industrial estates that is especially planned at peripheral areas is an influential phenomenon.

As it is known what puts the approach claiming industrial estates' being pushed out of centre by the planning act, into agenda are the aims of - eliminating the negative environmental effects of small manufacturing which are located at the areas open to dynamic development of an urban center - and especially increasing the urban rents which decreased in parallel to physical decay at the center.

Today, the concentrated decentralization of petty producers at small industrial estates has proved the successful urban policy in the

case of Turkey. It creates a pressure on potential operations in and around the core such as urban renewal and redevelopment.

Besides, petty industrial estates has became an influential planning tool for planners to realize decentralization at urban scale.

Small industrial cooperatives springed up at the fringe of metropolitan city has changed into the core of a spantaneous growth process around them, after a while.

Petty industrial estates which are planned as completed spatial organization at the beginning, started to attract other entrepreneurs by creating external economies, market relations and infrastructure facilities to their environs.

It is possible to examine SİTELER in Ankara, as an example, from the discussion view point of future environmental problems and possible growth dimensions.

In the beginning of 60's the petty industrial estate established by furniture producers was a work place at the fringe for those days. In three decades it was not only developed into a huge agglomeration area of over 10.000 predominantly furniture production related businesses employing around 100.000 workers, but also was surrounded by squatters which has formed a district of its own in the metropolitan area.

SİTELER had shown an unexpected development process over the planned size, production and employment capacity.

It is clear that, petty industrial estates which were pushed away from or around an urban center can be an attraction area and cause various planning problems in the vicinity.

By knowing "incubation function" of small industrial zones, the planners will acquire a new dimension for planning and giving the location decisions of them.

Besides the small industrial estates, the center as a result of its accessibility acts as an incubator for the small industry tpyes which need face to face relations with the consumer. Since such a situation is more adventageous than that offered by the small industrial sites, such industries prefer locations in or around the centre.

Thus the firms activeting in wearing and printing industries continue to make their location decisions dependent to the center such a tendency should not be ignored while planning the urban center.

In this context the theory has an importance with respect to making and application of healty urban plans and planning industrial areas that are more sensitive to dynamic development instead of static and rigid plans.

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APPENDIX 1: INDUSTRIAL DISTRICT CODES AND THEIR NAMES WITHIN THE DISTANCE ORDER OF 6 kms, 15 kms, AND 25 kms FROM THE CENTER OF ANKARA

	DISTRICT CODE	NAME OF THE SUB-DISTRICT	NAME OF THE DISTRICT
6 kms	1.1.1	ALTINTAŞ	ALTINDAĞ
	1.2.2	AYDINLIKEVLER	AYDINLIK
	1.3.2	ÖRNEK	ÇALIŞKANLAR
	1.4.1	ALTINBAŞ	DIŞKAPI
	1.4.2	BOZKURT	DIŞKAPI
	1.4.3	FEHMİYAĞCI	DIŞKAPI
	1.4.4	KÖPRÜBAŞI	DIŞKAPI
	1.4.6	ZİRAAT	DIŞKAPI
	1.5.4	GÜLPINAR	GÜNEŞEVLER
	1.5.5	GÜNEŞEVLER	GÜNEŞEVLER
	1.5.6	KARAKUM	GÜNEŞEVLER
	1.5.7	ULUBEY	GÜNEŞEVLER
	1.6.2	GÜNDOĞDU	HAMAMÖNÜ
	1.7.1	AKKÖPRÜ	HİPODROM
	1.8.2	AKBAŞ	HİSAR

DISTRICT CODE	NAME OF THE SUB-DISTRICT	NAME OF THE DISTRICT
1.8.3	ALPARSLAN	HİSAR
1.8.9	KILIÇARSLAN	HİSAR
1.8.11	ÖZBEKLER	HİSAR
1.8.13	PAZAR	HİSAR
1.8.14	SAKARYA	HİSAR
1.8.16	ŞÜKRİYE	HİSAR
1.9.1	EVLİYAÇELEBİ	İSKİTLER
1.9.2	YENİTURAN	İSKİTLER
1.9.3	ZÜBEYDEHANIM	İSKİTLER
1.11.1	ÜLKÜ	ÜLKÜ
1.12.6	ÖNDER	ÖNDER
1.13.1	SİTELER	SİTELER
1.13.2	DEMİRCİLER SİTESİ	SİTELER
1.15.1	ANAFARTALAR	ULUS
1.15.2	DOĞANBEY	ULUS
1.15.3	FEVZİ	ULUS
1.15.4	İNKİLAP	ULUS
1.15.5	İSTİKLAL	ULUS
1.15.6	KIZILELMA	ULUS
1.15.7	KOYUNPAZARI	ULUS
1.15.9	NECATİBEY	ULUS
1.15.10	ÖZGEN	ULUS
1.15.11	ÖZTÜRK	ULUS
1.15.13	SUTEPE	ULUS
1.15.14	ŞENYURT	ULUS
1.15.16	YENİCE	ULUS

DISTRICT CODE	NAME OF THE SUB-DISTRICT	NAME OF THE DISTRICT
2.2.1	AYRANCI	AYRANCI
2.2.3	İLKYARDIM	AYRANCI
2.3.1	BAHÇELİEVLER	BAHÇELİ
2.3.2	YUKARI BAHÇELİEVLER	BAHÇELİ
2.4.1	BALGAT	BALGAT
2.5.1	CEBECİ	CEBECİ
2.5.5	ERTUĞRULGAZİ	CEBECİ
2.5.6	ERZURUN	CEBECİ
2.5.7	FAKÜLTELER	CEBECİ
2.6.1	AZİZİYE	ÇANKAYA
2.6.2	ÇANKAYA	ÇANKAYA
2.6.3	GÜVEN	ÇANKAYA
2.10.1	EMEK	EMEK
2.13.4	ÖNCEBECİ	İNCESU
2.14.1	KAVAKLIDERE	KAVAKLIDERE
2.15.1	CUMHURİYET	KIZILAY
2.15.2	KIZILAY	KIZILAY
2.15.3	KORKUTREİS	KIZILAY
2.15.4	SAĞLIK	KIZILAY
2.16.1	FİDANLIK	KOCATEPE
2.16.2	KOCATEPE	KOCATEPE
2.16.3	KÜLTÜR	KOCATEPE
2.16.4	MEŞRUTİYET	KOCATEPE
2.17.1	BARBAROS	KOCATEPE
2.17.3	ESETOĞLU	KOCATEPE
2.18.2	ETİ	MALTEPE

DISTRICT CODE	NAME OF THE SUB-DISTRICT	NAME OF THE DISTRICT
2.18.3	MALTEPE	MALTEPE
2.18.4	MEBUSEVLERİ	MALTEPE
2.18.5	YÜCETEPE	MALTEPE
3.2.3	EMRAH	AŞAĞIEĞLENCE
4.1.1	ABİDİNPAŞA	AKDERE
4.3.1	DEMİRLİBAHÇE	DEMİRLİBAHÇE
4.5.2	GÜLVEREN	GÜLVEREN
4.10.2	KARTALTEPE	SAİMEKADIN

15 kms

1.17.1	AYDINCIK	MERKEZ
1.17.3	KARACAÖREN	MERKEZ
2.1.5	KARAPINAR	ATA
2.7.2	KIZILIRMAK	ÇAKARAMBER
2.1.6	ŞEHİTMEVLUTMERİÇ	ATA
2.4.2	CEVİZLİDERE	BALGAT
2.9.1	DİKMEN	DİKMEN
2.11.1	GAZİOSMANPAŞA	GAZİOSMANPAŞA
2.11.2	KAZIMÖZALP	GAZİOSMANPAŞA
2.12.6	KEKLİK PINARI	İLKER
2.19.1	KARAKUSUNLAR	O.D.T.Ü.
2.21.5	BÜYÜKESAT	SEYRANBAĞLARI
2.21.7	MURAT	SEYRANBAĞLARI
2.23.1	MERKEZ	BEYTEPE
3.1.5	HASKÖY	AKTEPE
3.1.6	KAMİLOCAK	AKTEPE
3.3.3	ETLİK	ETLİK

DISTRICT CODE	NAME OF THE SUB-DISTRICT	NAME OF THE DISTRICT
3.4.2	GÜLLÜKKAYA	KEÇİÖREN
3.4.7	ŞENLİK	KEÇİÖREN
3.4.9	YAKACIK	KEÇİÖREN
3.5.5	PINARBAŞI	SANATORYUM
3.6.2	PURSAKLAR	MERKEZ
4.2.1	BOSTANCIK	BOSTAN
4.4.1	GÜLSEREN	GÜLSEREN
4.4.2	YATIKMUSLUK	KAYAŞ
4.6.2	DERBENT	KAYAŞ
4.6.4	KAYAŞ	KAYAŞ
4.7.2	BAHÇELERİÇİ	KEÇİKIRAN
4.9.1	YURAKIİMRAHOR	NATO YOLU
4.3.4	YEHİBAYINDIR	ÜREGİL
5.1.1	ERGAZİ	BATIKENT
5.2.2	BEŞTEPELER	SÖĞÜTÖZÜ
5.3.2	DEMET	DEMETEVLER
5.3.3	DEMETGÜL	DEMETEVLER
5.3.4	DEMETLALE	DEMETEVLER
5.3.5	MACUN	DEMETEVLER
5.4.1	ERLER	ESKİŞEHİR YOLU
5.7.1	EMNİYET	GAZİ
5.7.2	GAZİ	GAZİ
5.8.1	İVEDİK	İVEDİK
5.9.3	BURÇ	KARŞIYAKA
5.9.8	KARŞIYAKA	KARŞIYAKA
5.9.10	ÖZEVLER	KARŞIYAKA

DISTRICT CODE	NAME OF THE SUB-DISTRICT	NAME OF THE DISTRICT
5.9.12	YAHYALAR	KARŞIYAKA
5.11.1	BAHÇEKAPI	ŞEKER FAB.
5.13.1	ÇARŞI	YENİMAHALLE
25 kms		
4.14.7	ORTAKÖY	MERKEZ
5.4.2	ÜMİT	ESKİŞEHİRYOLU
5.5.2	İSTASYON	ETİMESGUT
5.10.1	EMİRYAMAN	SİNCANKUZEYİ
5.14.1	ALACAATLI	MERKEZ
5.14.2	AŞAĞIYURT	MERKEZ
5.14.3	BAĞLICA	MERKEZ
5.14.9	MEMLİK	MERKEZ
5.14.10	SUSUZ	MERKEZ
5.14.16	LODUMLU	MERKEZ
5.15.1	KAZAN	KAZAN
5.15.4	AYDIN	KAZAN
5.15.5	BİTİK	KAZAN
5.15.20	KIŞLAKÖY	KAZAN
5.15.25	SARAY	KAZAN
5.15.30	YASSIÖREN	KAZAN
13.0.0	GÖLBAŞI	
13.1.2	HAYMANA YOLU	
13.1.12	KONYA YOLU	
13.1.18	KONYA YOLU	
13.1.22	TAŞPINAR YOLU	
10.0.0	ÇUBUK	

DISTRICT CODE	NAME OF THE SUB-DISTRICT	NAME OF THE DISTRICT
10.1.1	ÇUBUK - BUZLUMEVKİİ	
10.1.19	ÇUBUK - DEVLETYOLU	
10.1.61	ÇUBUK YOLU	

APPENDIX 2: INTERNATIONAL STANDARD INDUSTRİAL CLASSIFICATION

31.1.1. Slaughtaring, preparing and preserving meat.

31.1.2. Manufacture of dairy products.

31.1.3. Canning and preserving of fruits and vegetables.

31.1.4. Canning preserving and processing of fish crustaced and similar goods.

31.1.5. Manufacturs of vegetable and animal oils and fats.

31.1.6. Grain mill products.

31.1.7. Manufacture of bakery products.

31.1.8. Sugar factories and reginaries.

31.1.9. Manufacture of cocoa, chocolate and sugar cofectionary.

31.2.1. Manufacture of food not elsewhers classified.

31.2.2. Manufacture of prepared animal feeds.

31.3.1. Distilling, rectifying and blending spirits.

31.3.2. Wine industries.

31.3.3. Malt ligours and malt.

31.3.4. Monalcholic beverages, carbonated fruit quics, naturel.

31.4.0. Tobacco manufactures.

32.1.1. Spinning, wearing and finishing textiles.

32.1.2. Manufacture of made-up textile goods except wearing apparel

32.1.3. Knitting mills

32.1.4. Manufacture of carpets and rugs

32.1.5. Cordage rope and twine industries

32.1.9. Manufacture of fur and leather products.

32.2.2. Manufacture of made-up wearing apparel.

32.3.1. Tanneries and leather finishing.

32.3.2. Fur dressing and dysing industies.

32.3.3. Manufacture of leather and leather substitutes.

32.4.0. Manufacture of all kinds of footwear.

33.1.1. Sawmills planning and other wood mills.

33.1.2. Manufacture of wooden and cane containers. and small cane ware

33.2.0. Manufacture of furniture and fixtures.

34.1.1. Manufacture of pulp paper and paperboard.

34.2.1. Printing, publishing and allied industries.

35.1.1. Manufactures of basic industrial chemicals.

35.1.2. Manufacture of fertilizers and pesticides.

35.1.3. Manufacture of synthetic resins, plastic materials and manmade fibres.

35.2.1. Manufacture of paints, vernishes and lacquers.

35.2.2. Manufacture of drugs and medicines.

35.2.3. Manufacture of soap and cleaning preparations, ferfumes, cosmetics and other toilet preparation.

35.2.9. Manufacture of chemical products not elsewhere classified.

35.3.0. Petroleum rafineries.

35.4.1. Manufacture of asphalt paving and roofing matirals.

35.4.2. Manufacture of coks coal and briuqettes.

35.4.3. Compounded and blended lubricating oils and greases.

35.5.1. Tyre and tube industries.

35.5.9. Manufacture of rubber products not elsewhere classified.

35.6.0. Manufacture of plastic products not elsewhere classified.

36.1.0. Manufacture of pottery china and earthenware.

36.2.0. Manufacture of glass and glass products.

36.9.1. Manufacture of structural clay products.

36.9.2. Manufacture of cement, lime and plaster.

36.9.9. Manufacture of non-metallic mineral products not elsewhere classified

37.1.0. Iron and steel basic industries.

37.2.0. Non ferrous metal basic industries.

38.1.1. Manufacture of cutlery, hand tools and general hardware.

38.1.2. Manufacture of furniture and fixtures primarily of metal.

38.1.3. Manufacture of structural metal products.

38.1.9. Manufacture of fabricated metal products not elsewhere classified.

38.2.1. Manufacture of engines and turbines.

38.2.2. Manufacture of agricultural machinery and equipment and repairing.

38.2.3. Manufacture of metal and wood working machines and repairing.

38.2.4. Manufacture of special industry machines.

38.2.5. Manufacture office, computing and accounting machinery and repairing.

38.2.9. Manufacture of machinery and equipment except electrical not elsewhere classified.

38.3.1. Manufacture of electrical industrial machinery and apparatus.

38.3.2. Manufacture of radio, television and communication equipment and apparatus.

38.3.3. Manufacture of electrical appliances and housewages.

38.3.9. Manufacture of electrical apparatus and supplies not elsewhere classified.

38.4.1. Ship building and repairing.

38.4.2. Manufacture of railroad equipment and repairing.

38.4.3. Manufacture, assembly of motor vehicles and repairing.

38.4.4. Manufacture of motorcyles and bicycles and repairing.

38.4.5. Manufacture of aircraft and repairing.

38.4.9. Manufacture of transport equipment not elsewhere classified.

38.5.1. Manufacture of professional and scientific and measuring and controlling equipment not elsewhere classified.

38.5.2. Manufacture o photographic and optical goods.

38.5.3. Manufacture of watches and clocks.

38.5.4. Others.

39.0.1. Manufacture of jewellery and related articles.

39.0.2. Manufacture of musical instrument.

39.0.3. Manufacture of sporting and athletic goods.

39.0.4. Manufacture of toys and game instruments.

39.0.9. Manufacture industries not elsewhere classified.

* Agriculture, husbandry, mining, transportation and services were excluded.

APPENDIX:3

CODE NUM.OF SUB.DISTR.	NUM OF INDUST. FIRMS IN 1988	TOTAL EMPLOYM.	T.EMPLOYM. N.OF ESTAB.	T.CAPITAL N.OF WORK.	T.CAPITAL NUM.IN.EST.
1.1.1	2	4	2	6000	12000
1.2.2	4	21	5.25	1090	5725
1.3.2	2	26	13	19884	258500
1.4.1	4	26	6	3127	20325
1.4.2	30	382	12	6382	81264
1.4.3	4	170	42.5	3541	150501
1.4.6	2	27	13.5	735	9925
1.5.2	1	188	188	10746	2020404
1.5.4	1	3	3	1833	5500
1.5.5	1	14	14	6428	90000
1.5.6	1	7	7	5714	40000
1.5.7	3	15	5	1286	6433
1.6.2	1	4	4	9500	38000
1.8.2	1	6	6	3000	18000
1.8.3	1	5	5	700	3500
1.8.9	1	10	10	400	4000
1.8.10	2	20	10	8275	82750
1.8.11	1	10	10	400	4000
1.8.13	1	3	3	833	2500

CODE SUB.DISTR.	NUM.OF FIRMS	NUM OF INDUST. IN 1988	TOTAL EMPLOYM.	T.EMPLOYM. N.OF ESTAB.	T.CAPITAL N.OF WORK.	T.CAPITAL NUM.IN.EST.
1.8.14	1		9	9	5222	47000
1.8.16	1		40	40	1788	69750
1.7.1	11		152	13	5193	71757
1.9.1	32		856	26	4506	120535
1.9.2	8		102	12	1636	20859
1.9.3	85		2560	30	5808	174923
1.11.1	1		6	6	5000	30000
1.12.6	5		19	3	3473	13197
1.13.1	151		4181	27	5641	156192
1.13.2	16		225	14	7888	110925
1.14.1	1		37	37	1405	52000
1.15.1	6		50	8	1272	10600
1.15.2	12		108	9	3501	31516
1.15.3	38		717	18	39367	742793
1.15.4	3		76	25	9013	228333
1.15.5	2		18	9	483	4350
1.15.6	2		54	27	2870	77500
1.15.7	2		8	4	5343	21375
1.15.9	3		52	17	6526	113117
1.15.10	1		12	12	1120	134450
1.15.11	3		37	12	15648	193000
1.15.13	2		16	8	2812	22500
1.15.14	1		8	8	3250	26000
1.15.16	1		6	6	875	5250
1.17.1	3		60	20	5645	112903
1.17.3	16		742	46	4898	227144

CODE SUB.DISTR.	NUM.OF FIRMS IN 1988	NUM OF INDUST. EMPLOYM.	TOTAL T.EMPLOYM. N.OF ESTAB.	T.CAPITAL N.OF WORK.	T.CAPITAL NUM.IN.EST.
2.1.5	1	18	18	2055	37000
2.1.6	1	3	3	400	1200
2.2.1	4	40	10	5518	55187
2.2.2	1	42	42	935	39300
2.2.3	1	7	7	1357	9499
2.3.1	2	16	8	4281	34250
2.3.2	2	18	9	1222	2750
2.4.1	10	720	72	15167	1092077
2.4.2	3	646	215	7311	1574463
2.5.1	4	23	5	1391	7998
2.5.5	3	22	7	1568	11500
2.5.6	2	52	26	2250	58500
2.5.7	2	18	9	1138	10250
2.6.1	2	31	15	8662	134276
2.6.2	3	61	20	1431	29116
2.6.3	3	39	13	823	10699
2.9.1	4	53	13	483	6399
2.10.1	3	8	2	4125	11000
2.11.1	2	71	35	3215	114132
2.11.2	1	12	12	10000	120000
2.12.6	1	30	30	2631	78959
2.13.4	1	5	5	8200	41000
2.14.1	10	203	20	4545	92281
2.15.1	12	297	24	7183	177779
2.15.2	44	760	17	4580	79109
2.15.3	12	236	19	13240	260386

CODE NUM.OF SUB.DISTR.	NUM OF FIRMS IN 1988	INDUST. TOTAL EMPLOYM.	T.EMPLOYM. N.OF ESTAB.	T.CAPITAL N.OF WORK.	T.CAPITAL NUM.IN.EST.
2.15.4	1	9	9	8333	75000
2.16.1	7	138	19	4037	79586
2.16.2	13	216	16	8217	110934
2.16.3	3	65	21	1084	23500
2.16.4	7	174	24	6493	161401
2.17.1	5	338	67	527	35666
2.17.3	1	50	50	1802	90139
2.18.2	10	376	37	11729	441010
2.18.3	10	139	13	4317	60008
2.18.4	2	38	19	2184	41500
2.18.5	1	8	8	1812	10500
2.19.1	12	342	28	7339	209161
2.21.1	2	9	4	1194	5375
2.21.5	1	52	52	17258	897436
2.21.7	2	16	8	39128	313025
2.23.1	5	1276	255	27441	7003045
3.1.5	1	6	6	2000	12000
3.2.2	2	10	10	450	4500
3.2.3	2	38	19	2383	45286
3.3.3	2	49	24	1306	32000
3.4.7	2	10	5	1810	9050
3.6.2	2	231	115	10567	1220500
3.4.2	1	4	4	1000	4000
3.4.9	1	5	5	2500	12500
	12	353	29		

CODE NUM.OF SUB.DISTR.	NUM OF INDUST. FIRMS IN 1988	TOTAL EMPLOYM.	T.EMPLOYM. N.OF ESTAB.	T.CAPITAL N.OF WORK.	T.CAPITAL NUM.IN.EST.
4.1.1	1	3	3	666	2000
4.1.3	1	4	4	1125	4500
4.2.1	2	34	17	156	2654
4.3.1	4	47	11	1850	21737
4.4.1	5	80	16	1470	23525
4.4.2	3	29	9	3103	30000
4.5.2	1	173	173	2060	356439
4.6.2	3	30	10	8933	89333
4.6.4	5	152	30	8883	270043
4.6.5	1	206	206	6067	1250000
4.7.2	2	15	7	1180	8850
4.9.1	6	294	49	3823	187340
4.10.2	2	16	8	481	3853
4.13.4	1	15	15	18000	270000
4.14.7	1	27	27	2569	69371
5.1.1	22	1309	59	7725	459685
5.2.2	4	97	24	1345	32625
5.3.2	14	177	12	5999	75850
5.3.3	5	59	11	1472	17369
5.3.4	8	90	11	6211	69875
5.3.5	309	8721	28	10504	296483
5.4.1	2	564	282	1995	562865
5.4.2	1	33	33	2704	89232
5.5.2	15	2985	199	12413	2470187
5.7.1	2	862	431	3162	1362959

CODE NUM.OF SUB.DISTR.	NUM OF INDUST. FIRMS IN 1988	TOTAL EMPLOYM.	T.EMPLOYM. N.OF ESTAB.	T.CAPITAL N.OF WORK.	T.CAPITAL NUM.IN.EST.
5.7.2	10	1945	194	9958	1936831
5.8.1	1	19	19	1473	28000
5.9.3	1	4	4	750	1500
5.9.8	2	19	9	1710	16250
5.9.10	3	13	4	3303	14316
5.9.12	5	38	7	4618	35100
5.9.13	2	9	4	2750	12375
5.10.1	9	815	90	5441	492797
5.11.1	20	2245	112	6687	750700
5.13.1	2	24	12	1687	20250
5.14.1	2	513	256	3151	808335
5.14.2	1	215	215	1292	277873
5.14.3	5	55	11	9478	104258
5.14.9	1	12	12	11500	138000
5.14.10	32	1577	49	2490	122710
5.14.16	1	12	12	10785	129427
5.15.1	4	180	45	1745	78525
5.15.4	1	30	30	666	20000
5.15.5	1	108	108	1498	161815
5.15.20	2	141	141	27659	3900000
5.15.25	14	1033	73	5765	425374
5.15.30	1	65	65	11073	719775
13.0.0	9	236	26	6717	176133
13.1.2	1	162	162	2310	374209
13.1.8	1	26	26	2692	70000
13.1.12	3	480	160	12542	2006760

CODE NUM.OF SUB.DISTR.	NUM OF FIRMS IN 1988	INDUST. TOTAL EMPLOYM.	T.EMPLOYM. N.OF ESTAB.	T.CAPITAL N.OF WORK.	T.CAPITAL NUM.IN.EST.
13.1.18	3	46	15	23132	354704
13.1.22	2	27	13	8185	110500
10.0.0	2	53	26	919	24379
10.1.1	2	24	12	15041	180500
10.1.19	12	1034	86	17861	1539037
10.1.61	2	435	217	21252	4622500
10.2.2	5	414	83	120080	9942626
10.17.3	1	13	13	3401	44218