TECHNOLOGICAL CHANGE IN INDUSTRY AND REGIONAL DEVELOPMENT CASE STUDY: DETERMINATION OF ESKİŞEHİR'S REGIONAL INDIGENOUS POTENTIAL FOR TECHNOLOGICAL CHANGE AND INDUSTRIAL DEVELOPMENT

A Master's Thesis

Presented by

Tanyel ÖZELÇİ

to

the Graduate School of Natural and Applied Sciences

of Middle East Technical University

in Partial Fullfillment for the degree of

MASTER OF SCIENCE

in

REGIONAL PLANNING

MIDDLE EAST TECHNICAL UNIVERSITY

ANKARA

February, 1994

To my Family

Approval of the Graduate School of Natural and Applied Sciences.

for Prof. Dr. İsmail TOSUN

Director

I certify that this thesis satisfies all the requirements as the thesis for the degree of Master of Science.

Prof. Dr. Gönül TANKUT

Chairman of the Department

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

Prof. Dr. İlhan TEKELİ
Supervisor

Examining Committee in Charge:

Prof. Dr. İlhan TEKELİ

Assoc. Prof. Dr. Ayda ERAYDIN

Assit. Prof. Dr. Gülden BERKMAN

Assoc. Prof. Dr. Murat GÜVENÇ

Prof. Dr. Bahattin AKŞİT

ABSTRACT

TECHNOLOGICAL CHANGE IN INDUSTRY AND REGIONAL DEVELOPMENT
CASE STUDY: DETERMINATION OF ESKİŞEHİR'S REGIONAL INDIGENOUS POTENTIAL FOR TECHNOLOGICAL CHANGE AND INDUSTRIAL DEVELOPMENT

ÖZELÇİ, Tanyel

M.S. in Regional Planning

Supervisor: Prof. Dr. İlhan TEKELİ

February, 1994, 143 Pages

The role of technology has been a determinate factor relevant to an understanding of both industrial growth and industrial decline in the history of industrial development. In recent years, rapidly changing economic, social and spatial structures and the transition process of the industrial production system cause the development of new theories in respect to technological change in industry and regional development.

The new production system which is defined as "flexible production" brings a new perspective to regional industrialization by putting forward the localization factor and local production systems.

Developing the indigenous potential on the basis of new technologies has given rise to the suggestion of an innovation oriented regional policy.

In addition, development literature increasingly adresses the importance of domestic technological capabilities in the healthy industrialization of the developing countries.

In this study, the theoretical framework of the subject is formed and the situation of Türkiye as a developing country within these new formations and new organizational mechanisms is examined. As a case study, the regional indigenous potential of an Anatolian city, Eskişehir is discussed for technological change and industrial development. It is concluded that for the successful industrial development in the new production system of the world, nations and regions should develop their domestic capabilities to asses, select, use adapt and create new technologies.

Key Words: Technological change, regional policy, indigenous potential.

Science Code: 601.06.01

ÖZ

SANAYİDE TEKNOLOJİK DEĞİŞİM VE BÖLGESEL GELİŞME ÖRNEK ÇALIŞMA: SANAYİ GELİŞİMİ VE TEKNOLOJİK DEĞİŞİM İÇİN ESKİŞEHİR'İN YEREL BÖLGESEL POTANSİYELİNİN BELİRLENMESİ

ÖZELÇİ,Tanyel

Yüksek Lisans Tezi, Bölge Planlama Ana Bilim Dalı

Tez Yöneticisi: Prof. Dr. İlhan TEKELİ

Şubat, 1994, 143 Sayfa

Sanayileşme tarihinde, endüstriyel büyüme ile endüstriyel gerilemenin kavranmasında teknolojinin belirleyici bir rolü olmuştur. Son yıllarda hızla değişen ekonomik, sosyal ve mekansal yapılar ve geçiş dönemi içinde bulunan sanayi üretim sistemi, teknolojik değişim ve bölgesel gelişme konularında yeni teorilerin gelişmesine neden olmuştur.

"Esnek üretim" olarak tanımlanan yeni üretim sistemi, yerelleşme ve yerel üretim sistemlerini öne çıkararak bölgesel sanayileşmeye yeni bir bakış açısı getirmektedir.

Yeni teknolojilere dayalı yerel potansiyeli geliştirme, stratejisi teknoloji ağırlıklı bölgesel politikaları gündeme getirmektedir.

Ayrıca azgelişmiş ülkelerin sağlıklı sanayileşmelerinde yerel teknolojik yeteneklerin önemine değinilmektedir. Çalışmada, konuya ilişkin teorik çerçeve oluşturulmuş ve gelişmekte olan bir ülke olarak Türkiye'nin bu yeni

oluşumlar ve yeni düzenleme mekanizmaları içindeki durumu gözden geçirilmiştir. Örnek çalışma olarak bir Anadolu kenti olan Eskişehir'in teknolojik değişim ve endüstriyel gelişme için bölgesel yerel potansiyeli tartışılmıştır. Son olarak, yeni üretim sistemi içinde başarılı bir sanayileşme için ülkelerin ve bölgelerin yeni teknolojilerin yaratılması, değerlendirilmesi, seçimi, kullanımı, adaptasyonu konularında yerel yeteneklerini geliştirmeleri gerektiği sonucuna varılmıştır.

Anahtar Kelimeler: Teknolojik değişim, Yerel potansiyel, Bölgesel Politika.

Bilim Dalı Sayısal Kodu: 601.06.01

ACKNOWLEDGEMENTS

I would like to thank Prof. Dr. İlhan TEKELİ for his valuable guidance and encouragement throughout the study. I am grateful to Assoc. Prof. Dr. Ayda ERAYDIN for stimulating my interest in the topic of the study.

I owe thanks to Atilla CANDIR, Yunus Emre HEPER and Ali İhsan KARAMANLI from the Eskişehir Chamber of Industry for their valuable assistence.

I would like to thank John ÖZELÇİ for her valuable assistence in the arrangement of the study.

Thanks are also due to my friend Neşe ÇAKIR and the people who work in the General Directorate of Preserving the Natural and Cultural Entities for their patience and moral support throughout my study.

I would like to thank to İlknur KARGI for her worthy cooperation in typing the study.

Finally, I would like to thank my family for their valuable support throughout my education life.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

1.1. Aim of the Study

With the study, it is aimed:

(i) to constitute a theoretical framework of the role of technology in industrial change, technological change and economic growth, technological activity in developing countries,

(ii) to examine the industrial development patterns and technology policy of Türkiye,

(iii) do determine the regional indigenous potential of Eskişehir for technological change and industrial development.

1.2. Scope of the Study

Rapidly varying demand, defining today's competition conditions, aimed at diversification of goods, new products, different designs and quality. In the recent competition conditions nations, regions and firms should have a production flexibility serving the changeable market structure and diversification of goods defined by consumer preferences.

Technologically changing units will win the fight for survival in a time of structural change.

Localization factor and the local production systems is a new perspective to regional industrialization that comes out from the new system of flexible production.

Developing the indigenous potential to stimulate the local production systems on the basis of new technologies and the production of high quality human capital, intensive goods and services are called innovation oriented regional policy.

Regional innovation potential, the ability of a region to participate in the macroeconomic innovation process is determined by the potential for action on the part of the economic units in the region (by means of the internal characteristics of firms and establishments), and by the individual economic units into the interrelationship of personnel, goods and information.

A region can only sustain a high level of growth, if firms established there are able and prepared to adjust continually to satisfy current market demand and technological change.

The development literature addresses the importance of domestic technological capabilities in the successful industrialization of the developing countries. The concepts of assessing, selecting, using, adopting and creating new techniques becomes the decisive factor in the successful operation of imported technologies.

Industrialization experience of Türkiye does not achieve an attack to make necessary arrangements for the integration with the changing world production system. Industrialization development declined after 1980s as the result of macroeconomic policies which reducing the role of public sector in industry, going to liberalization in exports and imports, reducing effective protection ratios in manufacturing industry and orienting the industrial production to exportation. The strategy of producing new technologies or the adaption of existing technologies to local conditions is neglected.

Eskişehir is one of the cities that is affected negatively from the macroeconomic policies of 1980s. The relative importance of Eskişehir's industry within Türkiye's industry declined after 1980s. (ESO Yayınları No: 24, 1988). The region was not prepared to the new competition conditions. But the region provides some advantages for the future development of the industry basing on the changing structures of production systems.

1.3. Outline of the Study

In the next chapter the theory of technological change and economic growth; Preliminary concepts and relations, product cycle, mature industries and innovation, technological change and industrial policies are explained. In the third chapter the role of technology in industrial change is emphasized within the new reflections of Kondratiev's theory of long cycles and within the Fordist and Post-Fordist production systems. In the fourth chapter the relation between technological change and geography of industrialization is mentioned where the progress in spatial theories and implications for regional policies are discussed. In fifth chapter the importance of developing domestic technological capabilities in the industrialization of the developing countries is mentioned. In the sixth chapter the industrial development process and the technology policy of Türkiye is examined. In the seventh chapter Eskişehir's regional indigenous potential for technological change and industrial development is studied. In the last and eighth chapter conclusion is mentioned. The chapter also includes proposed policy options and strategies for developing local policies to stimulate technological change in industrial development.

CHAPTER II

THE THEORY OF TECHNOLOGICAL CHANGE IN INDUSTRY AND ECONOMIC GROWTH

2.1 Preliminary Concepts And Relations

2.1.1 Production Processes, Techniques and Technology

Production of goods in any individual enterprise involves combining different kinds of primary inputs, such as unskilled labour and natural resources, with intermediate inputs, such as semi-fabricated materials and energy, and with the services of the skilled labour and fixed capital. Production is often a very complex operation but it can be broken down into many distinct standard operations which may take place simultaneously. These are called production processes or activities.

In the whole system of processes, different methods of producing the final good or goods are called techniques, and the set of all techniques available to a firm is its technology. When several processes are involved, we way need someone in the firm to know that they are in fact available and to be able to make the best selection from among them. We include this higher level of organizational and management knowledge in the concept of technology in the broader sense. Consequently, the technology set includes not only purely technological processes reflecting different ways of combining inputs, but also organizational processes reflecting different ways of combining the processes themselves.

The industry's technology is defined as the collection of all the firm-specific technology sets, each of which contains the production techniques of one firm in the industry. An enlargement of the technology set for any firm even it has occurred through the interfirm diffusion of the existing technological knowledge within the industry, would then also represent an enlargement of the industry's technology set.

Technological change is a change in the economy's information set detailing the relationship between inputs and outputs in the economy. Technological change is the process by which economies change over time in respect of the products they produce and the processes used to produce them.

Whatever the level of aggregation, and enlargement of the corresponding technology set represents, by definition, a technological change. Technological progress takes place when a firm's subset of efficient techniques is enlarged or when the newly arrived techniques dominates one or more of the existing efficient techniques so that the latter become inefficient.

2.1.2 Invention and Innovation

Invention is a new product or production process, with the latter including a new method of organizing economic activity. Inventions in their first prototype form usually undergo a lengthy and costly process of improvement before they are ready for commercial application. An invention may never be adopted by any producer, but when it is an innovation takes place.

Innovation is the initial production of a new product, and/or the first utilization of a new production process or an organizational technique.

An innovation always rest upon an invention. In so far as inventor and innovator are not identical, there lies between invention and innovation a process of diffusion. The same process occurs if an innovation is taken up by other actors_adoption, imitation. The process of diffusion includes two sub phases; the information transfer between inventor and innovator, or between innovator and adopter and the micro economic (firm-level) innovation process. The latter is according to the degree of the maturity of the received innovation and the specific goals and the particular economic situation of the receiver, a process of varying length and complexity. It includes up to three phases; the determination of demand, research and development and translation into production and marketing. The macroeconomic innovation process, is thus, a series of individual economic innovation as well as diffusion processes which emanate from individual firms. These processes do not run in an isolated fashion parallel to one another but, by means of the interrelationships of goods, personnel and information between the individual economic units, are connected with one another in a variety of ways. The network thus created from the spatial-temporal overlap of individual diffusion processes in turn causes multiplicative and accelerating systematic effects.

- Product and process innovation

Production innovation usually refers to the introduction of significantly new products, while process innovation takes place when significantly new ways of making or using existing goods are adopted. It is useful to regard the term "new" as being firm-specific, so that interfirm diffusion of existing goods or processes is also a form of innovation. The difference between a new product and a new process is a clear cut at the inventive than at the innovative stage. The reason is that the production of a new good,

would almost always require a new combination of inputs and hence be tied up with a process innovation. In turn a new process very often changes the quality characteristics of the outputs produced, thus resulting in product innovation.

2.1.3 Dynamic Economies of Scale, Product Cycle, and Innovation

The unit cost of producing an important new product is usually very high compared with its use value, but so is the potential for improvement in the performance characteristics of the product and the methods of its manufacture. These improvements may require the invention of new tools and process equipment, much higher standards of purity of the materials used better quality control instruments, and new labor skills and these may become available to the producer only gradual in response to the demands emanating from the development work on his new product. In the product's introduction phase the quantities produced are small and the firm itself may also be small, but process and product improvement innovations are fast.

As the product becomes cheaper and more attractive, demand for it rises, and with it the scale of production and the size of the firm; this is the growth phase of the product cycle. As soon as specialized equipment for large-scale production is developed and starts to be used, this typically reduces unit costs drastically, setting in a "virtuous circle": from further reduction in price. The producer is seen to benefit from what may be called "dynamic economies of scale"'a combination of three factors: (i) adaptive learning by doing by the work-force and management that reduces cost; (ii)a sequence of product improvements that increase demand for the product at a given price; (iii) positive feedback effects resulting from the increasing scale of output on unit cost, innovation efforts in the supplying industries, and the

product's price and demand. The growth phase ends and the mature phase begins when the quantity demanded levels off, possibly to decline later on.

In the introduction phase of the cycle the potential for innovation is vast, but the firm's resources are small. In the mature phase the resources are large but the innovation potential is small. In the intermediate phase, however, the firm's resources are sizeable and the potential for improvement is high; consequently, the rate of innovation and growth are likely to be highest in that phase (Gomulka, 1990).

2.1.4. Mature Industries and Innovation

Modern innovation policy represents a fusion of traditional science and technology policy and traditional industry policy. In general, innovation policy interprets comparative advantage in more dynamic terms, in which the international division of labor is shaped by the planning, organization, education, and creative power of the work force and of institutions and by their choices and abilities to changing economic circumstances.

In practice, innovation policy has come to be associated very narrowly with "high-tech" activities, while debates regarding mature industries continue to be couched in the rhetoric of the traditional concepts of comparative advantage. Particularly in the case of hinterland regions, however, a strong case can be made for giving more attention to mature industries within the context of innovation policy (Hayter, 1987).

First, as conventional innovation theory itself indicates, productivity-oriented innovations will normally be important for continued competitiveness and there may be circumstances when the rate of innovation falls unacceptably low or an industry loses its ability to adopt technology de-

veloped elsewhere to its own circumstances.

Second a greater commitment to innovation may be essential to create value added activities which even in mature industries can be job enhancing.

Third, mature industries are typically strongly connected to local supplying industries and services so that innovations by the former will have wider repercussions for the regional economy.

Fourth, mature industries may themselves consist of a range of low, medium and high tech business. That is, emerging research intensive business are found in segments of older industries. In addition, it is possible that mature industries may provide a seed bed and orientation in which to develop expertise in the newly emerging technologies.

Fifth, as rates of return on R&D on low tech activi-ties can be surprisingly high.

Sixth, it may be argued that the adoption required of the work force, for example, in the form of retraining, as a consequence of innovation policy is more likely to be successful if workers can remain within their exist-ing industrial environment.

Science and technology underlies production change in all-goods producing industries and not just high tech activities. An innovation policy emphasis on mature industries would typically be able to draw upon, as well as contribute to, accumulated investments at physical and human resources and in a manner which could favour hinterland economies.

2.2 Technological Change and Industrial Policy

2.2.1 Small Firm Led Growth Models

The industrialized world is presently undergoing a change in the source of its economic vitality. The large vertically integrated corporation is viewed as a dinasour, unable to compete in a post–industrial world characterized by continually fluctuating consumer demands, heightened international competition, and the need for "more flexible" forms of work and inter–firm interaction (Harrison 1991:471).

There are a number of variations on this theme that we have entered an era of small firm led economic growth and development. Small companies, considered either as atomistic competitors or as members of highly interdependent networks, are said to have become the most important creators of new jobs (Birch, 1987) and the seed beds for the cutting edge technological innovation (Acs&Audretch 1990). But the most interesting twist on the small firm theme directs our attention to the emergence of networks of mostly small linked but generally loosely coupled, spatially clustered manufacturing companies, typically built around a craft form of work organization. These are the industrial districts, now the object of both study and policy prescription in many different regions of Europe, the USA and Japan.

In the ideal, typical industrial district, each small firm specializes in one or a few phases of a complete production process. On any particular project, the small flexible firms will often cooperate with one another, sharing tools, information and even skilled personnel, only to compete fiercely for a share of the next new contract or market opportunity. Some of these small firms have even become clever enough to make connections to several production networks at the same time, thereby reducing their vulnerability to

the economic fortunes of any one group (Harrison, 1991:471).

2.2.2 Scale Economies, Externalities and Agglomeration

The orthodox economic analysis of the concentration of economic activity in a finite number of locations begins at the most elementary level with the theory of economies of scale internal to the producing firm. At least up to some point, for some manufacturing process and product types, unit cost of production are presumed to fall, the larger the scale of the facility. The potential for realizing internal economies of scale offers one explanation for why managers might choose to concentrate production in one large enterprise or plant, rather than to construct several smaller scale units of different locations.

But individual firms may also be induced to expand because of the possibilities for enjoying external economies.

When a locality or region constitutes the site for an expansion of the common pools of labor, capital and infrastructure, or when pecuniary externalities can be traced to the new investments made by a firm in some particular place, then the lower unit costs of production facing firms in that place are called agglomeration economies. This term invokes the image of the clustering in geographic space of direct producers (firms plants, shops), pools of labor and finance capital and physical as well as social infrastructure. Producers located in such an environment will, at least up to some point in the locale's expansion face lower unit production costs than would be the case if they were situated in some less endowed place. Agglomeration has conferred on them a variety of external economies associated with location (Harrison, 1991:472).

CHAPTER III

THE ROLE OF TECHNOLOGICAL CHANGE IN INDUSTRIAL DEVELOPMENT

3.1 Post–war Industrial Evolution

The post war era has been characterized by the rapid growth of a bunch of new industries based on new technological possibilities that emerged during the previous twenty years or more. The rapid development of these technologies was forced by the political conditions prevailing in Europe in the 1930s and especially by the 1939–1945 war. The industries that emerged on a significant scale during the 1940s and 1950s, electronics, synthetic materials, solid–state devices, petro chemicals, agro–chemicals, composite materials and pharmaceuticals created rapidly growing new markets. At the same time there was a rapid growth in demand for capital equipment, often of a new kind. The wealth generated by the emergence of these new technology–based industries caused an associated boom in demand for consumer durables, leading to the rapid growth of the automobile and consumer white good industries.

Small firms or units, operating in fast growing, new and relatively undefined markets and concentrating on product–related technological innovations is the dynamic growth phase which lasted from 1945 to about 1964, during which many manufacturing jobs were created.

During the consolidation phase (the mid to late 1960s) markets

become better defined, organizational rationalization take place, mergers occurred and there was increased emphasis on process improvement. While productivity rapidly increased during this phase, so too did demand. A rough balance between the two meant that manufacturing employment remained relatively unchanged.

From about 1970 onwards, the phase of industrial maturity and market stagnation was reached. By this time the new industries were highly concentrated, production was centered on very large units and development was aimed primarily at process rationalization and productivity increase. Price became a much more significant factor in competition. Productivity growth (albeit at a lower rate than previously) outstripped demand growth in a largely saturated markets and many jobs were lost. At the same time firms increasingly located production of mature product lines in areas of low labour cost, and further jobs were lost in the advanced economies. The situation was greatly exacerbated by the oil crisis of 1973–1974, which significantly increased production costs. The subsequent very high rates of inflation, with accompanying high interest rates, further effectively depressed the real level of demand. A recessionary trend on a world wide scale thus become established (Rothwell 1982:364).

3.2 Kondratiev Long Waves

Emergence of the current economic recession and its inherent future uncertainty has stimulated a new interest in structural dynamics of economic systems. In this respect Kondratiev's theory of long cycles has stimulated new reflections and scientific debates (Anderson and others, 1989).

Kondratiev, analysed the development of long term trend in a number of economic indicators in 1920s. He discovered a long term cyclical variation in economic activity with a period of between approximately fifty and sixty years. While Kondratiev did not explicitly include technology as a factor in long wave formation, he did suggest when a major wave of expansion was under way, inventions that had remained dormant would begin to find commercial application.

Kondratiev's original theory distinguished five stages in the long run cyclical pattern of a free enterprise economy; take off, rapid growth, maturation, saturation and decline.

It was the economist Schumpeter, 1939, who first emphasized the central role of technology in long wave formation. He introduced the idea of technological revolutions as the driving force of the Kondratiev cycles pointing to the role of steam power in the first Kondratiev (1818–1842), railroads in the second (1843–1897) and of the electrical power and automobile in the third (1898–1949). According to Schumpeter, these major changes are brought about primarily through bursts of innovative activity by entrepreneurs.

Schumpeter had suggested that, after a strong bandwagon effect in the boom phase, with many new firms entering the rapidly expanding sectors, there would follow a period of "competing" away of profits as the new industries matured. This would lead to stagnation and depression if a new wave of innovations and investment did not compensate.

Not all economists support the Schumpeterian interpretation of the Kondratiev long waves, and they generally fall into two separate camps, the

first emphasizing technology–push factors, the second emphasizing the factors of demand–pull.

According to Mensch (Mensch, 1979), from the technology– push camp, there are a number of distinct periods during the past 200 or so years that uniquely favour the production of basic innovations. Mensch's data show a marked bunching of innovations around 1826,1888 and 1938; these bunches of major innovations form the dynamo of the subsequent economic upswing.

Pratagonists of the demand–pull emphasize the role of demand for physical capital (Graham and Senge 1979). Time lags in the perception of demand for, and the construction and supply of, new capital equipment lead to cyclical over and under expansion of the capital producing sector resulting in long waves in the economy of approximately fifty year durables. They suggest that during the upswing, dormant basic innovations will attract capital and via entrepreneurship, begin to diffuse into the economic use. They do not see technological change as the driving force of the upswing, but rather as a consequence of investment in new physical capital.

It seems probable that the real answer is neither pure technology–push nor pure demand–pull, but rather that a combination of favourable conditions must occur to cause the upswing, in which the nevertheless new technology plays a key role.

While technological capability is a major enabling condition for the development, by itself it is insufficient. Demographic, social, industrial, financial and other demand conditions had also to be right before rapid commercialization could take place on a sufficiently large scale to favourably influence the whole of the economy (Rothwell 1982:364).

3.3 The Information Technology Paradigm

In the period of structural change of the 1980s, when energy costs rose and the growth potential of the old leading sectors was partially exhausted, a new techno–economic paradigm emerged, based on the extraordinary low costs of storing, processing and communicating information. In this perspective the structural crisis of the 1980s, like those of 1880s and 1930s, was a prolonged period of social adaptation to a new paradigm which affected every other branch of the economy in terms of its current and subsequent employment and skill requirements, its subsequent market prospects. This cluster of innovations has resulted in a drastic fall in costs and a counter inflationary trend in prices, as well as vastly improved technical performance, both within the electronics industry and in other areas.

The full economic and social benefits (including employment generation) of information technology depend on a similar process of social experimentation and learning.

3.4. Fordism and Flexible Production Systems

Fordism is a type of production system dated to 1914 and became a dominant production organization in the standardization of commodity. The main target of the fordist approach was reaching more labor productivity in consumption goods sectors and decreasing the unit cost of production. The main elements of fordist production system comprise the deskilling of labor by means of fragmentation of work task while integrating the human operator into the whole machinery of production (Saraçoğlu, 1993) "Fordist mass production" had some well known characteristics: (Storper and Walker 1989)

– large capital intensive factories organized around either

continuous flow processes (e.g., petrochemicals and steel) or assembly–line processes (e.g., cars, electrical machinery);

- production and marketing posited on standardization of output, long production runs, and dedicated, non–adapt able capital equipments;
- large firms internalizing large parts of production systems, seeking to enhance internal economies of scale;
- the factory of the large corporation occupying the critical position between upstream suppliers and downstream fabricators, who often manufacture using batch production methods;
- multi–plant oligopolistic corporations operating within a relatively stable competitive framework;
- industry–wide unions with national contracts.

The problems about Fordism was appeared in the mid 1960s. It was appeared as saturated internal market for some of the countries and as declined productivity–profitability, lost of power of international financial system for some of the countries. These conditions caused to come in to light the inability of Fordism. There were problems about the rigidity of mass production system and labor process that created social, political and economic disorders.

The crisis in 1970s bring a different form of production accumulation and different strategies that arise from its high adaptation capacity and flexible structure. These strategies are adaptation of new technologies, re–structuring of production of relations, subcontracting, disintegration of production process, changes in the scale of production and so on. This structure

caused to gain importance of technical know–how according to quick chang–ing tastes and needs of world which is in contradiction with the rigid and stable features of fordism.

Removing from the standardized production produced by unskilled labor that is indifferent to the quality of production process, and forming a new flexible production system more creative and open to continuous devel–opment, will achieve a new production and accumulation process (Piore and Sabel 1984:4).

Rapidly varying demand, defining today's competition conditions, aimed at diversification of goods, new products, different designs and quality. In the recent competition conditions firms should have a production flexibility serving the changeable market structure and diversification of goods defined by consumer preferences.

Flexible production systems quickly adapting to the variable demands necessitates the use of microelectronic technologies.

The high quality labor power making production design, computer programming, machine regulating and contributing actively to product renew–al, quality development and innovation, gains importance.

In the new production system, organization structure is formed according to the participation of the workers, from every stage bottom to top, to the management and production process. Continuous knowledge transfer and systematic integration is aimed between the units having different func–tions (Duruiz & Yentürk, 1992).

World production system is in a transition period. Discussions are

on the question of whether this kind of a production system will gain a dominant state or not (Eraydın, 1992:13).

It is accepted that the new production system will not totally externalize the traditional large-scale production.The industries making massive production could be living together with the dynamic and flexible industries with the help of new product and process innovations (Gibson and others, 1984.)

CHAPTER IV

TECHNOLOGICAL CHANGE AND GEOGRAPHY OF INDUSTRIALIZATION

4.1. Geographical Industrialization

In contemporary capitalist societies, economic development is principally the outcome of productive activities organized in the form of industries. The development of these activities and their locational dynamics are responsible for urban and regional development. What is unique about spatial development under capitalism is that it is carried out by individuals and private firms employing wage and salary workers, acting under conditions of generalized market exchange and the spur of competition. These social foundations of capitalist production encourage the technological dynamism of the system, which in turn generates the new products, processes and inputs characteristic of industrialization. The expansive qualities of industrialization create the locational capability of industries, freeing them at crucial moments from the limits of the past and its geographical imprint. But industrialization as linked to capitalist competition and the dynamics of capital accumulation, also generates a highly disequilibrated form of growth that repeatedly unhinges the existing economic order (Storper and Walker, 1989). Storper and Walker determines four principles for geographical industrialization; Localization, clustering, dispersal, and shifts.First, industries are often highly localized for much of their history; they neither arise ubiquitously nor spread out evenly regional among cities and regions. The result is that each economy has its characteristic specializations. Second, certain locales within industries normally outrace the others as more and more activities that are part of or

related to, their production system cluster together. The resulting regional complex of industry may be densely packed within a large city or spread more widely over an extended region. Third, industries eventually disperse some of their production units away from clusters, at a variety of spatial scales. Fourth, new or radically restructured industries, with distinctive product lines and production methods, usually take up new locations, often outside previously industrialized regions.

According to Storper and Walker (1989) none of the prevailing models of industry location and regional development can cope with the expansion, instability and differentiation that characterize the inconstant geography of capitalist industrialization.

There is no explanation for rapid growth at the periphery. Neoclassical models focus on the stability of market economics and their ability to adjust to external events, such as technical change. For any given set of production technologies, income levels, and population, there is an equilibrium geography, i.e., a stable set of plant locations, urban centers and trade relationships (Isard, 1956, 1969).

If firms are subject to perfectly competitive conditions, and household incomes and factor supplies are fully allocated, there is no endogenous source of change in the economy. This is one reason why neoclassical economics has never proposed a satisfactory model of technological change.

Conventional efforts to introduce technical change, to provide a degree of dynamism to regional development models, are no more successful in coming to terms with extensive growth at the periphery. According to innovation diffusion theory, new techniques and industries incubate in well-developed areas and then move outward and down through the urban and

regional hierarchy (Berry, 1972; Brown 1989). Product cycle theories are similar in portraying young industries as arising in core regions and decentralizing as they mature, owing chiefly to a standardization of products and production methods that allows the penetration of distant markets and use of cheaper, unskilled labor in peripheral areas (Vernal 1966; Hirsch 1967).

Neither of these models can account for outlying areas that outface core industrial zones in rate of growth. A partial way out of the dilemmas of trickle-down models is the exported theory of regional growth put forward by North (1955). North argued that peripheral regions could develop through specialization in certain favorable exports. But this theory says nothing about the process of industrialization beyond the fact that some outputs are exchanged across long distances.

Another approach to regional development which tries to escape the limitations of general equilibrium theory suggests that peripheral regions begin to attract industry rapidly once they pass scale thresholds necessary to support market for particular activities (Lampard, 1955). This model makes population movements exogenous, however, begging the question of the economic basis of migration. All subsequent industrialization is left to multiplier effects, in a sort of "regional Keynesianism", resting on autonomous consumers, income flows, and market thresholds. Development is reduced to the location of branch plants attracted to outlying areas by growing markets; the real dynamics of industrialization are ignored (Storper and Walker, 1989).

The evidence also refutes the once-prominent dependency thesis that backward regions and nations can never break the vise of underdevelopment and domination. This is not to deny that innumerable obstacles face poor countries trying to develop, including colonialism and imperialist inter-

ventions, nor to argue that industuralization spreads evenly or rapidly in all directions, but simply to observe that many formerly backward regions have successfully industrialized.

Industries are able to create a productive capacity that did not exist before, often without very much regard to the previous conditions of the place in which they are situated. To a large degree, they provide their own impulses toward development, endogenously, in place. That is fundamental to the nature of industrialization as a world-historical-and world geographi-cal process.

Capitalist industrial countries-and regions manifest a great variety of industry localization and urbanization patterns. One common feature of development among capitalist countries is the persistent tendency for regions to be economically differentiated from each other.

Localization of industry has traditionally been explained, in the classic theory of location, chiefly in terms of transportation costs for raw materials and finished goods (Weber, 1909, Hoover, 1948, Smith, 1981). By this explanation, inprovements in infrastructure ought to have reduced the degree of localization of industry by lowering costs of transportation and communication, but there is no reliable evidence to support this. We shall have to look into the way industry produces its own conditions of localization.

Gross aggregates such as industrial output, income or population are very poor ways to get at the formation of regional economies. Regional growth can only be understood by opening up the "black box" of production to reveal its geographical dimensions (Storper and Walker, 1989).

4.2. Technological Change and Regional Development

Prevailing models do not justice to the richness of the relation between technological change and regional development. Most models may be broadly characterized as "Schumpeterian". They rest on three key ideas.

First the trinity "invention–innovation–adoption", in which new technologies appear on the horizon, are introduced by leading entrepreneurs, and the diffuse to industrial imitators. Second the special role of research and development, which gives large corporations the ability to generate their own inventions through captive research laboratories and thereby maintain a persistent technological lead. Third industrial maturation, or the gradual exhaustion of the technological possibilities inherent in a new invention. The dominanat theories of technology and location derive from these precepts (Malecki, 1983). One such model is innovation diffusion, which claims that innovation arise in industrial centers, especially centers of research and development, and spread from there to backward peripheries. Another model focuses on science–led growth, and makes a case for the uniqueness of "high–technology" industries in regional development. A third model is the product cycle, wherein industries disperse from their historic core areas as they mature.

Schumpeterian thought is characterized by a series of dichotomies: between the realm of science from which invention springs and the workaday world of industry; between leading cores and lagging peripheries; between major and minor innovations; between product innovation and process evolution; between large and small firms; and so forth. Technology in Storper and Walker (1989)'s view, unfolds through an ongoing process of interaction between nature and human practice, knowledge and application,

routine practice and problem-solving, large and small actors, product and process change and the like. The practical mastery of technology is not a placeless process. It is geographically localized by virtue of the particular people, materials, machinery, and firms that embody the experience of an industry. Workers are bound to places by homes, family ties and friendships; firms by investments, faithful customers, and trusted employees and supplies; machines by the bolts in the floor. Technologies are spatially grounded by all these local ties, but also by the mutual play of competence with specific kinds of products and labor processes across the social division of labor in every industry. Industrial locales provide a technological milieu of great richness, going beyond access to information to include both the accumulated know-how, and active techniques of industrial production.

Technological localization is thus a process of learning by problem-solving as an industry or closely-linked group of industries grow and change. Industrial complexes, by bringing together so much activity, of such variety, not only increase the frequency of contact and sharing of knowledge, talents problems and demands; they increase the probability of hitting on significant innovations, and of allowing their rapid spread and embellishment through the network of firms and activities.

4.3. Cultural Influence on Technological Development and Regional Development Policies

The success of regional policy in 1960s was strongly associated with stimulating movement to the assisted areas. Mobility of firms to assisted areas is particularly dependent upon the additional production capacities and thus, can hardly to continue under the present economic conditions. In a changed macroeconomic situation, new national strategies for the stimulation

of economic growth have receiving increasing attention.

Flexible production system brings a new perspective to regional industrialization by putting forward the localization factor and local production systems providing internal integration.

Developing the indigenous potential on the basis of new technologies and the production of high quality human capital, intensive goods and services gain importance as regional policy (Ewers & Wettman 1980:165). The basis of such a strategy are those factors which determine the ability of a region to produce or to quickly adopt innovations. Different societies have differences in the capacity of adaptation and creation technical innovations that are suitable to their economic needs. But, societies are described due to their culture that is the collection of beliefs, attitudes, values, skills, institutions of the people in a particular place (Malecki, 1991:1).

A significant element of culture operates through how technology is viewed, how foreign or alien technology is accepted and how throughly technological change penetrates a population. The largest variation is at a large, often national, scale, but is by no means isoloted to that scale.

The combination of national and local variations in culture determine the economic advantages and technological capability. One of the most important subjects of these invisible factors of culture are skills and enterpreneurship that are key elements in economic development of local level nearby the webs of international information flow.

At the same time these subjects must be supported by R&D; educational system, search for information and new technologies.

Technological transfer is no guarantee to success. In the absence

of a facilitative culture the development effects of transferred technology are minimal too little information is exchanged, too few firms are formed.

All of these factors not only require certain cultural norms in local level but also government policies in national level.

The significance of culture grows as the technological lag between advanced countries and underdeveloped countries appears to be growing larger.

Another concept, as a result of the cultural attributes is the spirit of cooperation and interest to collective goals.

Corporate activity is characterized by network, not centralized administration, and by horizontal coordination facilitates quick, flexible response to changing market conditions and to changes in other factors in the economic environment (Malecki 1991).

In local level education is one of the most important determinant of entrepreneurial success or feature, flow of information, preferences of customers, or type of market. The importance of work experience in creation of the dynamic local environments which are separated from others due to four qualities: resilience, creativity, initiative taking and diversity (Shapero, 1984; Anderson, 1985), (Malecki, 1991:15). These qualities create a stimulating culture and successful regions where locally specific attributes, shortcomings, histories, type of human relationships all plays an important role in defining the future potential of regional economy (Sweency, 1983 Malecki, 1991:15).

Industrial districts is a local production system of usually single or

highly related industries. In this formation a dense network of linkages and interrelations between firms play important role.

Indeed, the industrial district itself can be seen as a collective enterpreneur, with only, firms, but inter firm associations, worker organizations, financial instructions and governmentel agencies also playing important roles (Best, 1950: Malecki. 1991:17).

Consequently, the different attributes of local culture provide an opportunity for development within an industrial district. Local production networks must be considered with the influences of local culture as a deterministic factor.

It is apparent that in a continually changing environment it becomes necessary to change technologically at least as fast as competitiors if long term survival is to be achieved. A region can only sustain a high level of growth, or achieved "self-sustained" growth, if firms established there able and prepared to adjust continually to satisfy current market demand and technological change.

The regions which will win the fight for survival in a time of structural change will be those which are able to compansate for the loss of old markets either by developing new markets or through technological change in their production.

CHAPTER V

TECHNOLOGICAL ACTIVITY AND INDUSTRIALIZATION IN DEVELOPING COUNTRIES

5.1. Nature of Technological Activity in Developing Countries

Much of the traditional literature, theoretical and emprical has neglected the need for and production of, technological activity in developing countries. To the extent that technological lags are admitted, developing countries are taken to receive all relevant improvements from developed country innovators: there is no problem in assimilating the transferred technology in the developing country: there are no adaptations required, since alternatives are available for all factor price; all firms remain equally efficient; firm-specific learning or technical effort are unnecessary and irrelevant; and so on (Nelson, 1987).

These traditional approaches to technology also assume that innovation is a completely distinct activity from gaining mastery of technology or adapting it to different conditions.

Innovative activity is an investment in something unrelated to production. In theoretical modeling, such investment is guided by a known innovation possibility frontier, with marginal returns equalized with other returns (Nelson, 1981). In the developing country context, it is assumed that major innovations all occur in the advanced industrial countries. Developing countries select and costlessly apply those innovations that are useful or

appropriate. As the general level of capital accumulation (and skills) rises, more capital-intensive (or complex) technologies become economical – these are also bought from the international technology shelf.

The general thrust of conventional approaches is to minimize, not just the role of technological activity in developing countries, but also the need for policies to support, protect and induce such activity (Pack & Westphal 1986). What are now termed `neoclassical approaches' to development associated with Balassa, Krueger and others tend to confine themselves to prescription such as `get prices right', `reduce or eliminate protection' or `free international flows of capital and technology' and cut back on government intervention on industrial activity. These approaches disregard the peculiar nature and costs of technology learning in specific activities, the externalities it generates and the complementaries it enjoys, which may lead to market failures and may call for a more selective approach to policy than conventional theory admits (Lall, 1991).

In contrast `unconventional' approaches to the issues of technology in developing countries have appeared in the past decade. These have assigned a central role to indegenous technological effort in mastering new technologies, adapting them to local conditions, improving upon them, diffusing them within the economy and exploting them overseas by manufactured export growth and diversification and by exporting technologies themselves. They can be framed in neoclassical terms but their emphasis is often on the reasons that markets are not efficient.

5.2. Technological Capabilities and Industrialization

5.2.1 Firm-Level Technological Capacities (FTC)

The microlevel analysis of technology in the developing countries has drawn inspiration from the `evolutionary theories' developed by Nelson and Winter (1982), and explained in Nelson (1981, 1987) and Dosi (1988).

The starting point of these theories is that firms can not be taken to operate in a common production function. Technological knowledge is not shared equally among firms, nor is it easily imitated by or transferred across firms. Transfer necessarily requires learning because technologies are tacit and their underlying principles are not always clearly understood. Thus simply to gain mastery of a new technology requires skills, effort and investment by the receiving firm, and the extent of the mastery achieved is uncertain and necessarily varies by firms according to these inputs. Furthermore, firms have more knowledge of their own technology, less about similar technologies of other firms and very little about dissimilar alternatives, even in the same industry. They operate in other words, not on a production function but at a point, and their technical progress, building upon their own efforts, experience and skills, is `localized' around that point (Atkinson and Stiglitz, 1969). The extent to which firm level differences in technological effort and mastery occur may vary by industry by size of firm or market, by level of development or by trade industrial strategies pursued (Lall, 1991).

As Dosi (1988) puts it, evolutionary theories can explain the permanent existence of asymmetries among firms, in terms of their process technologies and quality of output. Scale economies explain part of this asymmetry, but they are also the different innovative capabilities, that is different degrees of technology accumulation and different efficiencies in the

innovative search process. Once firm-level technological change is understood as a continuous process to absorb or create technical knowledge, determined partly by external inputs and partly by past accumulation of skills and knowledge. From the firms' point of view, there is little difference in essence between efforts to improve technological mastery, to adapt technology to new conditions, to improve it slightly or to improve it significantly, though in terms of detailed strategies, degrees of risk and potential rewards these efforts will certainly be different.

There is a basic core of functions in each major category that have to be internalized by the firm to ensure successful commercial operation. If a firm is unable by itself to decide on investment plans or selection of equipment processes, or to reach minimum levels of operating efficiency, quality control, equipment maintenance or cost improvement or to adopt its product designs to changing market conditions, or to establish effective linkages with reliable suppliers, it is unlikely to be able to compete effectively in open markets. The basic core must grow over time as the firm undertakes more complex tasks. The ability to identify a firm's scope for efficient specialization in technological activity, to extend and deepen these with experience and effort, and to draw selectively on others to complement its own capabilities, is the hallmark of a `technologically mature' firm. Before full maturity is achieved, firms will vary in their mastery of the various functions involved while this is true of any economy, it is likely that the typical firm in developing countries, with deficiencies in skills and limited experience of manufacturing, will use the same technology less efficiently than its counterpart in developed countries.

5.2.1.1 Investment Capabilities

Investment capabilities are the skills needed to identify, prepare obtain technology for, design, construct, equip, staff and commission a new facility. They determine the capital costs of the project, the appropriateness of the scale, product mix, technology and equipment selected, and the understanding gained by the operating firm of the basic technologies involved.

5.2.1.2 Production Capabilities

Production capabilities range from basic skills such as quality control, operation and maintenance, to more advanced ones such as adaptation, improvement or equipment stretching, to the most demanding ones of research, design and innovation. They cover both process and product technologies as well as the monitoring and control functions included under industrial engineering. The skills involved determine not only how well given technologies are operated and improved, but also how well in-house efforts are utilized to absorb technologies bought or imitated from other firms.

5.2.1.3 Linkage Capabilities

Linkage capabilities are the skills needed to transmit information, skills and technology to, and receive them from, component or raw material suppliers, subcontractors, consultants service firms, and technology institutions. Such linkages affect not only the productive efficiency of the enterprise but also the diffusion of the technology through the economy and the depending of the industrial structure, both essential to industrial development.

5.2.1.4 Main Influences on the Demand for and Supply of FTC

On the demand for efforts to built FTCs, the most important factors are threefold. First there is an inherent need for the development of new skills and information simply to get a new technology into production.

Second, external factors strongly influence the process. As with any investment decision, the macroeconomic environment, competitive pressures and the trade regime all affect the perceived returns to FTC development efforts. A stable high growth environment, with international competition probably the most potent inducement to skill and technology upgrading. Trade orientation also affects the content and pace of FTC development.

Third, technological change itself, which proceeds continuously in almost all industries in the developed world, stimulates developing country firms to try to keep up. Exposure to competition mediates this incentive, and highly protected firms can delay their upgrading for long periods. Nevertheless, the existence and potential availability of more efficient technologies can create their own incentives to invest in FTC.

On the supply side, the ability of firms to produce new capabilities depends on; the size of the firm; access to skills from the market; organizational and managerial skills in the firm and its ability to change structures to absorb new methods and technologies, access to external technical information and support (from foreign technology sources, local firms and consultants, and the technology infrastructure of laboratories testing facilities, standards institutions and so on), and access to appropriate `embodied' technology in the form of capital goods from the best available sources, domestic or foreign.

In sum FTC is the outcome of investments undertaken by the firm in response to external and internal stimuli, and in interaction with other economic agents, both private and public, local and foreign. Thus there are factors firm–specific and those that are common to given countries.

5.2.2 National Technological Capabilities (NTC)

National capabilities are not simply the sum of thousands of individual firm–level capabilities developed in isolation. Because of externalities and interlinkages, there is likely to be synergy between individual FTCs. There is a common element of response of firms to the policy, market and institutional framework. Countries developing or developed differ in their ability to utilize or innovative technologies, which manifests itself in their productivity, growth or trade performance. The analysis of NTC is nevertheless important because of the current dominance of some partial explanations of industrial success, which may lead to misleading conclusions.

The OECD explains long term differences in the performance of advanced industrial economies thus: `Over the longer term, economic growth arises from the interplay of incentives and capabilities. The capabilities define the best that can be achieved; while the incentives guide the use of the capabilities and, indeed stimulate their expansion, renewal or disappearance. In the advanced economies, the capabilities refer primarily to the supplies of human capital, of savings and of the existing capital stock, as well as to the technical and organizational skills required for their use; the incentives originate largely in product markets and are then more or less reflected in markets for factor supplies thereby determining the efficiency with which capabilities are used. Both incentives and capabilities within an industrial framework: institutions set rules of the game, as well as directly intervening in

the play; and they can modify behaviour by changing attitudes and expectations' (OECD, 1987:18). This approach, involving the interplay of capabilities, incentives and institutions, is a useful way of organizing the numerous factors that influence NTC in developing countries.

5.2.2.1 Capabilities

At the country level, capabilities can be grouped under three broad headings: physical investment, human capital and technological effort. These three are strongly interlinked, if physical capital is accumulated without the skills or technology needed to operate it efficiently, NTC will not develop adequately, or if formal skills are created but not combined with technological effort, efficiency will not increase dynamically. Physical investment is in some sense a `basic' capability, in the plant and equipment are clearly necessary for industry to exist but it is the efficiency with which capital is utilized that is of greater interest.

The term human capital is used broadly here to include not just the skills generated by formal education and training, but also those created by on-the-job training and experience of technological activity, and the legicy of inherited skills, attitudes and abilities that aid industrial development. Literacy and primary education are essential for all forms of efficient industrialization, and may be largely sufficient for early industrial efforts utilizing simple technologies (Mc Mahan 1987). As more sophisticated technologies are adopted, however, the work force and managers emerges (Teitel, 1982). Moreover the gap between the work force and engineers has to be reduced to facilitate skill transfer (Mody 1989). The quality of formal education, especially of technical training, and the relevance of the curriculum to changing technical need, are clearly very important. To the extent that private

or public training facilities do not meet the need for such skills, firms have to invest in their own training facilities, but will do so only if mobility is low and their investment yield appropriate benefits (King, 1984).

The final capability relates to national technological effort. Trained labor and physical capital are only fully productive when combined with efforts by productive enterprises to assimilate and improve upon the relevant technology. Such effort comprises a broad spectrum of production, design and research work with firms, backed up by a technological infrastructure that provides information, standards, basic scientific knowledge and various facilities too large to be owned by private firms. It is impossible to measure properly such technological effort but rough proxies are available in the form of technical personnel available for technical tasks, or expenditures on formal research and development or innovations, patents and other indicators of technological success.

Apart from the domestic technological effort, the extent and nature of a country's foreign technology is also directly relevant to NTC. All countries need to import technology but different modes of import have different impacts on local technological development. In semi-industrial countries, for instance, a heavy reliance on foreign direct investment (FDI) may become a substitute for domestic effort at the advanced levels because FDI is an efficient means to transfer the results of innovation rather than the innovative process itself. The alternative strategy, a la Japan, of building a strong domestic technological base may therefore entail a selective curtailment of FDI entry, at least at certain stages of development process.

5.2.2.2 Incentives

Incentives, arriving from market forces, institutional functioning and government policies, affect the pace of accumulation of capital and skills. In most developing countries, the role of policies assumes great importance, in both positive and negative ways: positive because structural and market failures call for remedial action, negative because interventions can be excessive or misjudged, and even justifiable interventions can be poorly administered.

– Macroeconomic Incentives

Under this heading signals that emanate from GNP growth (rate and stability), price changes, interest rates, exchange rates, credit and foreign exchange availability and similar economic variables as well as political stability or exogenous stocks are included. The impact of growth, stability, sensible balance of payments, monetary or fiscal policies, favorable external circumstances etc. on investment and capability building are obvious.

– Incentives From Competition

Competition is the most basic of incentives affecting capability development. Domestic competition is influenced by the size of industrial sector, its level of development and diversification and government policies on firm entry, exit, expansion, prices, ownership, small-scale industry and so on. Most developing countries impose constraints on internal competition to prevent excessive entry in protected markets to preserve employment, to promote small firms or public enterprises, to hold down prices, to force industry to locate in backward areas, or to prevent the growth of large firms or the concentration of economic power.

International competition from imports, entry of foreign investors or export activity can be an even greater simultaneity to healthy technological development than domestic competition in small or large countries. Yet governments place many barriers to such competition, often in a sweeping, irrational and prolonged way that retards technological development, efficiency, export growth and structural change. The recent development literature has analyzed the costs of inward oriented trade strategies at great length. Most of the conventional arguments are not couched in terms of the impact of trade strategies on technological capabilities, but the implicit assumptions made about technological capability development are very relevant to the issue (Lall, 1991).

5.3 Trade Regime and the Technological Change Activities

5.3.1 *Domestic Technological Search Efforts*

Development literature increasingly addresses the importance of domestic technological capabilities in the successful industrialization of the developing countries. It is now widely accepted that in order to successfully operate imported technologies, developing countries must develop capabilities to asses, select, use, adapt and create new techniques on the basis of imported ones.

Efforts to select appropriate technologies and to make minor innovations that adapt the imported technologies to local conditions and improve them, have been instrumental in the export success of the developing countries. Technological change (TC) activities of developing country firms have, in many cases, evolved directly into new areas of dynamic comparative advantage. Thus, adaptive technological efforts, undertaken especially within a protectionist environment, have given rise to a new and

highly idiosyncratic production capable of earningrents in third markets as a production asset.

Once a country decides to pursue a more export oriented growth strategy, however the adaptive technological search efforts must be supplemented by technological search activities of a different sort. Moreover excess demand and lack of competition lead engineering departments into technological search efforts directed toward expanding the physical yield of existing plant and equipment. Conversely, it will be expected that the greater the degree of competition introduced especially be expanding the borders of the domestic market via exports and imports, the greater will be the dominance of cost-cutting, quality improvement and product differentiation innovations. It is therefore possible to hypothesize a link between the prevailing trade regime and the nature and direction of TC activities that will be pursued by domestic enterprises (Kırım, 1990).

5.3.2 Export Activity and Technological Change

Export orientation can also have a bearing on the channels through which technologies are acquired. Dahlmann and Westphal (1982 and 1983) argue that export activities open up new possibilities for the transfer of knowledge into the developing countries who can acquire technologies without actually paying for them These authors classify the modes of transfer of knowledge into formal (i.e., market mediated) and informal (i.e., non-market mediated) and further categorize with respect to the roles played by foreigner in the technology transfer. Thus while the main focus in the literature has been on the formal means of knowledge transfer where foreigners play an active role (such as direct investment, licensing, management contracts and turnkey projects), Dahlmann and Westphal argue that the role of

informal modes has been nearly completely ignored. Examples of informal modes of knowledge transfer are learning by exporting, imitation, keeping up with the technical literature, visiting trade fairs and scientific exchange. The importance of these informal modes of transfer lies in the fact, the transfer are primarily non-market mediated and hence involved little cost for acquiring the technology.

A final area of interest as regards the relation between domestic technological capabilities and exports concern the export of technology. It is generally argued that the evolution of domestic technological capabilities leads to a dynamic comparative advantage in both specific products and the technologies used to produce them. Hence developing country firms develop a comparative advantage in those technologies which are particularly suitable for production under the conditions prevailing in other developing countries (Kırım, 1990).

5.4 Proposed Industrial Strategies for Developing Countries

Eraydın (1992), mentions that the new production systems have to be developed in developing countries for the integration with world production system in the future. But today there is no definite model about with which policy and tools, the flexible production networks will supported and how the state make contribution to the starting of this development process.

The studies about this subject emphasize the factors such as local production culture, accumulation comes from production relations in historical process, creativeness, middle and small size industry, variety in industry and good living conditions.

Developing countries have significant debt burdens transferred

from the economical depression period of 1970s. The foreign exchange need for the repayment of these debts and provision of necessary input for the continuation of present production made it necessary for these countries to follow an export–oriented policy, in order to gain foreign exchange, for a certain period. Besides, externally open growth, export increase and reaching to the world market accepted in many countries within last years.

It is known that the difficulties of realization of great increases of production within industrial market oriented industrialization is due to boundaries that have been reached at the expansion of market. The demand in the internal market can only be provided by the realization of increases in the prices and incomes.

At that point, such a dilemma comes into being; if the flexible production system is taken as a base, there is no possibility for these countries to sell goods to external markets without cheap workmanship. Increase in worker's salaries in order to expand the internal market destroys the export possibilities.

One of the proposed ways is the transfer of some portions of income, gained from external world, to the working part of the society by means of various mechanisms, for protecting these parts affected negatively from the such externally open politics.

Another proposal is the improvement of price – ratio by increasing factor productivity in production and to increase worker's salaries and by this way not increasing the production prices. Thus it is necessary to follow the continuously changing technology in the world. Important point here is the adaption of these new technologies to the conditions of the countries (Eraydın, 1992).

Storper (1990: 433), points out that the industrialization strategies of the third world countries have to resemble the industrialization logic of developed capitalist countries, because they will face with the new conditions of capitalist market and proposes: industrialization oriented to export in a great scale; product variation and specialization; provision of flexibility in both static and dynamic production sections.

It seems flexible production paradigm is attractive for the Third World Countries. This attractiveness resulted from, the difficulties of the countries, that have small local markets, to transmit to mass production and as well as the increasing importance of the small-scale units in their present production systems.

These small-scale units are naturally too different from the small industrial units referred in the flexible production networks. In this case; the question of whether the small industrial units of developing countries can acquire a structure similar to the ones in the western world gains importance (Eraydın, 1992).

At this point Schmitz (1989), asserts these hypotheses;

- During the 1970s depression it was seen that the world competition had been increased because of the demand bottleneck resulted from the big mass production more than the demanded amounts. As a consequence of this competition countries oriented towards the smaller markets.

Growing competition necessitates the adaptation to changing conditions. This is valid for developing countries as well as developed countries.

– Today developing countries also integrate to the world economic system at various levels and affected from the expansion and shrinkage of the world economic system so the adaptation capacity is more important for these countries.

– There are empirical studies about good performance of small industry under depression conditions.

– It is impossible for small industries to attain the adaptation capacity by its own. The aim of increasing the productivity as a whole can be oriented.

Eraydın, (1992), states that during the renovation process of technological structure in a region, geographical proximity or sharing the same space is a very important element between firms, supplying different type of technology. This situation provides the continuation of production by making the relations easy and both giving the possibility of selling the used technologies of their own to technology changing firms and also make the use of second–hand, cheap technology by the smaller and financially restricted sectors.

The excess man–power in the developing countries gives the possibility of using the cheap worker as a substitution to innovations in some of the production processes. But in Japan the use of intensive man–power was supported especially during the adaptation processes to production technologies and in some production levels. Also it is impossible to say that the great numbers of man–power remove the all innovation stimulants. Especially the innovations that come into being by the way of creative imitation, can be possible in these kind of competition conditions in spite of the existence of excess man–power.

Excess man-power has indirect effect on the operation of system in the creation of competition conditions. The lowness of the worker's salaries make the establishing of own working places attractive for these people. Some of these firms make sub-production and by this create a new work division in production process or enlarge the competition conditions with their products. These small working-places use cheap man-power and in this case, the production of high quality products or use of advanced technology can not be realized.

In the emergence and development of flexible production systems, institutional structure (official and non-official) gains importance. Importance of local political forces and especially local governments in the emergence of flexible production areas by developing these kind of relations is emphasized (Bianchi, 1989; 1990). But as it was pointed out by Schmitz (1989), in many developing countries economical responsibilities and functions of local governments are limited and the authority in these kind of subjects are generally concentrated on central government. For this reason, it can be expected that rather than state establishments present institutions and arrangements that has social-private quality, will gain importance. On the other hand insufficiency of central government in solving local problems creates reform necessity in many countries.

One of the basic characteristics of the developing countries is heterogeneousity. Double structure is existing in both social and economical respects and when it is interpreted with traditional point of view, this double structure is also reflecting to the space. Another characteristics is the inability of the development of market mechanisms for the regular operation of capitalist relations. For this reason intermediate and buffer mechanisms are

produced. Basic dynamics and buffer mechanisms are produced. Basic dynamics and the possibilities of transformation comes into being by this complex structure of the system (Eraydın, 1992).

5.5. Theoretical Perspective of Technological Activity, For Türkiye case at the National Level and For Eskişehir Case at the Regional Level

After the examination of the theories about technological change in industry and regional development and the changing structures of economical social and spatial systems some statements could be developed for searching their validity in Türkiye and Eskişehir cases.

- The combination of national and local variations in culture determine the economic advantages and technological capability.
- Industries are often highly localized for much of their history. Each economy has its characteristic specialization.
- Locally specific attributes, shortcomings, histories, type of human relationships all plays an important role in defining the future potential of regional economy.
- Skills and entrepreneurship are the key elements in economic development of local level nearby the webs of international information flow. These subjects must be supported by R&D, educational system, search for information and new technologies.
- In local level education is one of the most important determinant of entrepreneurial success or feature, flow of information, preferences, of customers, or type of market.
- Resilience, creativity, initiative taking and diversity are the factors that create a stimulating culture and dynamic local environment.
- Spirit of cooperation and interest to collective goals is another concept characterized by network, not centralized administration, horizontal coordina-

tion facilities, quick, flexible response to changing in other factors in the economic environment.

– In the absence of a facilitative culture the development effects of transferred technology are minimal. There is an inherent need for the development of new skills and information simply to get a new techno– logy into production.

– Macroeconomic environment, competitive pressures and trade regime all affect the perceived returns to firm level technological capabilities development efforts.

– Technological change stimulate developing country firms to try to keep up.

– The ability of firms to produce new capabilities depends on; the size of the firm; access to skills from the market; organizational and managerial skills in the firm and its ability to change structures to absorb new methods and technologies, access to technical information and support (from foreign technology resources, standards institutions and so on).

CHAPTER VI

INDUSTRIAL DEVELOPMENT AND TECHNOLOGY POLICY IN TÜRKİYE

6.1 Industrial Structure Before 1980

Eraydın (1992) mentions that the attempts for developing private industry began immediately after the establishment of Republic in 1923.

In 1930 s the establishment of public industrial sectors with a view to foster private industrial investments, accelerated industrial development. Industrial investments were interrupted with the Second World War. With the post-war economic policies at the beginning of 1950s, development of the industrial investments started again, but at a slower rate.

At the end of 1950 s with Five Year Development Plan, industrial investment accelerated again. In 1960s, industrialization strategies provided significant progress in domestic transportation, energy, education and health sector with an economic growth rate of six percent (Eraydın, 1992).

Until 1980s, the integration of industrial development with external world was limited (Şenses, 1989). This limited integration was also true for external trade, and foreign investment (Eraydın, 1981).

In 1980 s, although support was provided through foreign capital,

foreign currency transfer and capital investment by Turkish workers abroad and capital transfers from other sectors; capital investments to the industrial sector from the sector itself was not fully efficient due to capital transfer to other sectors.

These industries, to which the state provided great support with incentive measures, continued their production oriented to the internal market, by high customs tariffs. In industrial development, the main pushing power was provided by the enlargement of internal demand; the industrial sector which was protected against external competition, did not have the necessary quality for opening to external markets because of scale and cost disadvantages.

Briefly, at the beginning of 1970s, the economic structure and especially the industrial structure, that was already in existence, had various inner problems. In this period that had suitable conditions for development; the necessary arrangements, to solve the structural problems of the existing industry, were not made and when 1970s economic depression reflected on Türkiye in different forms, the problems became heavier (Eraydın, 1992:90–92).

6.2 Industrialization Defined by The Policies During 1980–1990

Eraydın (1992), summarizes the basic selections of policies about industry, that came into effect after 1980 as, reducing the weight of public sector in industry, providing the intensification of public investments to infra–structure sectors, liberalizing exports and imports, to reduce effective protec–tion ratios in manufacturing industry and orienting the industrial production towards the export market. During this period, internal trade limits were imposed on agricultural products and agricultural inputs to industry were

subsidized.

In this period, in order to increase exports and raise the ratio of industrial goods, participation of industrial capacities which were established during the period 1973–1977 and raising of the capacity using ratios which were too low, was considered.

Thus industrial production could be increased, without making a great scale industrial investment, by participation of capacity, realized in the second half of the 1970s.

The idea of opening, surplus industrial production to external competition was in considered the first stage by providing export incitements, cheap man–power and cheap raw–material for the industries, depending on agriculture.

In 1980s foreign trade sectors were supported rather than industrial sectors. Increasing the industrial production without making new investments because of the present low capacity use of industry and increasing the industrial export by limiting the internal demand, pushed the establishing of new industrial units to second degree. Besides the limits on the rate of interest, monetary greatness and inflationary conditions raising the industrial investment risk, changed the minds of investors.

Besides, effective protection ratios were reduced in manufacturing industry and opened to external competition in some sectors.

The main principals of industrial development in 1980s were the use of cheap labor advantage, competition with world markets and not going into big investments. The share of the public within industrial investments showed a continuous decline as a result of policies which consider the

rather less participation of public to production activities.

Starting from 1980s, the share of industry within total investments decreased continuously. The recovery provided in private sector investments in 1984 could not continue especially after 1987, when it went into a decrease trend again. The policy of increasing the capacity use and decreasing the public share in industry limited the new investments in industry and also prevented the future growth of industry.

In fact, the basic problem in every depression period is the scarcity of investment capital and difficulty of finding external sources. By taking the necessary economic steps and with rather intensive international support, Türkiye could cope with this problem in the first half of 1980 s but, on the other hand, Türkiye could not take advantage of this positive environment especially from the point of new industrialization policies (Eraydın, 1992:93-96).

6.3 Evaluation of the Industrial Structure Before and After 1980

Eraydın (1992), states that developing country's trends are different from the developed world in depression period conditions. Türkiye tried to adopt the Western Countries methods of the re-structuring of industry in the form of new technology, new production systems, new labor division, in industry, growing inter-industrial relations, adjusting the marketing of production and job organization.

During 1970-1980 period, small-scale industry grew in respect to the employment it provided but stayed constant in respect of value added and decrease in respect to the share of wages within value-added. While the average wages in small-scale industry reached 40.8 % of large-scale indus-

try's average wages in 1970; this ratio decreased to 21% in 1980. Parallel to this, value-added created in small-scale industry per worker was 67% of large-scale industry in 1970 and this ratio was reduced to 47% in 1980. In other words, there was a decrease in both average wages and value added per worker in small-scale industry during the period of 1970-1980.

Available data shows that differences of value-added between large and small scale industry began to diminish after 1980s. This points out that the productivity increase in small-industry was more between 1980-1985.

Although this rough data does not say that the small industry sector was in a great attack, they show that it had dynamic structure and had not lost its significance within industry. After 1980, it is also seen that small enterprise was supported because of the inability of creating jobs with salaries.

During the integration process to international markets small-scale industry became effective in certain sectors such as, clothing, food industry, textile, chemical products and basic metal industry,

A basic question is whether the industry achieved technological development and transformation as a whole. One of the most rough indicators of technological change in manufacturing industry is the change of value-added per worker, which shows the increase in productivity. In the sectoral base; in the period of 1960-69 with the increase in production and work-power there was rapid productivity increase (10.5%) in the large firms employing 10 or more workers. Productivity increase impetus showed a significant decrease from the beginning of 1970s and was negative during the

1975–1980 period.

Productivity increased in the period of 1980–1984 at a rate of 2.1%, there was further increase in productivity between 1984–1988, especially in the sectors wood–furniture, non–metallic mineral and metallic products.

Productivity increases show great differences at sectoral base. Generally, technological change was greater in consumer goods and intermediate goods industries than in investment goods industries.

All data about productivity shows that there were significant increases in all sectors during the 1960s but this high level of increases could not continued and the period of 1975–1980 had a low performance. While the industrial sector showed a sharp rise especially in the export sector and production increases reach a rather high value after 1980 , it is observed that productivity increases stayed behind these indexes (Eraydın, 1992:93–103).

6.4 Spatial Distribution of Industry

Eraydın (1992), mentions that during the first and second half of 1970s, industrial investments continuing in spite of the serious economic problems, shifted from outside the main centers in an increasing rate. Increasing difficulties and costs of establishing industries within the metropolitan areas and the abrogation of industrial incitements in these areas became effective in the location preferences of these industrial units and the tendency of preferring a location outside the industrial center but close to its surroundings arose.

1980s resulted in the return of industrial investments in the metropolitan areas once again, and it also gave rise the possibility of developing

some local production areas. The industrial enterprises in the 1970s, which had an individual base gradually became integrated firms, and choose different locations not far away from scale economies.

The information about the large manufacturing industry shows that the number of persons working in the manufacturing industry increased rapidly before the depression period (1971–1974) and reached to the ratio of 8.19% increase annually. The rapid increase in the number of people working in manufacturing industry was seen in some cities of Trakya Region and Central Anatolia.

During the period in which the economic depression was concentrated (1974–1979), employment growth ratio of industry declined (3.73%) and in many cities employment growth in industry was lower than in the former period. In this period the employment growth in underdeveloped regions was greater than in the developed cities.

In the period of 1980–1982 employment growth in industry only reached a ratio of 1.85% falling under the values of the former period and the number of people working in industry, decreased in many cities as an absolute value. Starting from 1983 it is seen that the employment growth in industry rose little; but during 1983–1987 production growth ratio increased to 6.77% annually while the employment growth ratio at an increase of 2.78%.

After 1983, the rapid growth in industrial employment and production was seen in regional centers but rapid increases were also seen in the main industrial centers (Eraydın, 1992:129).

6.5. Technology Policy in Türkiye

1960s had been a beginning period for both planning and constituting technology policy for Türkiye. The First Five Year Plan states that;

".... important and special place is given to research which is the human being's struggle to reach the new realities and creations. Research as a whole is a factor that supports and accelerates the development in industrial, technological, economic and social subjects. Solution to the various problems that are specific to Türkiye, in every area of development, should be procured by research in the most true, efficient and quick way. The international character of basic research compels the developing countries to give priority to applied research ...."

In the plan, the development of research by higher education, encouragement of research in private sector and providing the efficiency of research in the public sector is examined and necessary measures are taken (First Five Year Development Plan, 1963; P:463).

In the plan it was anticipated that, at the end of First Five Year Plan Period (1963–1968), 3330 researchers and 1452 million TL expenditure would be assigned to scientific and technological studies. In reality, it is doubtful, whether the quality of the studies was of international standards, but in any case it was a starting point. In 1967, the R & D expenditures constituted approximately 2%. of the national income.

This value is equal to the U.S.A's industrial R & D expenditure in national income in 1920. At this level, while the U.S.A had the world's most advanced industries and technologies and increased it's creative power continuously, Türkiye's economy was underdeveloped, agriculture based, backward and dependent on foreign aid.

The First Five Year Plan, collected the measures necessary for the Turkish technology policy to develop research studies under 4 headings;

1) Creating a required environment for research

a– Being fastidious in the choice of researchers and in giving titles.

b– Providing required financial means.

c– Providing a virtual environment that depends on respect to research independence.

2) Institutionalization of R & D activities for establishing a system that will organize and coordinate the dispersed research studies. A Scientific and Technical Research Council will be established for this purpose.

The council will procure the direction of research towards the plan targets and the determination of priorities.

3) Training personnel in every subject at the highest level, especially in foreign countries.

4) Taking measures for development of publication and translation.

All these measures than would constitute the functions of Türkiye Scientific and Technical Research Institution (TÜBİTAK) which was established in 1963. The general task of the Institution can be summarized as preparing, applying and controlling the application of the science and technology policy which will be determined together with the government.

The restrictions and rules made in the establishment of TÜBİTAK gave the institution a university structure. Naturally, in this environment, the research had academic character. Because of this structure, organic

ties could not be established with the industry sector.

After the First Development Plan, general technology policies were defined in the following Plan Periods. However, these general policies defined in the development plan documents could not be put into effect from the lack of organizational arrangements. Also, in the incentive system for industrial development, technology could not gain a concrete quality.

In different plan periods Türkiye utilized high technologies in the industrial sectors directed at foreign trade and labor oriented technologies in the industrial sectors directed at domestic demand.

In Türkiye, it is known that various technologies are transferred for the same production sector but the lack of systematic collection of information concerning the technologies that were transferred makes guidance impossible.

In an environment where technology transfer is uncontrolled and disordered, production of new technologies or the adaptation of the new technologies to the local conditions is neglected. The technology based long term economic and industrial policies of Western Countries can not be transferred to Türkiye where short term economic policies are followed (Eraydın, 1985:109).

Today, Türkiye's production structure which is directed to consumer goods, without enlarging the production of intermediate and investment goods, creates negative effects on balance payments and savings. This depression could direct the dynamics of internal economics to a positive way if it could be well administered. The positive way would be to reach the phase of producing capital products with domestic technologies. At the

same time the technology production phase necessitates large technology transfer. This will then necessitate the reservation of more foreign exchange for technology imports. But Türkiye should break this vicious circle to keep up with the developments in the world economy Türkcan, 1981; p: 237).

Table 6.1. Share of Education and R & D in National Product In Some Countries

Countries	Share of Education in National Product (%)	Share of R & D in National Product (%)
USA	5.30	2.8
JAPAN	5.00	2.8
GERMANY	4.50	2.7
ENGLAND	5.30	2.3
FRANCE	5.90	2.3
SPAIN	3.20	0.8
POLAND	4.50	1.5
GREECE		0.3
TÜRKİYE	2.10	0.2

Source: SALAM, M.A.,1989

6.6. Türkiye's Regional Structure From the Technological Development Perspective

Türkiye is behind the developed countries in producing regional policies like utilizing technology policies in industry. Regional planning policies could not reach to application phase like technology policies.

Regional unbalances could be observed in all indexes. Regional

income differences are in important scales (Table 6.2). Industry agglomerates in some definite regions. Industrial establishments are mostly placed in İstanbul, Bursa, İzmir, Çukurova and Ankara Regions. Whereas, the industrial base of eastern regions of the country is almost non-developed.

Although the incentive system is giving priority to less developed regions without restricting the type of industry, the number of new industrial units being established in less developed regions is too low. One of the most important reasons for this is the difficulties faced in infrastructural possibilities.

Although industries using high technologies have less dependence on location, it is impossible to make these industries locate to less developed regions which have inadequate infrastructure. In this respect, to reach a certain level in the development process of Türkiye, it is necessary to develop infrastructure possibilities at a regional level.

In recent years, it has been understood that removing industrial capital from developed regions to less developed regions is not enough to contribute to the development of a region. The necessity to transform the regional indigenous resources to investment is emphasized.

Table 6.2. Regional Indexes (1985)

REGIONS	Income Index	Unemployment Index
İstanbul	152.14	142.3
Bursa	109.52	112.2
Eskişehir	108.19	109.3
İzmir	97.93	73.9
Ankara	102.91	100.0
Konya	84.71	87.6
Adana	101.68	102.3
Samsun	82.79	53.5
Kayseri	75.15	97.8
Sivas	49.31	71.4
Malatya	75.35	108.9
Gaziantep	70.58	110.4
Trabzon	80.50	110.8
Erzurum	65.82	49.6
Elazığ	71.62	92.4
Diyarbakır	47.54	91.8
Total	100.0	100.0

Source: Eraydın, A. 1985 p:114

The direction of surplus created in developed regions to less developed regions as the means of investments is restricted in Türkiye too. Only the public sector assumed the establishment of some industries at different periods. In this respect, it is meaningful to transfer the surplus created in a region to the industry of that region.

It is hard to constitute a high level of technology in the industrial units established by the income of the region or by the income transferred from other regions, although the infrastructure possibilities are provided. At this point, the public sector should function as a guide and at the local level various units should be organized for providing a necessary environment in their region (Eraydın, 1985; p: 109).

CHAPTER VII

CASE STUDY: DEPERMINATION OF ESKİŞEHİR'S REGIONAL INDIGENOUS POTENTIAL FOR TECHNOLOGICAL CHANGE AND INDUSTRIAL DEVELOPMENT

7.1. Methodology

Eskişehir's regional indigenous potential for technological change and industrial development is studied within the theoretical framework of localization factor and local production systems.

The industrial development of Eskişehir is examined in historical perspective to determine the accumulation of local production culture, variety in industry and the creativity of the region coming from production relations. Factors that are peculiar to Eskişehir's industrialization such as the capital groups in the industrial history, tradition of local leadership, effects of public investments, effects of macroeconomic policies, changing philosophy of the region's industrialists and efforts for technological developments are studied in different sections.

In the 9th section all the factors that affect the regional indigenous potential of Eskişehir for technological change and industrial development and the region's efforts for stimulating the local dynamics are evaluated.

7.2. History of Industrial Development in Eskişehir

7.2.1. Industry in the First Years of Republic

In the first years of the Republic, the development of Eskişehir's industry was based on agricultural and natural resources. Eskişehir was an important cereal region and, the soil characteristic of the region which includes ironoxide is appropriate for the production of tile, brick and ceramic.

The economic development level of Eskişehir was lagging until the mid 19 th century. After the 1877–1878 Ottoman–Russian war, the immigrants settled in the region made important contributions to the development of the region's economy. Relatively developed agricultural tools which were brought by the immigrants increased the productivity in agriculture and production for market process began to meet the cereal demand of Western provinces.

In the following years the importance of Eskişehir increased and the province became the entrance gate to Western Anatolia from the east. After 1914, Eskişehir was transformed into a regional center where the provinces and subdistricts were connected with macamadized roads. On the other side, railways to Ankara and Konya were constructed. With this transportation network, raw material produced in the hinterland was collected in the storehouses at Eskişehir railway station and sent to Europe from there. This transportation network was also used to market the materials coming from Europe. In this way, Eskişehir specialized in the export of agricultural and metal products. The production of flour from wheat, and the manufacture of agricultural tools and cement were the other industrial activities at that period.

"Cer Atelier" was established during the construction of Berlin–Baghdad Railways (1884). After nationalization in 1924, it took the name State–Run Railroads Equipment Repair Work and became one of the most important establishments of Eskişehir industry and made important contributions to the industrial development of the province by generating a qualified labor force.

In 1986 the structure of the establishment changed and it became a company called "Türkiye Locomotive and Motor Industry Co." (Tülomsaş). The 100 years of history of Tülomsaş realized the accumulation of knowledge and became the leader in casting and machine manufacturing.

Another plant established in the first years of Republic was the Military Aircraft Repair Workshop bounded to Air Forces. In 1930 it became an independent establishment "Air Supply and Maintenance Center" and was enlarged by the experts brought from France. After that, the center was used as an application area for the technology courses for the Air Forces. Later the maintenance of the units outside of Eskişehir were also given to the Center. In 1942, Eskişehir was responsible for the maintenance of machines and equipment of the all Air Force Units of Türkiye.

In 1956, a F–84, F–84, F–86 and T–33 maintenance workshop, and in 1967 a workshop to repair jet motors were established. High technology is used in these establishments where sensitive accessories are produced of world standards.

The biggest flour mills were established in the first years of Republic. In 1927, "Law for the Encouragement of Industry", spurred the construction of two private flour–mills. At the beginning, flour mills which had

been processing up the wheat of surrounding areas, met the flour needs of especially İstanbul and Bursa; after 1960s the flour mills which were established in other regions, especially in Trakya Region, stopped the development of the ones in Eskişehir. One of the flour-mills then transformed its production from flour to biscuits and today it has become one of the big biggest biscuit factories of Türkiye.

Marseille tile which had been imported until 1927 began to be produced in Eskişehir for the first time in Türkiye. The first tile factory in Türkiye was established in 1923 in Eskişehir by Kurt Sait and Muhtar Baştürk. In 1927 The Aslan Tile Factory was established. In 1933 Kurt Sait established, the Çift Kurt, Tile Factory. In 1943 the Aslan Tile Factory began to continue its production in the name of Kılıçoğlu Tile and Brick Factory.

At the same time most of the tile producers began brick production. The first machine brick production in Türkiye was carried out by Kılıçoğlu in 1949. The developments in demand and technology entailed the establishment of fire brick producing firms in the province.

The leading establishments in wood products industry in 1920 were a timber factory and a wood-work and furniture factory. Türkiye's first timber machines also developed in Eskişehir. The existing capacity of machines which were produced for utilizing the natural resources were then enlarged to meet the demand of the developing construction sector and vanguarded the production of asphalt machines. The different kinds of machine production developed especially after 1970s, gradually brought with the more advanced investments. The 100 year history of this industry sector used its comparative advantage by creating new products in the areas where it witnessed new demand produced its own design and become a monopoly

in all over Türkiye.

According to the results of 1927 Census of Industry (Table 7.1) there were totally 846 work-places in all. 333 of these were employing 2-5 person. The number of work-places employing 6.10 person was 58, and the number of enterprises employing more than 10 persons were only 30.

In 1920s most of the work-places were in the agricultural industry sector. Only 5 mills employed more than 10 people.

There were 217 work-places in the manufacturing and metal products and machinery industry. Only the Railroad Equipment Factory employed more than 10 workers. The others were generally manufacturing agricultural machinery.

The 35 workplaces in the sector of construction industry dealt with tile and brick production and only four of them employed more than 10. There were 148 workplaces in the wood products industry and 8 of them had more than 10.

Table 7.1 Number of Work-place and Workers in Eskişehir According to the 1927 Census of Industry

Sector	Number of Work-place	Number of Workers
Metal Extraction Industry	53	402
Agricultural Industry	324	836
Textile Industry	63	188
Wood Products Industry	148	589
Construction Industry	35	198
Manufacturing of Metal Products	217	517
Chemical Industry	4	11
Other	2	3
TOTAL	846	2744

Source: State Institute of Statistics (SIS) 1927 Census of Industry

7.2.2 Industry in the Period 1930–1950

In 1930s new public enterprises added to the industry of Eskişehir and the establishments in the private sector continued their development. In this period, brick and flour factories which are the traditional industries of the province enlarged their capacities. The Eskişehir Sugar Factory was established in 1932 by the government initiative. This public investment contributed to the economy of the province by leading the establishment of new enterprises and by training a qualified labor force.

The main target of the import substitution industrialization strategy which had been applied in 1930s was to establish the sugar industry in Türkiye and give an end to sugar importation. The Eskişehir Sugar Factory was one of the first factories established for this purpose.

The Eskişehir Sugar Factory was established by Anatolian Sugar Factories Co. (Anadolu Şeker Fabrikaları A.Ş.). It had a 1500 tons beet processing capacity at the beginning then by the enlargement in the capacity the beet processing per day increased to 1800 tons. In 1976 the establishment had 66.000 tons of sugar production capacity per year and had 10% share in Türkiye's total sugar production.

Another part of the sugar factory was the machine manufacturing plants. These workshops consisted of a foundry, carpentry, iron work and repair shop at the beginning. In the following years the rubber works and steel construction units were added. These foundations were organized as the "Eskişehir Sugar Machine Factory" by the help of supplementary investments made in the periods of 1956–1969 and 1974–1977. This factory is establishing the sugar, cement and distillery factories belonging to the public.

The 75–95% of these factories are being established by domestic contribution. The Türkiye Sugar Factories' Eskişehir Machine Factory has Türkiye's highest capacity machines related to steel constriction procedures.

7.2.3 Industry in the Period 1950–1960

In this period an important development was seen in the small-scale industry sector.

The geographical location, economic mobility and the dynamism of the public sector made Eskişehir a province attracting people. In 1950s, immigrants coming from Bulgaria, Rumania and other countries to Türkiye mostly settled in Eskişehir.

According to 1960 census, 8% population of the province and 33% of the immigrants setting in Eskişehir were from foreign countries. Most of the immigrants chose this province. The work environment appropriate for their own profession played an important role in this preference. In 1950–1951, the immigrants from Bulgaria were generally artisans and small manufacture and they preferred Eskişehir for the existence of suitable conditions for small industry. The working discipline, knowledge and experience of the immigrants made important contributions to the social and economic development of the province.

In 1950, the immigrants from Bulgaria settled in Eskişehir, brought together the production technology of stoves and kitchen stoves. The development of the stove production provided the establishment of branches such as casting and enamel.

The kitchen type stove was first brought to Türkiye by the immigrants settled in Eskişehir, then it spread through the whole of Türkiye and

began to be used widely. The rapidly increasing demand for Eskişehir's stoves caused the production of different coal stoves and constituted a new branch of industry.The production made in small workshops in the first years made in 12 middle and large scale factories today.

Afterwards, the machine and casting capacity resulted in the production of machines which are necessary for the other industry sectors of the province. The variety in agricultural production of Eskişehir led to the development of machines which process the agricultural inputs of sugar, flour, grain, biscuits etc. Also, to meet the demand of mines in the area, the production of mine grinding and sieving machines began.

After 1950s, the investments made to the agriculture sector with the initiative of foreign aid and then the difficulties faced in foreign payments caused the qualified personnel who had been trained in the public establishments, to produce agricultural machines and equipment. Every new production brought the development of related industries for providing input. One of them is the rim industry. Cast iron and steel foundries also began to produce the units necessary for the machine industry.

There were 10.000 workers in manufacturing industry in 1950.5800 of the workers were in public enterprises' namely Eskişehir Sugar Factory, and Railway Factory and Aircraft Factory and 1645 workers were in 27 private enterprise.

As in the first years of Republic the main sectors in the manufacturing industry were food manufacturing, the manufacture of non-metallic mineral products and manufacturing of transport equipment. 95% of the value added was created in these three sectors where the 75% was in food

manufacturing, 15% in manufacturing of transport equipments and 5% in manufacture of non-metallic mineral products industry.

In 1950 the manufacturing industry of Eskişehir accounted for some 28% in the gross product of the province and its share increased to 31.4% in 1960. Employment increased 78% in this period which was especially due to the development of small-scale industry. The employment increase was about 24% in public sector and 152% in private sector.

Small-scale industry developed after 1950s. The labor share of small-scale industry in the manufacturing industry was 25%. Small enterprises were mostly metal goods manufacturers and machine and motor vehicle repairers. The small-scale industry used qualified labor force coming from the public sector. Also, the development of a road network and the increasing of motor transport vehicles fostered the rapid development of small scale industry which necessitated trained labor force rather than big capital.

The two important private establishments founded in this period were the Eskişehir Cement Factory and Eskişehir Cotton Factory. The Eskişehir Cement Factory was established in 1953 by public support under the leadership of Eskişehir Bank. The Eskişehir Cotton Factory was established in 1956 in the partnership with the public. The factory enlarged its production base and incorporated thread, textile and print functions in 1966 and it passed to ready-made cloth production after 1976.

7.2.4. Industry After 1970s.

From the first years of 1970s Eskişehir's manufacturing industry experienced a rapid development process.

The proximity of the region to big consumption centers, connection with roads and railways and the development in the energy sources, played an important role in the development of Eskişehir's industry. Proximity to large energy production centers such as Sarıyer, Gökçekaya, Seyitömer, Tunçbilek was also an important advantage for the industry of Eskişehir.

The private industrialists gained power at the beginning of 1960s. They organized separately from the Eskişehir Chamber of Trade and Industry and established the Eskişehir Chamber of Industry in 1968. With this new organization, industrial capital took important steps in protecting the profits of industrial development and influenced the general economic policies. The most important success was the establishment of the Organized Industrial District. The infrastructure possibilities that the industrial district supplied, created new investments.

Advances secured by transportation, energy, trained labor force and a large small-scale industry sector were well evaluated by the industrialists of Eskişehir. Besides new investments, industrialists went through product differentiation and because of the bottlenecks in foreign exchange, they began to produce intermediate and investment goods. At the beginning of 1960s 90% of tile 80% of cement, 75% of flour produced were exported. But in 1970s, the same kind of industries were established in the neighboring provinces and exports to other provinces was decreased.

The accumulation of knowledge and experience in the machine manufacturing sector helped the coming of more advanced technologies to Eskişehir. The large establishments coming from outside related to machine production and casting also made investments in Eskişehir and Bozüyük at the end of 1970s and in 1980s. The locomotive production of TULOMSAŞ,

the truck and diesel motor production industry, the compressor industry and other advanced technologies developed and materialized by using the qualified labor power.

Tusaş, which began production in 1987, is an establishment that will bring different dimensions to the development of the machine industry. Its potential for providing the transfer to more sensitive machines and spare parts production technology in the long run is high.

Also, factories processing gypsum, factories producing goods for the construction industry, and ceramic producing factories were established in Bozüyük in 1970's.

In 1987 the increasing demand in the construction sector caused the entrepreneurs in the region to refer to foreign investment in their search for new products. The firm Terakko was established by this initiative.

7.2.5. Existing Structure of Eskişehir Industry

In regard to large industry in 1989, there was a total of 77 establishments, 8 of them belonging to the public and 69 of them to the private sector. In all, 16999 people were employed, 7586 of them in the public sector and 7413 in the private sector. The textile industry is the sector having the highest number of plants and working personnel (Table 7.2. and Table 7.3.).

In all middle and small-scale industry, according to the values of 1988, there were 135 establishments 27167 persons were employed. The machine industry is the sector having the highest number of establishments and working personnel (Table 7.4).

Table 7.2 The Development of Eskişehir's Industry According to the Industry Groups

Industry Group	Sector	1981 No.of Estab.	1981 Av.no.of Employee	1989 No.of. Estab.	1989 Av.no.of Employee
Food	Pu	2	2042	3	667
Manufacturing	Pr	29	1804	10	1027
	T	31	3846	13	1690
Manufacture of	Pu	1	1337	-	-
Textiles	Pr	6	284	38	9420
	T	7	1621	38	9420
Manufacture of	Pu	1	18	-	-
Wood and	*Pr	11	325	-	-
Wood Products	T	12	343	-	-
Manufacture of	Pu	-	-	2	-
Paper and	*Pr	3	77	-	-
Paper Products	T	3	77	2	-
Manufacture of	Pu	-	-	-	-
Chemicals	Pr	2	-	5	719
	T	2	-	5	719

Manufacture	Pu	-	-	1	395
Non-Metallic	*Pr	12	2053	3	204
Mineral Products	T	12	2053	4	599
Basic Metal	Pu	-	-	-	-
Industries	*Pr	5	962	1	-
	T	5	962	1	-
Man.of Fabri-	Pu	2	4820	-	-
cated Metal	Pr	34	893	5	311
Products,	T	36	5713	5	311
TOTAL	Pu	6	8217	8	7586
	Pr	107	6632	69	7413
	T	113	14849	77	16999

Source: State Institute of Statistics (DIE),

Annual Manufacturing Industry Statistics of 1981 and 1989.

a Pu: Public Pr: Private T: Total

* Not published because of secrecy

Table 7.3. The development of Eskişehir's Industry

	Sector	1976	1980	1984	1989
Number of	Pu	7	8	6	8
Establish-	Pr	70	110	52	69
ments	T	77	118	58	77
Average	Pu	8498	8165	8165	9413
number of	Pr	5862	7287	7090	7586
Employees	T	14360	15568	15255	16999
Output	Pu	2153	10863	45968	369918
million TL	Pr	1723	13471	49219	56689
	T	3876	24335	95187	963815
Value	Pu	863	4503	15094	180910
Added	Pr	564	5354	20136	229749
million TL	T	1427	9857	35231	410659

Source: State Instute of Statistics (DIE).

Annual Manufacturing Industry Statistics

Table 7.4. The Structure of Eskişehir's Middle and Small Scale Industry

	No.of Plants	No.of Person.	No.of Workbench
Machine Ind.	45	6735	2156
Bureou and Home Instruments Ind.	12	1745	1172
Grain Mill	8	338	169
Other Food Ind.	16	3634	366
Soil Ind.	14	2614	859
Forestry Products Ind.	10	539	174
Textile and Wearing Ind.	4	1779	1207
Metal Ind.	13	2065	545
Manufacture of Chemicals	9	72	3151
Packing Ind.	4	149	45
Others	-	7500	200
TOTAL	135	27167	10044

Source: Eskişehir Sanayi Odası Yayınları No.24 1988, P:35

7.2.6 Existing Structure of Firms

In Eskişehir the firms choose to produce different products and in this way, they keep away from competing with each other. Even the firms producing the same products emphasize the evident differences of their products. The exporting firms selling their products to the neighboring areas and to Türkiye in general are the industries which achieved evident high qualities in their products and used advanced technologies. These establishments could perceive the sectors developing in Türkiye in general. The bottleneck of these establishments is caused by not being able to go to product differentiation and develop new products. Some of the goods produced in the Eskişehir machine manufacturing industry is a monopoly in Türkiye in general and has a high market share. Especially construction, mining, biscuit machines and some agricultural machines and their spare parts are produced only in Eskişehir and marketed in Türkiye. Yet the capacity of some of these products is unable to meet the demand of the whole of Türkiye. A machine firm producing construction materials, although it has a monopoly, states that it could address only 10% of the municipalities of Türkiye.

The private enterprises that achieved technological development overcame the bottleneck by passing from "machine intensive" to "knowledge intensive" mode of production. It is observed that in these establishments investments are made in personnel having technical skills rather than investments in machines. In addition they are extensively in coordination with other establishments making production of electronic systems design outside Eskişehir.

The employment of trained labor in the fields needing specializa-

tion like management, financing and marketing did not become a common practice.

Programs for the education of existing personnel take place in a few firms. It is observed that establishments having effective education programs are the firms that came from outside Eskişehir. Parallel to the rest of Türkiye, the relations between administration and ownership could not be separated in most of the establishments that are family enterprises. The entrepreneurs strict control could be observed also in the establishments employing professional administrators.

In the evolution of the firms the necessary level of institutionalization could not be achieved. The conservative characteristic of entrepreneur-administrators in Eskişehir and their likening for independence restricted their cooperation with other firms. License agreements and shared initiatives constitute the exceptions in Eskişehir.

7.3 Social and Economic Structure of Eskişehir

7.3.1 Population Growth

The rate of population increase-which is an indicator for the industrial attractiveness of a city, is less than the other cities of Anatolia having the similar development dynamics (Table 7.5)

Table 7.5 Eskişehir's Population Growth Compared to Similar Cities of Anatolia

	ESKİŞEHİR	DENİZLİ	GAZİANTEP	KAYSERİ	KONYA
1950	89879	22017	71887	65488	64434
1955	120092	29909	96678	82405	92236
%increase	33.6	35.8	34.5	25.8	43.1
1960	153096	48925	124097	102596	119841
%increase	27.5	63.6	28.4	24.5	9.9
1965	173882	64331	160152	126653	157934
%increase	13.6	31.5	29.1	23.4	31.8
1970	216373	82372	227652	160985	200464
%increase	24.4	28.0	42.1	27.1	26.9
1975	259952	106902	300882	207037	246727
%increase	20.1	29.8	32.2	28.6	23.1
1980	309431	135373	374290	281320	329139
%increase	19.0	26.6	24.4	35.9	33.4
1985	366765	169130	78635	373937	439181
%increase	18.5	4.9	7.9	35.9	33.4
1990	413082	204118	03434	421362	513346
%increase	11.2	17.1	20.6	1.3	14.4

7.3.2 Development Range

Eskişehir's development range fell from sixth level to nineth level during the period of 1950–1985 (Table 7.6).

Table 7.6 The level in the development range (1950–1985)

1950–1965	1970–1975	1980	1980–85
1. Istanbul	1.Istanbul	1.Istanbul	1.Istanbul
2. Ankara	2.Ankara	2.Ankara	2.Ankara
3. İzmir	3. İzmir	3. İzmir	3. İzmir
4. Adana	4. Adana	4. Adana	4. Adana
5. Bursa	5. Bursa	5. Bursa	5. Bursa
6. Eskişehir	6. Gaziantep	6. Gaziantep	6. Gaziantep
	7. Eskişehir	7. Konya	7. Konya
		8.Eskişehir	8. Kayseri
			9. Eskişehir

According to the economic and social indexes of the State Planing Office, Eskişehir is in the 9th range while the other cities ranging as;

8. Konya	: 0,320
9. ESKİŞEHİR	: 0,291
11. Kayseri	: 0,161
13. Gaziantep	: 0,110
46. Denizli	: –0,346

According to the "agricultural modernization indexes" Eskişehir is in the 57th range and the other cities are in the ranges of;

11. Konya : 0,705

15. Denizli : 0,367

24. Kayseri : –0,047

29. Gaziantep : –0,105

57. ESKİŞEHİR : –0,624

On the other hand Eskişehir has a very high level in the range of "education index" according to the similar cities;

6. ESKİŞEHİR : 1,379

16. Denizli : 0,660

23. Kayseri : 0,491

39. Konya : 0,038

46. Gaziantep : –0.512

7.3.3 Gross Domestic Product of Eskişehir

Industry is the sector having the highest share in GDP of Eskişehir. 1/3 of GDP is realized by industry in 1986 and with this share Eskişehir is one of the 21 industry provinces of Türkiye.

The manufacturing industry is the important sector in the total industry having a share of 24.8% in GDP.

While the share of industry in GDP in 1976 was 25.40%, the level increased to 26.87% in 1986. From 1979 to 1985, industry showed a decline. The lowest level was 20.1% in 1983.

Second sector in GDP is Trade. In 1979 the share of trade in GDP

was 14.39 and it increased to 18.99% in 1986 with constant prices. The highest increase from %14.94 to %17.34 in the share of trade in GDP was realized in 1983.

The contribution of the agriculture sector to GDP is decreasing and in the year 1986, it became the 4th sector after industry, trade and transportation. The prominent recession of the sector was seen in 1983 and 1985. The share of agriculture in GDP decreased from 18.92% to 15.91% in 1986. In 1979 at constant prices, Eskişehir's share in the national product was 1.53%, with this share Eskişehir was 14th among the other provinces of the country. In 1986, Eskişehir was 16th with a share of 1.35%.

In 1979-1986, period, GDP values in Eskişehir were behind the rest of Türkiye in all industry, trade and agriculture sectors.

In 1979-1986 period while the increase of the agriculture sector in GDP of Eskişehir was 11.3 times, the increase in the whole of Türkiye was 13.9 times at current prices. The increase of industry sector in GDP of Eskişehir was 20.1 times, the increase in Türkiye general was 24.2 in current prices and the increase of trade sector, in GDP of Eskişehir was 21.2 and the increase in Türkiye general was 21.6.

Table 7.7 Composition of Gross Domestic Product of Eskişehir
(At Constant Prices) (%)

SECTORS	1979	1980	1981	1982	1983	1984	1985	1986
1. Agriculture	18.92	22.37	21.95	21.08	18.31	18.59	15.82	15.91
2. Industry	25.40	21.53	21.96	22.63	20.10	23.23	26.28	26.87
Mining	1.26	1.33	1.39	1.34	1.43	1.33	1.40	1.49
Manufacturing	21.02	17.42	17.06	18.30	16.46	18.84	22.66	23.42
Energy	3.13	2.77	3.50	3.00	2.21	3.07	2.22	1.95
3. Construction	3.82	3.42	3.38	3.80	3.53	2.88	2.66	2.52
4. Trade	14.39	14.53	14.84	14.94	17.34	16.60	16.78	17.13
5. Transport	13.11	13.06	13.02	12.45	13.68	13.05	12.56	12.32
6. Finance	2.64	2.70	2.65	2.65	2.56	2.46	2.42	2.29
7. Housing Incomes	4.25	4.66	4.57	4.50	4.99	4.47	4.18	4.10
8. Free Services	4.54	4.56	4.48	4.51	4.38	4.49	4.55	4.37
9. Banking Expenditure	1.32	1.35	1.32	1.28	1.22	1.22	1.21	1.14
10.State Services	11.33	12.46	12.56	12.69	14.46	13.27	12.93	12.54
11.Import Tax	2.93	2.06	1.91	2.12	1.97	2.19	3.03	3.10
12.GDP	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: ISO, Yayın No: 1988/8, 1988

Table 7.8 GDP OF SOME PROVINCES
(At 1979 Prices)

PROVINCE	1979		1980		1981		1982		1983		1984		1985		1986	
	Range in GDP	Share in GDP	Range in GDP	Share in GDP	Range in GDP	Share in GDP	Range in GDP	Share in GDP	Range in GDP	Share in GDP	Range in GDP	Share in GDP	Range in GDP	Share in GDP	Range in GDP	Share in GDP
1.İSTANBUL	1	21.19	1	19.35	1	19.67	1	20.95	1	20.57	1	21.45	1	21.74	1	22.0
2.İZMİR	2	7.34	2	7.97	2	7.53	2	8.19	2	8.14	2	7.88	2	8.04	2	8.0
3.ANKARA	3	7.33	3	7.43	3	7.39	3	7.42	3	7.11	3	7.05	3	7.28	3	7.2
4.KOCAELİ	4	3.51	4	3.93	4	4.58	4	3.75	4	5.03	4	4.48	4	4.62	4	4.6
5.BURSA	6	3.21	6	3.14	6	2.99	7	3.06	6	3.35	6	3.34	5	3.56	5	3.5
6.KONYA	7	3.02	8	3.02	8	2.95	8	2.91	8	2.93	7	3.05	7	2.73	7	2.7
7.DENİZLİ	17	1.42	17	1.43	16	1.44	16	1.46	16	1.40	15	1.43	15	1.39	15	1.4
8.GAZİANTEP	19	1.22	19	1.24	19	1.29	19	1.21	19	1.22	18	1.26	19	1.20	18	1.2
9.KAYSERİ	16	1.47	18	1.27	18	1.30	18	1.33	18	1.25	19	1.20	18	1.23	17	1.2
10.KÜTAHYA	20	1.22	22	1.14	21	1.13	20	1.15	21	1.05	21	1.10	21	1.14	20	1.1
11.AFYON	32	0.87	32	0.87	25	0.99	29	0.89	31	0.84	30	0.84	30	0.89	30	0.8
12.BİLECİK	56	0.39	56	0.39	52	0.42	55	0.37	55	0.37	53	0.40	53	0.42	53	0.4
13.ESKİŞEHİR	14	1.53	14	1.53	14	1.47	14	1.46	17	1.28	17	1.36	16	1.36	16	1.3

Source: ISO, Yayın No: 1988/8, 1988

Table 7.9 Increase Rate of GDP by Years

	Current Prices	Constant Prices
1979	--	--
1980	95.5	-3.8
1981	64.7	3.1
1982	33.6	4.3
1983	17.4	-8.5
1984	67.4	11.8
1985	52.6	6.1
1986	39.3	5.4

7.4 Capital Groups in the Industrial History

The main capital groups that were effective in the economy of Eskişehir were the families of Zeytinoğlu, Kanatlı and Kılıçoğlu. The Kanatlı group was dealing with the production of floury goods (especially biscuits), the Kılıçoğlu group was dealing with tile and brick production and the Zeytinoğlu group was dealing with the production of construction materials and machine manufacturing.

The Industrial history of the Kanatlı and Kılıçoğlu Groups goes back to the early years of the Republic. However, the Zeytinoğlu Group got into this area in 1960s, and in 1980s it was the most effective group.

Figure 7.1 shows the development of the Capital of the Kanatlı Family. The first generation came to Eskişehir from Gümülcine and estab-lished flour mills. But the development of the flour mills in Eskişehir stopped

in 1960s because of the flour mills established in other regions. At that time, the Kanatlı Family utilized the advantages of the existing sugar industry and the location of the province and Firuz Kanatlı established a biscuit factory in 1965.

In the following years ETİ biscuit factory developed oven and machine producing technologies for the first time in Türkiye and established a Biscuit Machine Factory in 1976. And to meet the increasing demand a second biscuit factory, "Tam Gıda Sanayi ve Ticaret A.Ş." was established in 1979. The family was also effective in the establishment of ECI and organized industrial district and took its in the leader group of industrialists.

Figure 7.2 shows the development of the Capital of the Kılıçoğlu Family. They came to Eskişehir from Bulgaria and established a Tile Factory. After 1960, the second generation increased the capacity of the factory and went to modernization and after 1960s, the family transferred the administration of the factory to professional administration and they went to Istanbul.

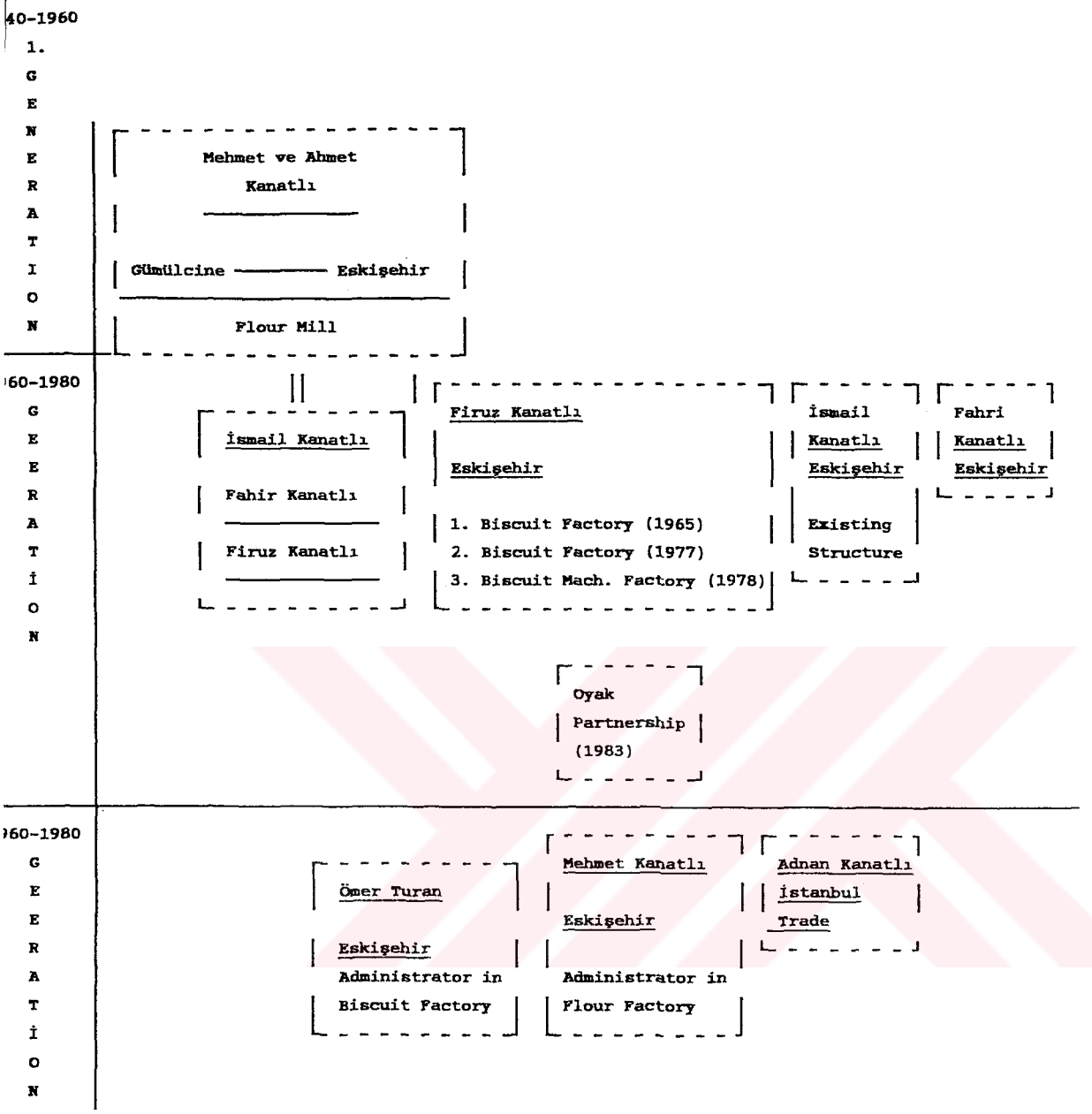
Figure 7.3 shows the development of the Capital of the Zeytinoğlu Family. The family of "Zeytunzadeler" came from Kütahya's Tavşanlı district and settled in Eskişehir. They acquired large amounts land in the province and began trading. In 1950s, the Zeytinoğlu Family were effective in the administration of the Bank of Eskişehir and in 1964 established Entin-Industrial Investments and Trading Co. by the accumulation of surplus acquired from agriculture and trade and then started founding and machine manufacturing. The Group established Eston in 1965 and began to manufacture prefabricated concrete and construction materials. Eston also has a factory in Gaziantep producing construction materials.

ES-EN another machine manufacturing factory of the Zeytinoğlu Family was established in 1977. The Group, holding the highest share in Eskişehir and carrying out trade activities through the Zeytinoğlu Trade and Industry Co. had another firm in the sector of transportation.

The Zeytinoğlu Family were effective in the administration of the Eskişehir Chamber of Industry. Mümtaz Zeytinoğlu was the chairman of the Chamber from 1970 up to this death in 1979. Then his brother Yavuz Zeytinoğlu undertook this mission.

Mümtaz Zeytinoğlu, with his efforts and responsibility in carrying out the activities of Eskişehir industry and the Eskişehir Chamber of Industry and with his ideas about the industrialization policies of Türkiye and with his struggle to defend his ideas was one of the most important representatives of intellectual industrialists in the development of Eskişehir industry.

He mainly emphasized the necessity of breaking the dependence on foreign economic powers for the development of Türkiye. The way to establish an independent national economy passes through real industrialization in which, machine producing machines are produced with domestic capital. He strongly criticized the Supplementary Protocol anticipating the partnership of Türkiye with European Economic Community which he saw as a real hindrance to the industrialization of Türkiye and with these ideas he became the representative of "Anatolian Capital".



gure 7.1 Transfering of the Capital of Kanatlı Family from Flour Milling to Food Industry

	NAME	PRODUCTION SUBJECT	ORIGIN & ACCOMODATION	WORKING PERIOD
1. GENERATION	SABRİ KILIÇOĞLU	Baker's trade	Deliorman (Bulgara)	
	SABRİ KILIÇOĞLU	Tile Factory and Fire-tile Factory	Eskişehir	1935-60
2. GENERATION	YALÇIN KILIÇOĞLU (Son)	Increase in the capacity of the factory and Modernization	Eskişehir	1960-68
	KILIÇOĞLU FAMILY	Transfering to Professional administration Preserving the same structure	Istanbul	1968

Figure 7.2 The Development of the Capital of Kılıçoğlu Family in the form of a Closed Firm Structure

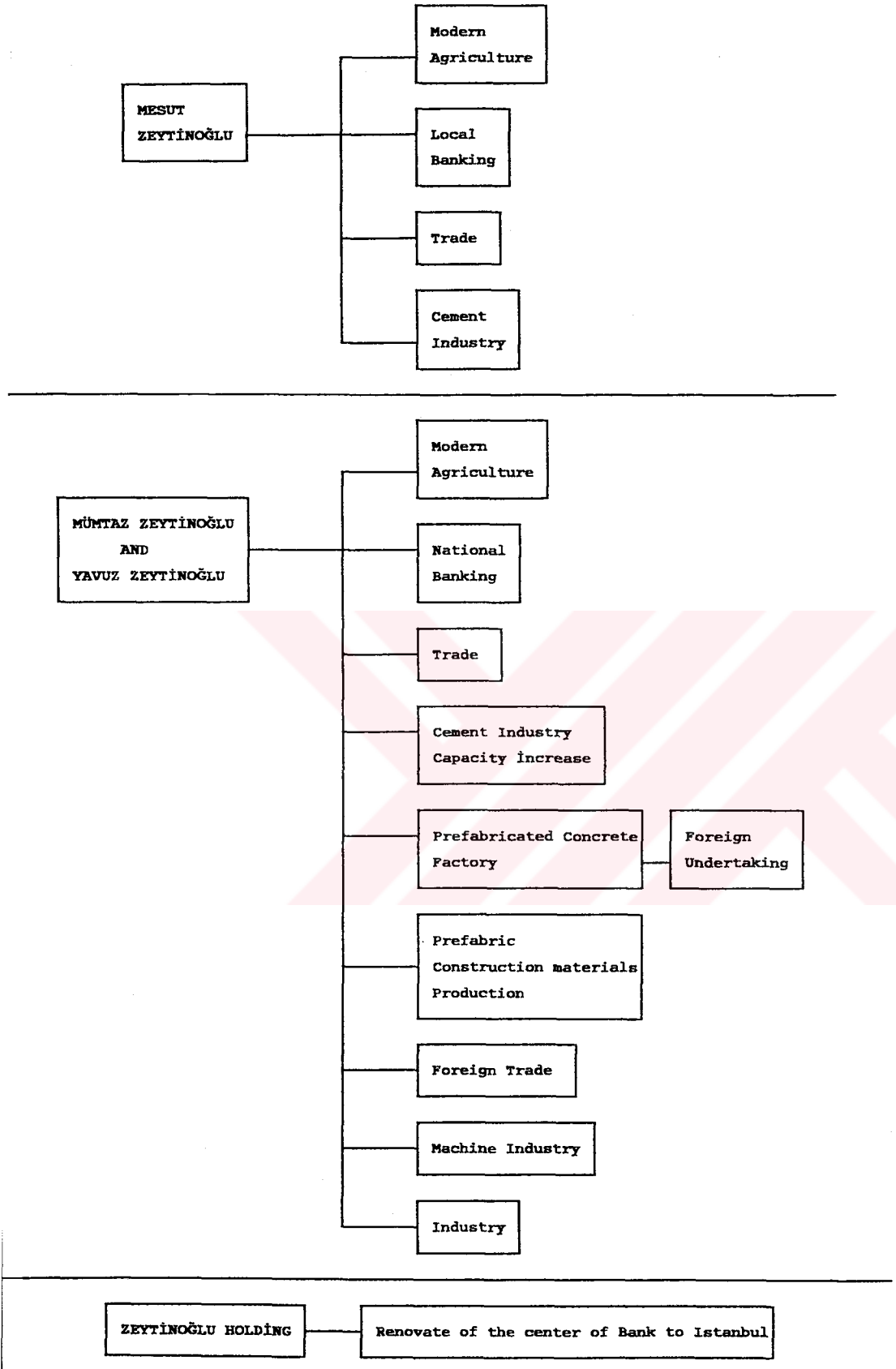


Figure 7.3 Development of the Capital of Zeytinoğlu Family

7.5. Tradition of Local Leadership

Utilizing the advantages of a region or a nation skillfully, necessitates a powerful "local leadership". The human resources, organizations that constitute the institutional structure and the capital resource will be stimulated only by the enthusiasm of this local leadership.

A successful leadership will implement the following functions:

- Designation of objectives;
- Recognition of the possibilities of the region and nation
- Constitution of a coherent philosophy
- Adaptation of the developments in the world in general by local possibilities
- Creating a project stock
- Creating public opinion for inciting the enthusiasm of local entrepreneurs or for making the region attractive for the entrepreneurs from outside.

There is the tradition of local leadership in Eskişehir. The first generation of leadership accelerated the industrialization of the region beginning from the first years of Republic. They formed the basis of the traditional industry of the region by using the countrywide campaign, which was observed in the multiparty period.

The second generation of dynamic entrepreneurs arose in 1960s, with the leadership of Mümtaz Zeytinoğlu 25 years ago these young industrialists decided to establish an independent Chamber of Industry, which up to that date had been part of the Chamber of Trade.

The history of the establishment of the Eskişehir Chamber of Industry gives the original example of relations among the vanguard person-

alities and social developments.

The aim of establishing an independent chamber came from the desire to air the voice of industrialists of the region to the public.

The industrialists began to see their future in the future of region's traditional structure from the perspective of industrialism. With these opinions the industrialists of Eskişehir established the Eskişehir Chamber of Industry in 1968.

The assembly of ECI was constituted from the elderly and experienced industrialists and the board of directors were constituted from the young and dynamic industrialists.

After its establishment, the young board of directors, firstly opened to discussion the subjects of industrialization of Türkiye, regional development of Türkiye, regional development of Eskişehir, banking, mining, foreign capital, universities, agricultural reform, European Community, Public Economic Establishments and organized industrial districts.

After long discussions, a declaration "the Declaration of Industrialist Directed to Society" was prepared which would then function as the constitution of ECI. This declaration aroused interest in Türkiye in general because a private sector institution was opposing the mistakes of the private sector and defending the interest of the whole society for real development.

ECI, opposite to its counterparts was not a solidarity establishment aiming to preserve only its own members or its own region's interests. It always talked about the duties rather than asking for new privileges like most of the other private establishments and put forward the negative effects of import industries directed to a consumer society, which retards the real .

development and makes the economy foreign dependent.The term "industrialist directed to society" constitutes the group of entrepreneurs which has the consciousness of social responsibilities. It is a natural attitude for these entrepreneurs to benefit from the possibilities of technology and science while they are planning their investments.

ECI undertook the establishment of Organized Industrial District in 1973. With restricted possibilities the Eskişehir Organized Industrial District was established by the efforts of the dynamic industrialists. The chairman of the ECI, İsmail Kanatlı, at that period, was carrying out a public duty for the first time of his industrial life and he was full of enthusiasm for this duty. Also, the industrialist families Zeytinoğlu, Kılıçoğlu, Çakır and Erden were supporting this project.

During its 25 year life, ECI has been published research, books, weekly and monthly periodicals and it has established a rich and current library. It has developed a technopark project with Anadolu University which will service the research and development studies. In addition, ECI is giving technology awards to encourage the development and the use of new technology in industry. The award ceremony has been held between the members of ECI every two years since 1985 and it is an unique application in Türkiye.

The stimulation of the desire for regional development, is a business of invitation, creating friendly relations and being conscious of responsibilities in creating a common future.

The accumulation of knowledge and experience of the leader group deriving from the dynamic entrepreneurs of 1960s and 1970s,today constitutes the most important chance of the region for stimulating development.

7.6. Effects of Public Investments

Contributions of public investments such as Cer Ateliers from the pre-Republic period which turn to giant institution, the Aircraft Repair workshop, the Sugar and Machine Factory, Sümerbank Printed Cloth Factory and the labor force trained in these public institutions, formed an important advantage for the region.

The rather long past of public industry institutions created an industrial culture and qualified workmanship in Eskişehir.

- Labor force trained in public institutions made contribution to other industries established in the region.

- Education investments from public help the training of the labor force.

- Public investments create industrialization conscious and encourage the other sectors to try to accelerate the development process.

Besides these advantages, public investments created a statist tradition in the region. This tradition has a negative effect on adaptation of today's economic policies which are open to foreign financing and international competition.

7.7. Effects of Macroeconomic Decisions

The majority of the investments focused on the Eskişehir Organized Industrial District which was established in 1970s with the policies implied by the government, such as "constant exchange, ensuring source with low interests, the protection of the goods securing the substitution of import" (ESO.24,1988:150).

After 1980s, the weight of the public sector in industry was reduced, liberalization in exports and imports resulted in the reduction of effective protection ratios in manufacturing sector and the industrial production was oriented to exportation. Starting from 1980s, the share of industry within total investments declined continuously.

Industrialists evaluate the effects of macroeconomic decisions for cutting the speed of industrialization as; "Nobody can make investment by calculating the changes in state policy. Economic policies, applied by governments are taken as a base. In 1970s, the second generation industrialists made the feasibility of their investments with such an approach. But the economic decisions of 1980s destroyed all the previously established balances. A rise in the foreign exchange rate as a result of the abolition of the difference in the exchange rates, increased the debts. Costs of investment credits increased."

Demand was restricted with the measures taken. With the deduction in customs, establishments which had not planned for the international competition conditions were forced into competition. Macroeconomic decisions reduced the investment speed in Eskişehir as it did in the whole of Türkiye.

7.8. Efforts For Stimulating Local Dynamics

It is observed that the development process of Eskişehir Industry declined relatively after 1980s within the macroeconomic policies.

Before 1980s, the local leader industrialists did not give importance to the internal (İstanbul) and external foreign capital because of their general philosophy which defines the development of industrialization with

local capital. This conservative attitude constituted a strong contradiction with the economic policies of 1980s.

After a recession period, industrialists of the Eskişehir region began to seek for new objectives which would stimulate the local dynamics in 1990s.

The Board of Directors of ECI decided to invite the domestic and foreign capital to the region to make big investments which would pass over the national borders. During the industrialization process of Eskişehir, the large establishments were brought to the region by public sector but now this will be done by the private sector.

How will the region be attractive for these big private investments? Firstly, the potential of the qualified labor force which is cheaper than the other industrial provinces, knowledge and experience accumulation coming from the historical production culture and the proximity to large consumption centers constitutes the existing advantages of the region. Secondly, the administration of ECI has taken conscious steps such as, increasing the area of Organized Industrial District from 4 million m^2 to 12 million m^2 and realizing infrastructure investments in these areas. This would ensure the provision of cheap and adequate land for the new investments. Eskişehir Organized Industrial District is one of the most orderly industrial districts of Türkiye and today it is the only industrial district that uses natural gas as energy.

The projects for increasing the quality of transportation will also have an effect in attracting investments to the region. The Bursa–Eskişehir motorway is an important project which will stimulate the connection of Eskişehir with harbor regions. Within these efforts, three big projects will be undertaken in the Eskişehir Organized Industrial District. These are the

second Arçelik factory, an Automobile Factory and a Ceramic Factory.

These high technology investments will have an important contribution in stimulating the industrial development of the region. By these investments the establishment of subindustries will be induced which will necessitate the use of high technology. ECI has developed the project of "technopark" for ensuring the success of the existing and newly developing sub industries of the region by supplying counseling services.

The efforts for providing a coordination of industry with university creates a scientific environment for technological development in industry.

As a result, we can say that, future oriented expectations of the industrialists of Eskişehir is based on the evaluation of variables such as; the appearance of new industrial structure in the world and in Türkiye, the adaptation of firms founded in the region to crisis conditions and the formation of a new philosophy in investment decisions.

7.9. Efforts For Technological Development

The changing philosophy of investment and management of the region's industrialists and the efforts of the local foundations shows the desire of the region to catch up with the new developments in industrial structure.

"The way of development passes from the industrialization. And the industrialization is possible only by producing the technology and transferring high technology. Producing the new technologies, keeping transferred new technologies alive and developing them depend on the success of the research and development systems.

The conditions of reaching absolute success in R&D systems are;

- Commercial ideas should direct the R&D studies
- R&D system should make applicable, convertible to the commercial products and manufacturable studies."

This explanation in the above quotation is the idea of the Eskişehir Chamber of Industry (ECI).

Anadolu Technological Research Park (ATAP A.Ş) a pioneer in the establishment of technoparks in Türkiye was established in 1990 by the partnership of Anadolu University and the Eskişehir Chamber of Industry and the member industrialists. The main aim of the foundation is;

- Encouragement of entrepreneurship,
- Establishment and growth of newly based companies,
- Turning R&D studies into investment,
- Diversification of local activities doing researches to determine researcher/specialist potential, to find out locally developed or developing technologies and to make a list of common technological problems encountered by local companies.

Through this initiative; Industry will solve the production related problems, will have the possibility of testing and analyzing, will consult on the selection of the production technology, will have a scientific environment where purchased and produced technologies by regional establishments will be developed and kept alive and will have the chance of an empiric training in the development of quality control methods, production technologies, and the use of equipment; while the University will have the chance of catching

industrial development and students and researchers will have motivation for an experimental research.

Giving technology awards is an important activity of ECI aiming to encourage the development and the use of new technology in the industry. This has been held between the members of ECI every two years, since 1985.

A Selector Committee which is selected from 2 persons from the Board of Directors of ECI, 2 persons from Anadolu University 2 persons from TÜBITAK and 2 persons from the related profession committees of ECI determines the owner of the awards.

These awards are given in three different fields:

1) The Technology Development Award is given to a new technological innovation that was not used before,

2) The Development of New Product Award is given to a new product development which was not known before or was not used or produced in our country,

3) The Technology Application Award is aiming to encourage the selection of the most developed technologies in realizing the investments. Applied technology can be domestic or foreign.

To be deemed worthy of the awards, the new technology or the product,

- Should be at an advanced level according to the world standards,
- Should be beneficial to the development of society and national economy,
- Should not be harmful to the environment.

The Technology Awards given by ECI are follows;

– Technology Development Awards

1. Name of the Firm: Mersan Merdiven ve Kaplamalar Sanayi ve Ticaret Ltd. Şti.

   Name of the Technology: "Conveyor Banded Continue Working Line"

This technology is used in the production of prefabric steps and square tiles. The firm produced this technology from its own original studies.

2. Name of the Firm: OTOSAN A.Ş.

   Name of the Product: Optic Sensored Electronic Measuring Equipment.

The newly developed equipment has rapid usage possibility in widespread and serial production, at the same time it provides both quality and efficiency in production.

The factory possessed imported control units and equipments. By the increase in production and increase in the domestic share of produced products the demand for this type of equipment also increased.

OTOSAN authorities state that the firm has a tendency to decrease foreign dependency in production. In this respect there are studies of how the motor parts, workbenches or control equipment could become domestic.

Optic Sensored Electronic Measuring Equipment has been developed as a result of the studies. It is wholly a domestic technology and had been applied for the first time in the world. It has a simple and very

cheap electronics compared to the similar imported ones and the maintenance is very simple.

The cost of production is 12–15 times cheaper compared to the similar imported models.

The system can be applied in nearly every situation and can be adapted for special purposes.

This equipment was not produced in Türkiye before, and firms using this type of equipments had been importing all of their needs and making large investments. This technological development will decrease the dependency to foreign investment in this field.

3. Name of the Firm: OTOSAN A.Ş.

Name of the Technology: "Measuring the Automotive Axles with the Help of Computer."

This is a technology development study aiming at ensuring quality by measuring. The product provides measuring reliance, decrease in measuring time and automation. Measuring time is decreased from 18–20 hours to 50 minutes. Reporting time results of measure become easier. Also the cost of this system is 230 million TL. while the price of similar imported systems is 600 million TL.

4. Name of the Firm: ÇAĞLAYAN MAKİNE SANAYİ VE TİCARET A.Ş.

Name of the Technology: "Technological Development in the Micronized Mine Grinding."

The firm using its own resources produced a separator for the first

time in Türkiye. Before this, the product was produced only in USA and Germany and the new developed product is cheaper compared to the imported one.

– Product Development Awards

1. Name of the Firm:HİSARLAR MAKİNA SANAYİ VE TİCARET A.Ş.

Name of the Technology: "Stalk Shredder and Rotary Tiller"

This product will have an important contribution to agricultural mechanization.

2. Name of the firm : ES–EN A.Ş.

Name of the Technology: "ES–EN 1212 Concrete Block Machine".

ES–EN A.Ş. a subsidiary of the Zeytinoğlu Holding A.Ş. is a machine factory that services the cement and construction sectors of the heavy machine industry.

ES–EN 1010 Briquet Machine's projects were taken from an Austrian firm and produced in 1978–1985 period. Then the capacity of the Machine became inadequate and the project of ES–EN 1212 Concrete Block Machine which provides a 60% capacity increase began to be made in Türkiye. There is no other machine having the capacity and performance of ES–EN 1212. Moreover it is times cheaper than the similar imported one. In a one year period it provides a saving of 715.000$ foreign exchange.

The eleven ES–EN 1212 Concrete Block Machine is working successfully in different parts of the country and has the capacity to compete.

3. Name of the firm: EMAYESAN LTD. ŞTİ.

Name of the Product: "Natural Gas Stove"

The firm took into consideration the distribution of natural gas in the country and the superior properties of natural gas to the other kinds of energies and began to look into ways of using natural gas in heating equipment. At the end of the studies about the practicality and economy of the usage in homes, the firm successfully developed the natural gas stove. This natural gas stove should be used in single rooms and it should also be fixed in the place of the radiator in homes. It provides savings both in installment and management costs compared to other forms of domestic heating.

4. Name of the Firm: YÜKSELİŞ DEĞİRMEN MAKİNALARI SANAYİ VE TİCARET A.Ş.

Name of the Technology: "Perpendicular Waltz Grinding Machine"

By developing the perpendicular Waltz in Türkiye, the firm succeeded in grinding wheat with only one Waltz while in the world this procedure was done by three normal waltzes. By this system, flour is obtained in a very economical way and there is a 40% energy saving.

With this expansion of this perpendicular Waltz Machine, flour prices and connected to this the prices of products which use flour as an input, like biscuits, bread etc., will decrease significantly.

5. Name of the Firm: ESKİŞEHİR MAKİNA SANAYİ A.Ş.

Name of the Technology: "Beet Unloading Machine"

The imported beet unloading machine from Russia was not appropriate to the conditions of our country. The new Machine is suitable for the conditions and the technological developments are adapted to the Machine.

– Technology Application Awards

1. Name of the Firm: Sörmaş Söğüt Refrakter Malzemeleri A.Ş.

Name of the Technology: "High Alimunaded Brick Production"

The firm brought the high alimunaded brick production technology to Türkiye for the first time and realized the production of high alimunaded at the rate of 70%–80% refractor brick.

2, Name of the Firm: SARAR GİYİM TEKSTİL SAN. VE TİC. A.Ş.

Name of Product : "Automatic Jacket and Coat Breast Form Press"

Eskişehir is ahead in the sector of ready–made clothes. There are three big ready–made clothes factories each employing approximately 300 workers producing approximately 2000–2500 suits for men. Besides these, 10–15 workshops are producing men and women' clothing.

"Sarar Giyim Sanayi" is one of the ready made clothing factories in production since 1960s. Sarar's previous workshop type production units were organized into a company in 1984. The new factory of "Sarar Textile and Wearing Apparel Industry and Trade Co" has a production park using the latest developments in technology.

The firm has an exporting capacity of 1000 suit per day. Some of the countries to which clothes are exported are England, Ireland, Hungary and Germany. From the beginning of 1987, production began to be oriented to the foreign market. Then a collective study was carried out with Germany's largest, world famous "Boss" firm and the possibility to address the world market came into being.

The ready–made clothes industry ironing press is produced by

few firms in developed countries and before the development of the Turkish press, it was imported from Germany at a high price. "The Automatic Jacket and Coat Breast Form Press" has been produced in the workshop of the Factory by using its own facilities.

3. Name of the Firm: TOPRAK DEMİR DÖKÜM SAN. A.Ş.
Name of the Product: "Automatic Blocking Unit and Automatic Casting Furnace.

These products provide the latest and most modern technology in the area of Iron-casting, the Blocking machine is produced by Swiss-Georg Fischer Firm and the casting Furnace is a product which is produced by the firm ASEA-BROWN BOVERİ ensuring the maximum productivity and controlled casting. The firm was given the award for its application of these products to Turkish market.

4. Name of the Firm: TUSAŞ MOTOR SANAYİİ A.Ş.
Name of the Product: "Mounting and Manufacturing of Aircraft Motor"

The motor is a model of a quality control system which is valid on the international market. It has been set up by the firm and qualified personnels have been trained in his high technology environment. This technological change will create a domestic resource that will be open to development.

5. Name of the Firm: TÜRK ELEKTRİK ENDÜSTRİSİ A.Ş.
ESKOM KOMPRESÖR FABRİKASI
Name of technology: "Indexed Crank Working Bench

Important saving from workmanship and from foreign exchange

and an increase in productivity is provided.

When we examine the examples of technological changes that have taken place in Eskişehir Industry, we see that the new products and processes developed are generally have a cost advantage compared to the similar imported products and processes. This shows the efforts of industrialists to cope with capital shortage. Also the aim of quality increase, quality control, productivity increase and energy saving are the other factors that induce the industrialists of Eskişehir to make technological changes.

Table 7.10 shows the structure of establishments that receive technology awards from the Eskişehir Chamber of Industry. It can be seen that the machine manufacturing sector is more effective than the other sectors in the fields of technology development, product development and technology application.

Other sectors which are successful in the area of technological change are; manufacturing of paper products and computer sector for technology development, chemical and stove manufacturing and the aircraft industry in the field of product development; and brick manufacturing and the electronics industry in the field of technological application.

There are firms receiving technology awards from three periods of Eskişehir's industrialization, the first generation dynamic group period (1930–1970), the second generation dynamic group period (1970s) and the period after 1980s.

The majority of the establishments receiving technology awards are large firms having high number of qualified personnel.

Table 7.10 Structure of Establishments that receive

Technology Awards from Eskişehir Chamber of Industry

TECHNOLOGY DEVELOPMENT

Year	Sector	No. of Person.	No. of Quali. Pers	Date of Establish	Turnover (billion TL)
1985	Machine Manufac.	20	-	1973	3.7
1987	Manufac. of Paper Prod	25	-	1980	2.5
1989	Machine Manufac.	600	25	1959	987.0
1991	Computer Technology	600	25	1959	987.0
1993	Machine Manufac.	36	1	1960	5.1

PRODUCT DEVELOPMENT

Year	Sector	No.of Person.	No. of Qualified Pers.	Date of Establish.	Turnover (billion TL)
1985	Chemical Manufac.	8	2	1981	2
1987	Machine Manufac.	250	8	1977	66.3
1989	a) Stove Manufac.	200	-	closed	-
	b) Machine Manufac.	110	16	1977	19
1991	a) Aircraft Industry	9	6	1986	7
	b)Machine Manufac.	10	-	1973	3
1993	Machine Manufac.	725	22	1936	88.2

TECHNOLOGY APPLICATION

Year	Sector	No. of Personnel	No. of Qualified Pers	Date of Establish	Turnover (billion TL)
1985	Brick Manufac.	300	15	1976	146.0
1987	a)Machine Manufac.	35	-	1963	4.3
	b) Machine Manufac.	725	22	1969	88.2
1989	a)Textile Mach.Manufac.	650	3	1965	108.0
	b)Iron Foundering	350	20	1989	50.0
1991	a)Aircraft Engine Man.	330	35	1985	106.0
	b)Electronics Industry	50	3	1986	4.7
1993	Machine Manufac.	600	15	1978	868.0

Source: Eskişehir Chamber of Industry.

7.10. Evaluation of Regional Indigenous Potential of Eskişehir for Technological Change and Industrial Development

The historical industrial culture, socioeconomic and physical structure of Eskişehir offers some advantages and disadvantages in stimulating the local dynamics for technological change and industrial development.

The industrial development process of Eskişehir and the relative importance of its industry within Türkiye's industry showed a decline after 1980s. The region could not make the necessary arrangements in the structure of industry, such as providing investment capital, organization of production management, marketing and transforming the market from regional to national and international competition, within the continuing macroeconomic policies.

With the present economic and politic plan it is apparent that the relative weakness of the peripheral industries will be continued until capital accumulation and industrialization of Türkiye accelerate again.

On the other hand, by utilizing the advantages of the Eskişehir Region, it should be possible to stimulate the local production system and increase the ability of the region to adapt to technological changes.

We can summarize the advantages of the region for this stimulation as;

- Industrialization understanding coming from the historical production culture, which is rarely found in most Anatolion provinces as it is mostly created by the public industry institutions,

- Existence of qualified work force which was trained in these public institutions,

– Tradition of local leadership which achieved the adaptation to structural transformation periods and created the desire for a common future for industrial development,

– The knowledge and experience accumulation of industrialist families passing from generation to generation.

– The geographical location that provides proximity to large metropolitan areas such as İstanbul, İzmit, Bursa, İzmir where economic movements are intense and Ankara which is the administrative center,

– High education level and the existence of Türkiye's largest university in the region,

– Infrastructure possibilities realized by the local efforts,

– Encouragement of the technological developments by local foundations and the efforts for institutionalizing the R&D activities,

– Changing philosophy of the regions industrialists for adapting to structural transformation in economy and the efforts for attracting the private sector to make big investments in the region.

CHAPTER VIII
CONCLUSION

8.1 Conclusion

In the study, the theoretical framework of technological change in industry and regional development and the changing structures of economic, social and spatial systems are examined. Within these theoretical perspectives, Eskişehir's regional potential for stimulating the local production dynamics is studied.

In a changed macroeconomic situation new national strategies for the stimulation of growth have receiving increasing attention.

New theoretical perspectives put forward the creation of local development environment which is based on internal dynamics.The capability of an environment whether it is a nation,a region or a firm,in adapting to the structural changes in the production system becomes a decisive factor in achieving the development process.

Locally specific attributes, shortcomings, histories, types of human relationships all play an important role in defining the future potential of regional economy.

Utilizing the advantages of a region necessitates the recognition of the possibilities of the region, adaptation of the developments at a national and international level through local possibilities and the constitution of a coherent philosophy for the development of the region.

It is argued that three elements are important in the creation of local development environment which is based on internal dynamics (Cappe-lin, 1991, Garofoli, 1990).

- Units or individuals that will be mediators/leaders in local development,
- Technological centers or institutions that may be effective in the evolution of technological development and innovations,
- Centers that will serve producers.

Local policies which are necessary for the provision of this devel-opment process have to cover these subjects (Eraydın, 1992):

a. Appropriation of a local development model based on local dynamics by the increase in use of local sources.

b. Development of the project capacity of the area by private initiatives which are realized at a local level.

c. Concentration on incentive measures in the form of real services rather than the financial incentive measures.

d. Provision of access to strategic services, innovations and strategically important information for local enterprises.

e. Establishment of multi-service units (which keep the planning and service supply together),undertaking the role of interface between possible service demand and supply rather than the direct service supply.

f. Support of local development institutions that can provide the relation public and private relations.

g. Providing reciprocal relations between local enterprises (these relations

are determined as an important factor in the circulation of strategic information, in the expansion of technologies, in the developing of the service functions and in the establishing of new firms.

h. Support of associate units that will strengthen the total production system and increase the cooperation and solidarity between enterprises rather than individual.

All of these factors not only require certain cultural norms at a local level but also government policies at a national level.

REFERENCES

Abernathy, W.J., and Utterback, J.M., 1981. "Patterns of Industrial Innovation", Technology Review, (June–July), pp. 40–47.

Acs, Z.J., and Audretsch, D.B., 1990 Innovation and Small Firms MIT Press, Cambridge.

Andersson, A.E., Batten, D.F., Johansson, B., Nijkamp, P., 1989. Advances in Spatial Theory and Dynamics, Studies in Regional Science and Urban Economics, Vol.20.

Aslan, C.,1985. "Teknoloji Transferi ve İstihdama Etkisi", Sanayi ve Ticaret Bakanlığı Yayını, pp.174–180.

Atkinson, A.B., and Stiglitz, J.E., 1969. "A New View of Technological Chage", The Economic Journal, Vol.79, No.4, pp.573–578.

Bademli, R., 1977. Distorted and Lower Forms of Capitalist Industrial Production in Underdeveloped Countries, Ph.d thesis, MIT, Cambridge A.B.D

Beckman, M.J., 1970. The Analysis of Spatial Diffusion Processes, Pap. Reg. Sci. Ass. 25, pp.109–117.

Berry, B., 1972. Hrerarchial diffusion: The basis of developmental filtering and spread in a system of growth centers in Growth Centers in Regional Economic Development, cd. N Hansen, New York: Free Aress, pp: 108–38.

Brown, L., 1980. Innovation Diffusion A New Perspective, London.

Biggs, Tyler S., Levy, B.D., 1991. "Strategic Interventions and the Political Economy of Industrial Policy in Developing

Countries" in Reforming Economic Systems in Developing Countries, ed. Dwight H.Perkins and Michael Roemer, Harvard Institute for International Development, Harward University.

Birch, D.L., 1987. Job Creation in America: How our Smallest Companies Put the Most People to Work, The Free Press, New York.

Cappelin, R., 1991. Interregional Cooperation and Internationalization of Economics of Alpe Adri, RSA 31.European Congress, August 28-30 1990, İstanbul.

Chapman, K., and Humphrys, G., 1987. Technical Change and Industrial Policy, The Institute of British Geographers.

Dahlman, C.J., and Westphal L.E., 1982 "Technological Seach Effort in Industrial Development" in F.Stewart and J.James (eds.), The Economics of new Technology in Developing Countries, London.

Dahlman, C.J., and Westphal L.E., 1983 "The Transfer of Technoloyg: Issues in the Acquisition of Technological Capabilities by Developing Countries", Finance and Development, Vol.20, No.4.

Davies, S., 1979. The Diffussion of Process Innovations. Cambridge University Press, Cambridge.

Dosi, G.,1988. "Sources, Procedures and Micoeconomic Effects of innovation", Journal of Economic Literature, Vol.26, No.3, pp:1120-1171.

Duruiz, L. and Yentürk, N., 1992. "21.Yüzyılın Ekonomisi ve Türkiye", Görüş, Tüsiad, November.

Eraydın, A., 1985."Bölgesel Gelişmede Yeni Teknolojilerin Önemi, Sanayi ve Ticaret Bakanlığı,pp:104-114.

Eraydın, A., 1992. Post-Fordizm ve Değişen Öncelikler, Middle East Technical University, Ankara.

Erickson, R.A., 1975. "The Filtering-down Process: Industrial Location in a non-metropolitan Area", Prof.Geog., 28, pp: 254-260.

Ewers, H.J., and Wettmann, R.W., 1980. "Innovation-Oriented Regional Policy", Regional Studies, Vol. 14, January pp:161-179.

Fritsch, M., 1991 "Regional Differences in New Firm Formation: Evidence From West Germany", Regional Studies, Vol.26.3, pp:233-241.

Garofoli, G.,1990. "Local Development: Patterns and Policy Implications, ed.N.Konsolas, Local Development, (Athens: Regional Development Institute).

Gomulka, S., 1990. The Theory of Technological Change and Economic Growth, London and New York.

Graham, A.K., and Senge, P.M., 1979. A Long Wave Hypothesis on Innovation, International Conference on Innovation Policy and Firm Strategy, IIASA, Schloss Laxenburg, Austria.

Gunther, M., 1992. "Innovation, Urban Development and individual Decisions: An Economic Perspective" in Innovation and Urban Population Dynamics, Aveburg, pp: 297-310.

Hagerstrand, T., 1969." Aspects of the Spatial Structure of Social Communication and the Diffussion of Information", Pap. Reg. Sci. Ass. 16, pp:27-42.

Harrison, B., 1991. "Industrial Districts: Old Wine in New Bottles" Regional Studies, Vol.26.5, September, pp: 469-483.

Hirsch, S., 1967. Location of Industry and International Competitiveness, Oxford: Clarendan Press.

Hoover, E.1948. The Location of Economic Activity, New York: Mc Grow Hill.

Howells, J.R.L., 1983. "Filter-down Theory: Location and Technology in the UK Pharmacetucal Industry, Environ. Plann. A, No.15, pp:147-164.

Isard, W., 1956. Location and Space Economy, New York: Wiley.

Isard, W., 1969. General Theory: Social, Political, Economic and Regional, Cambridge, Mass: MIT Press.

Işık C., Şanlıer K., 1988. Eskişehir-Nereden Nereye?, ESO Yayınları No.2, Anadolu Üniversitesi.

Kırım, A., 1990."Technology and Exports: The Case of the Turkish Manufacturing Industries", World Development, Vol.18, No.10, pp:1351-1362.

King, K., 1984. "Science and Technology and Education in the Develoment of Indegenous Technological Capability", in M. Fransman and K.King (eds.), Indegenous Tecnological Capability in the Third World, (London: Mac Millan), pp:31-63.

Kleinknecht, A., and Poot, T.P., 1991. "Do regions Matter for R and D?", Regional Studies, Vol. 26.3, pp: 221-232.

Lall, S., 1992. "Technological Capabilities and Industrialization", World Development, Vol.20, No.2, pp: 165-186.

Lampard, E., 1955. "The history of cities in the economically advanced ares", Economic Development and Cultural Chenge, 3 (2), pp: 81-102.

Malecki,E.J.,1983."Technology and Regional Development Survey", Int.Reg.Sci.Rev., No.8, pp: 89-135.

Malecki, E.J., and Varaiya, P., 1986. "Innovation and Changes in Regional Structure",in Handbook of Regional and Urban Economics, ed. Peter Nijkamp, pp: 629–645.

Malecki, E.J., 1991. Culture's Influence on Technological Development and Economic Growth, Department of Geography, University of Florida, V.S.A.

Martin, F., Swan, N., Banks, I., Barker G., 1979. The Interregional Diffussion of Innovations in Canada. Minister of Supply and Services, Canada.

Mc Mahan, W.W., 1987. "Education and Industrialization" Back ground Paper for the 1987 World Development Report, Washington D.C., World Bank.

Mensch, G., 1979. Stalemate in Technology, Bollinger, Cambridge.

Meyer–Krahmer, F., 1985. "Innovation Behaviour and Regional Indigenous Potential", Regional Studies, Vol.19, No.6, April pp: 523–534.

Mody, A.,1989. "Firm Strategies for Costly Engineering Learning", Management Science, Vol. 35, No.4, pp: 496–512.

Nelson, R.R., 1981:" Research Growth on Productivity Growth and Productivity Differences: Dead ends and new Departures", Journal of Economic Literature, Vol.19, No.3, pp: 1029–1064.

Nelson, R.R, 1987. "Innovation and Economic Developments: Theoretical Retrospect and Prospect", in Technology Generation in Latin American Manufacturing Industries, ed.J.Katz, London: Macmillan, pp:1029–1064.

North, D., 1955. "Location Theory and Regional Economic Growth" Journal of Political Economy, 63, pp: 243–58.

Oakey, R.P., Thwaites, A.T., and Nash, P.A., 1980. "The Regional Distribution of Innovative Manufacturing Establishments in Britain", Regional Studies, Vol. 14,January, pp:235-253.

Özel, S., 1989. VI.5 Yıllık Plana Doğru Kalkınan Eskişehir, Eskişehir Valiliği.

Pack, H., and Westphal, L.E., 1986. Industrial Stretegy and Technological Change: Theory versus Reality", Journal of Development Economics, Vol.22, No.1, pp: 87-128.

Peck, F., and Towsend, A., 1986. "The Impact of Technological Change upon the Spatial Pattern of UK Employment within Major Corparations", Regional Studies, Vol.21, No.3, May, pp: 225-239.

Piore, M.J., and Sabel, F.S., 1984. The Second Industrial Divide: Possibilities and Prosperity, New York: Basic Books.

Pred, A., 1977. City Systems in Advanced Economies, Hutchinson, London.

Richardson, H.W., 1973. Regional Growth Theory, Macmillan, London.

Rothwell, R., 1982. "The Role of Technology in Industrial Change: Implications for Regional Policy", Regional Studies, Vol.16, No.5, March, pp:361-369.

Salam, M., A., 1989. Notes on Science Technology on Scrence Education in Development of the South, Trieste.

Saraçoğlu,Y. 1993. Local Production Networks, Master's thesis, METU, Ankara.

Schmitz, H., 1989. Flexible Specialization-A New Paradigm of Small-scale Industrialization. Sussex, University of Sussex, Institute of Development Studies, Working Paper.

Schumpeter, J.A., 1939. Bussiness Cycles, Mc Graw-Hill Book Company, Newyork and London.

Smith, D.1981. Industrial Location, New York: Willey.

Şenses, F., 1989. 1980 Sonrası Ekonomi Politikaları Işığında Türkiye'de Sanayileşme Politikaları, Ankara: V Yayınları.

Taylor, M., 1986. "The Product Cycle Model: a critique", Environment and Planning A, Vol. 18, pp: 751-761.

Teitel, S., 1982. "The Skill and Information Reequirements of Industrial Technologies: On the Use of Engineers asa use of Proxy", in M. Syrquin and S. Teitel (eds.) Trade Stability, Technology and Eqeuity in Latin America, (New York: Academic Press), pp: 334-348.

Türkcan E., 1981. Türkiye'nin Ekonomi Politiği, Ankara İktisadi ve Ticari İlimler Akademisi Yayın No: 151, Ekonomi Fakültesi, Ankara.

Vernon, R., 1966. International Investment and International Competitiveness, Oxford. Clarendan Press.

Weber, A. 1909. Theory of the Location of Industries. English Edition 1929, Chicago.

İşletmeleri", Sanayi ve Ticaaret Bakanlığı Yayını.

ZeytinoğluM., 1981. Ulusal Sanayi, Çağdaş Yayınları.

---, 1963. Kalkınma Planı Birinci Beş Yıl, Ankara.

---, 1963. Kalkınma Planı Birinci Beş Yıl, Ankara

---, 1981. Eskişehir Sanayi Odası'nın 10 Yılı ve Mümtaz Zeytinoğlu, Eskişehir Sanayi Odası Yayınları No.18.

---, 1982, 1983, 1984, 1985, 1986,1987,1988,1989,1990,1991,1992, 1993, Eskişehir Sanayi Odası Bülteni.

---, 1988, Türkiye'de Gayri Safi Yurtiçi Hasılanın İller itibariyle Dağılımı.1979-1986, Yayın No: 1988/8

---, 1989. Eskişehir VI. 5 Yıllık Kalkınma Programı 1990-1994, Eksişehir Valiliği.

---, 1988. Eskişehir Sanayi-Dünü Bugüne Yarını, Eskişehir Sanayi Odası Yayınları, No:24.

---, 1989. Eskişehir VI. 5 Yıllık Kalkınma Programı 1990-1994, Eskişehir Valiliği.

APPENDICES

APPENDIX A

TABLES ABOUT ESKİŞEHİR'S INDUSTRY

ble A.1 Eskişehir's Largest Establishments in the Largest 500 Establishments of Türkiye

tablishments d Firms	Eskişehir's Largest Establishments' Range in the List of Türkiye's 500 Largest Establishments						Situations of the Firms in 1991				
	1980	1983	1986	1989	1991	1992	Sales from Production (Milion TL)	Returns (Milion TL)	Self Capital (Mil. TL)	Balance Profit (Milion TL)	No of Pers.
ibank Kırka raks müesse.	159	118	133	93	152	121	287.526	287.526	174.000	180.563	907
zacı.Yapı Re ç. San.A.Ş			487	201	160	173	279.284	284.916	151.359	39.508	1273
s Söğüt Ser. Ş.		436	368	331	208	208	216.120	216.120	63.616	2.276	818
i Gıda San. Ş.	61			307	217	211	203.985	204.079	25.386	10.159	759
lomsaş A.Ş.	56	113	142	280	222	277	196.859	196.859	98.176	(22.680)	2935
kişehir Çim. b. T.A.Ş.	260	332	345	349	325	303	135.033	136.818	45.294	7.451	247
lıser Halı r Döş. A.Ş.		372		463	333	392	131.538	157.830	48.983	(24.585)	388
gnezit A.Ş.					336	—	130.721	131.639	50.012	20.962	380
mirer Kab. n.A.Ş.			321	214	388	301	111.198	116.640	60.032	4.146	270
sler Soba n. A.Ş.					393	—	109.682	109.682	10.962	14.046	350
rmaş A.Ş.			464	421	429	—	99.021	99.021	36.279	18.450	296
mer.Holding ki. Basma n.İşlet.	149	186	272	287	442	337	94.170	94.170	(64.215)	(83.509)	894
n Gıda San. Ş.		296	339	400	446	382	93.471	93.471	20.448	486	633
kişehir Şek. brikası	62	—	—			—					
ksan	224	—	—			—					
Ş.F.A.Ş.Esk. r Mak. Fab.	298	—	—			—					

ıle A.1 (Cont'd)

ablishments Firms	Eskişehir's Largest Establishments' Range in the List of Türkiye's 500 Largest Establish.						Situations of the Firms in 1991				
	1980	1983	1986	1989	1991	1992	Sales from Production (Milion TL)	Returns (Milion TL)	Self Capital (Mil.TL)	Balance Profit (MilionTL)	No of Pers.
:işehir Yem	329	—	—								
.ıçoğlu Top.	342	—	—								
:in Çakır Un	419	—	—								
:on	426	478	426								
ɔsan	18	16	22								
:elik	24	19	9								
:k Demirdö.	—	114	76								
ıerbank Boz-ik seramik	—	—	—								
:isan	—	353	—								
.anser	—	—	277								
FAL NUMBER FIRMS	14	13	15	11	13	10	2.083.602	2.128.771	720.332	166.687	10.15
FAL OF 500 FIRMS							213.556.022	261.434.981	59.102.465	5.930.806	680.8
:işehir's Establishments shone in the						1991	1.0	0.8	1.2	—	1.5
.kiye's 500 Largest Establishments (%)						1990	0.9	0.7	1.1	2.3	1.4
						1989	0.8	0.8	1.0	2.3	1.5

A.1 Gross Sale Returns

The gross sale returns of the 264 Establishments which are the mumbers of the Eskişehir Chamber of Industry was 11.6 billion TL in 1992.

Table A.2 Turnover of the members of ECI (million TL)

	Turnover	Share (%)	Sales from Production	Share %	Profit	Share %	Export (Thousand $)
First 5 Firm	4.771.024	41	4.452.166	41	506.238	48	48.340
First 10 Firm	6.815.800	59	6.516.601	61	904.940	85	177.296
First 30 Firm	9.749.714	84	9.339.340	87	971.463	91	252.210
Industrialist	11.140.136	96	10.679.515	99	1.008.662	95	269.387
Total Members	11.601.826	100	10.740.483	100	1.059.349	100	269.387

Share %	No. of Personnel	Share %
18	5.907	20
66	11.796	40
94	19.613	66
100	28.567	96
100	26.827	100

The total sale returns in 1991 was 6.6 billion TL. The current increase from 1991 to 1992 is %76.3. The increase in wholesale prices in 1992 is %61.4. So the real increase in 1992 is realized as %9.2. This %9 increase in total turnover is the highest rate of the last years.

Table A.3 Real Increase in Gross Sale Returns, Average Profitability and Total Profitability According to the Preceding Year

Gross Sale Returns (% Real Increase)	
1989	5.9
1990	4.5
1991	2.0
1992	9.2

Average profitability of firms

(% Real increasee)

1989	11.5
1990	12.3
1991	9.8
1992	9.1

In 1992 the firms enlarged their business capacity but they could not show the same success in increasing their profitability.

A.2 Value Added

According to the surveys of Eskişehir Chamber of Industry in 1990, 100 establishments in 9 sectors were taken into consideration and input–output, value added and changes in costs were investigated. 100 establishments considered, has a share of 45% of the member of the Chamber of Industry. And 15.162 employer in these 100 establishments makes the 62% of the total employment. The data should be considered adequate for evaluating the industry of Eskişehir (Table A.4).

Total input of 100 establishments in 1990 was 861 billion TL. The total output of these firms is nearly 1.5 trillion TL.According to this approximately 630 billion. TL. value added was created by these firms in 1990. According to the preceeding year these seems %61 current increase in inputs and 70.6% current increase in output and 86% current increase value added. The real increase is 24%.

Food manufacturing industry with approximatly 40% share has the highest value added among the manufacturing industries, manufacture of machine industry is in the second order with 26% share. In the third order there is non–metallic mineral products manufacturing industry with 15.9% share which is decreasing from 18.6% in 1989.

In general food manufacturing, textile–wearing apparel industries share in total value added is increased according to the preceding year while

chemical industry, metal products, metal goods industries share is not changed. Other, metal goods, manufacture of machine, wood products and non-metallic mineral products manufacturing industries share in total value added is decreased.

15162 persons were employed in 100 establishments. Valua added created was 630 billion TL where the value added per person was 41.8 million TL. According to the preceding year the current increase was 109% and real increase was 39%. This value is the highest increase rate of the last years.

The highest value added per person was created in the basic metals industry with 67 million TL. The real increase according to the preceding year was 36%. The lowest value added per person was in chemical industry with 20.5 million TL. The real increase in this sector was 36.4%.

Table A.4 Input - Output - Value Added

Sectors	Establishment	Input (000 TL)	Output (000 TL)	Value Added(000 TL)	Share in Total (%)	Average Number of Worker	Value Added per Person (000TL)
FOOD MANUFACTURING	23	567.358.285	817.510.735	250.152.450	40	4.286	58.365
Public	4	297.583.326	421.393.296	123.809.970		1.852	66.852
Private	19	269.774.959	396.117.439	126.342.480		2.434	51.905
TEXTILE-WEARING APPAREL	7	73.545.857	134.481.354	60.935.497	10	2.392	25.475
Public	1	44.168.742	79.714.956	35.546.214		1.009	35.221
Private	6	29.377.115	54.766.398	25.392.283		1.383	18.358
WOOD PRODUCTS	6	19.608.660	25.549.254	5.940.594	1	230	25.828
CHEMICAL INDUSTRY	3	2.576.221	5.898.158	3.321.937	0.5	162	20.506
MANUFACTURE OF NON-METALLIC MIN. PRO. IND.	12	51.815.708	152.005.678	100.189.970	15	1.814	55.231
BASIC METAL GOODS	6	12.415.861	30.515.336	18.099.475	3	270	67.035
METAL GOODS	5	3.354.474	6.091.386	2.736.912	0.5	101	27.097
OTHER METAL GOODS	10	34.635.459	59.677.996	25.042.537	4	850	29.462
MANUFACTURE OF MACHINE INDUSTRY	28	95.811.540	259.377.461	163.565.921	26	5.057	32.344
Public	2	41.225.194	160.645.923	119.420.729		3.651	32.709
Private	26	54.586.346	98.731.530	44.145.192		1.406	31.398
TOTAL	100	861.122.065	1.491.107.358	629.985.293	100	15.162	41.550

A.3 Wages Payed

259.5 million TL. wage was payed to 15162 person working in 100 establishments in 1990. 164.4 billion TL of this was payed to workers in administrative works. Generally in manufacturing industry wages payed per person was 17.1 million TL. The real increase in wage payed per person according to the preceding year was 48%. While the real increase in value added per person was 39%, this 48% increase could be interpreted as a development in favour of wages. The highest wages payed per person was in food manufacturing sector with 21.1 million TL. The real increase in this sector is 80%. The lowest wages payed per person is chemical industry with 5.7 million TL. with a real incrase 8% according to the preceding year (Table A.5).

Table A.5 Wages Payed

Sectors	Wages Payed to workers in Production (1000 TL)	Wages Payed to workers in Administration (1000 TL)	TOTAL (1000 TL)	Waged Payed per Person (100 TL)	Share of Wages in Value Added (%)
FOOD MANUFACTURING	44.528.894	46.174.300	90.703.194	21.163	36.3
Public	12.944.247	22.008.568	34.952.815	18.873	28.2
Private	31.584.647	24.165.732	55.750.379	22.904	44.1
TEXTILE WEARING APPAREL	21.437.214	8.289.958	29.727.172	12.427	48.9
Public	12.651.989	7.802.729	20.514.718	20.331	57.7
Private	8.785.225	427.229	9.212.454	6.661	36.3
WOOD PRODUCTS	1.309.668	356.337	1.666.004	7.244	28.0
CHEMICAL INDUSTRY	637.418	288.759	926.177	5.717	27.9
MANUFACTURE OF NON-METALLIC MIN. PRO. IND.	25.051.250	11.067.178	36.118.428	19.910	36.0
BASIC METALS	3.305.464	1.686.639	4.992.903	18.489	27.6
METAL GOODS	643.866	198.545	842.411	8.340	30.8
OTHER METAL GOODS	4.835.745	1.153.347	5.983.092	7.046	23.9
MANUFACTURE OF MACHINE INDUSTRY	62.672.478	25.849.935	88.522.413	19.122	59.1
Public	50.291.635	21.044.101	71.335.736	19.539	59.7
Private	12.380.843	4.805.834	17.186.697	12.224	38.9
TOTAL	164.421.997	95.044.998	259.486.995	17.114	41.1

A. 4 Developments in Production in 1992

According to a research made by ECI, developments in production of the establishments which are the members of the ECI is examined during the period of 1986–1992 by indexing at the sectoral base.

The values obtained in the regional base is compared with the values of State Statistical Institue's production index based on 1986.

Table A.6 Percentage Change (%) in Production Index According to the Preceding Year in Türkiye and in Eskişehir (1986=100)

R=REGION C=COUNTRY

		1987	1988	1989	1990	1991	1992
Minning and Stone Quariying	R	22	23	0	0	3	2
	C	5.1	(5.2)	12.6	16.0	10.1	(2)
Food Manufacting Industry	R	29	(1.4)	4.5	4.3	1.0	8.2
	C	11.7	2.3	4.2	4.6	6.9	(0.5)
Wearing-Apparel	R	(13)	(29)	89	45	8	3
	C	8.2	(23)	(15.6)	1.2	(2.3)	(6.7)
Textile Industry	R	23	(6)	(6)	25	6.0	(21.5)
	C	9.5	3.5	4.5	24	(9.1)	(3.5)
Forestry Products Industry	R	7	0	21	16	(9)	8
	C	4.4	(2.8)	2.0	17.4	(6.2)	4.2
Manufacture of Non Metallic Mineral Products	R	7	9	7	16	4	44
	C	13	6.8	4.7	3.9	4.6	12.0
a) Tile & Brick	R	(19)	30	(51)	83	(20)	3
b) Ceramic Ind.	R	29	19	8	9	2	47
c) Other	R	17	(13)	12	35	11	43
Basic Metal Ind.	R	13	9	(3)	(3)	9	4
	C	12.2	(0.2)	1.2	16.8	(7.8)	6.7
Metal Goods Ind.	R	18	27	0	27	33	63
	C	13.8	5.9	2.5	7.9	2.6	(1.5)
a) Stove Manufac.	R	19	36	10	28	53	74
b) Other Metal goods	R	17	15	(16)	27	(4)	28
Machine Manufac. Ind.	R	97	(10)	(6)	(20)	(3)	4
	C	22.2	(9.2)	(3.9)	23.5	10.7	0.5
Electrical Machine and Equipments Manufac. Ind.	R	41	9	12	1	5	(5)
	C	(1.1)	(18.3)	6.2	49.4	20.7	(1.2)
TOTAL MANUFACTURING IND.	R	33	3	4	9	12	29
	C	10.7	1	2.1	9.5	1.8	4.3
TOTAL INDUSTRY	R	33	4	4	9	11	28
	C	10.5	1.6	3.7	9.5	2.6	5.1

Table A.7: Production Index of the Members ECI by Sectors

	No.of Establish-ments	1986	1987	1988	1989	1990	1991	1992
Mining and Stone Quariying	7	100	122	150	151	150	154	157
Food Manufac.Ind.	13	100	129	111	116	121	122	132
Wearing Apparel	4	100	87	62	117	170	183	188
Textile Ind.	2	100	123	116	123	154	247	194
Forestry Products. Ind.	3	100	107	107	129	149	136	147
Manufacture of Non-Meta.mineral Product	15	100	107	117	125	145	151	218
a) Tile And Brick	6	100	81	105	53	97	78	80
b) Ceramic Ind.	4	100	129	154	166	179	182	268
c) Other store and soil based ind.	5	100	117	102	114	154	171	244
Basic Metal Ind.	3	100	113	123	119	115	125	130
Metal Goods Ind.	15	100	118	150	149	189	252	412
a) Stove Manufac.	8	100	119	162	178	227	347	604
b) Other metal goods	7	100	117	135	113	143	138	177
Machine Manufac. Ind.	12	100	197	177	166	132	136	142
Electrical Machine and Egupments Manufac. Ind.	3	100	141	154	173	174	183	174
TOTAL MANUFACTU-IND	69	100	133	137	143	156	174	225
TOTAL INDUSTRY	76	100	133	138	143	156	173	221

A.5 Capacity Usage Ratios

According to a research made by ECI, 40 establish ments from 7 sectors capacity usage ratios are determined as %69 in 1992. According to the previous years capacity usage ratios there seems an important increase.

Table A.8 Capacity Usage Ratios

	1990 last 3months	1991 last 3months	1992 last 3months	1990 Average	1991 Average	1992 Average
Food Industry	65	52	62	66	49	62
Wearing Apponel Ind.	76	75	81	81	82	79
Other Metal Goods Ind.	63	73	80	47	67	79
Forestry Products Ind.	48	48	70	53	56	68
Manufacture of Non-metalic min.Produc.	69	42	56	65	43	64
Basic Metal Ind.	80	70	73	80	64	79
Machine Maufactu-ring Ind.	78	73	79	77	69	71
GENERAL SITUATION	68	57	68	67	56	69

Eskişehir Chamber of Industry

The highest value in capacity usage ratios in seen in wearing apparel industry. In 1992 the increase in capacity usage rations is seen in especially food, other metal goods (stove manufacturing), forestry products, non-metallic mineral products manufacturing and main metal industries.

Despite of this increase there are problems in not reaching to perfect capacity. Inadequate demand is one of the most important effects another factor is financial inadequacy then comes inadequacy of raw material, problems about working personnel, energy and other factors.

A.6 Regional Industrial Export

Eskişehir's regional export in 1992 was 268.5 million dollars. The rate of increase according to the Preceding year was %12. There were 37 establishment exporting in Eskişehir and Bilecik region in 1992.

Table A.9 Total Export in 1992

FIRMS	EXPORT VALUE		
		1992	1991
Etibank Kırka Boraks	Public Eco. (Enterprise	73.376.000	62.672.521
Magnesit A.Ş.	Foreign Ba-sed	25.347.820	23.120.193
Arçelik	External	24.866.089	23.868.600
Vitra Seramik		23.810.558	22.785.434
Tusaş A.Ş.		15.062.995	14.526.135
Türk Demir Döküm	Bozüyük	13.323.010	9.449.903
Eskişehir Şeker Fab.	Eskişehir	12.751.670	0
Toprak Seniteri A.Ş.	Bozüyük	12.531.284	13.783.050
Söğüt Seramik		11.966.000	14.105.000
Demirer Kablo A.Ş.	Bozüyük	9.212.686	8.358.367
Toprak Kağıt A.Ş.	Bozüyük	8.187.056	11.570.893
Halıser A.Ş.	Bozüyük	4.253.623	8.688.443
Arapoğlu A.Ş.	Eskişehir	4.250.000	0
Eskom A.Ş.		3.200.000	0
Sarar A.Ş.	Eskişehir	2.850.000	2.582.364
Hisarlar A.Ş.	Eskişehir	2.728.924	1.170.351
Sümerbank Holding	Public Eco. Enterprise	2.561.637	3.807.336
Otosan A.Ş.	External	2.391.077	1.022.177

Table A.9 (Cont'd)

Eti A.Ş.	Eskişehir	2.357.222	2.390.665
Çetintaş A.Ş.	Eskişehir	2.328.822	1.722.102
Artema Armator Grubu		2.300.953	2.750.430
Comag A.Ş.	Foreing Bas.	2.240.798	3.378.018
Sörmaş A.Ş.	Söğüt	2.182.036	674.364
ES-EN A.Ş.	Eskişehir	1.349.190	503.400
Cicison A.Ş.	Eskişehir	1.044.609	530.689
Tam Gıda A.Ş.	Eskişehir	654.276	891.263
Entil A.Ş.	Eskişehir	383.274	0
Gökay Soğuk Hava Tesisleri A.Ş.		297.865	760.995
ABS Alçı Blok A.Ş.	Bozüyük	297.046	88.498
Reckendrees Ltd.Şti.	Foreign Based	120.305	332.394
Pınar Emaye Ltd. Şti.		120.305	0
Terakko	Foreign Based	68.289	84.763
Emek Özel Civata San.		46.100	26.049
Güler Emaye Ltd.Şti.		32.280	0
Tekin Makina A.Ş.		25.737	1.092
Alipsan A.Ş.		15.900	0
Sadık Uzkesici ve Ort.		15.300	23.560
Other			3.796.957
TOTAL		268.532.507	239.466.026

Eskişehir Chamber of Industry

– Sectoral Distribution of Expots

Minning sector has the highest share in total exports. Total export of the sector is 101 million dollar and the share in total is 37.6%. The increase in share according to the preceding year is 12%.

The highest increase in exports is realized in food industry in 1992.

Table A.10 Sectoral Distribution of Exports

Sectors	Number of Firm	Export Value 1992 ($)	Export Value 1991 ($)	Increase (%)	Share in total 1992%	Share in total 1991%
Mining	4	100.979.918	90.101.149	12.1	37.6	37.6
Non metallic Mineral Products Manufacturing Industry	6	50.855.213	55.159.536	(7.8)	18.9	23.0
Machine Manufac.Ind	7	48.290.722	40.343.348	(20.0)	18.0	16.8
Met. Goods Industry	7	17.536.883	12.226.382	(43.4)	6.5	5.2
Food Industry	5	17.105.642	4.573.612	2740	6.4	1.9
Textile-Wearing Apparel	5	16.244.082	16.800.245	(3.4)	6.0	7.0
Electrical Eqipment Ind.	1	9.212.686	8.358.367	10.2	3.4	
Wood Products Ind.	2	8.307.3	11.903.387	(30.2)	3.0	5.0
TOTAL	37	268.538.507	237.466.026	12.1	100	100

Table A.11 Distribution of Exports Among Countries

COUNTRIES	EXPORT VALUE ($)	SHARE %
A-OECD COUNTRIES	193.097.332	78.8
I-EC COUNTRIES	137.633.071	56.2
GERMANY	57.362.440	
ENGLAND	26.555.371	
FRANCE	8.199.673	
HOLLAND	4.722.098	
ITALY	21.463.056	
SPAIN	7.087.530	
PORTUGAL	1.420.000	
GREECE	5.301.399	
DENMARK	686.829	
LUXEMBURG	3.135.000	
II.OTHER OECD COUNTRIES	55.464.261	22.6
USA	21.801.071	
AVUSTIRA	25.021.632	
JAPAN	4.470.600	
SWEDEN	2.596.700	
SWITZERLAND	415.113	
FINLAND	865.600	
AUSTRALIA	171.700	
CANADA	30.945	
ISLAND	8.100	
NORWAY	82.800	
B- ISLAMIC COUNTRIES	29.643.594	12.1
IRAN	5.329.019	
S.ARABIA	9.823.768	
IRAQ	116.674	
KATAR	6.610	
KUWAIT	28.268	
JORDAN	2.377.863	
TUNISIA	761.969	
SYRIA	3.379.733	
LEBANON	814.195	
CYPRUS	3.139.474	
LYBIA	3.819.921	
OTHER MIDDLE EAST COUNTRIES	46.100	
C. EAST EUROPEAN COUNTRIES	13.033.672	5.3
RUSSIA	4.097.614	
BULGARIA	1.584.414	
ROMANIA	4.831.679	
YUGOSLAVIA	1.650.000	

CZECH AND SLOVAKIA	691.228	
ALBANIA	130.274	
POLAND	16.183	
MACEDONIA	24.177	
BOSNIA-HERZEGOWINA	8.103	
TURKISH REPUBLICS	1.029.944	5.0
UZBEKISTAN	935.517	
CASSACKISTAN	53.577	
AZARBAIJAN	40.850	
E.OTHER COUNPRIES	8.318.885	
India	6.960.800	
Israel	556.345	
Gambia	20.500	
Singapur	47.100	
S.Afirca	103.773	
Namibia	7.100	
Colombia	300.000	
Maritus	3.720	
Gabon	2.490	
TOTAL	245.123.427	100
OTHER	23.409.080	
GENERAL TOTAL	268.532.502	

Table A.12 Problems in Exporting

DOMESTIC PROBLEMS	EXTERNAL PROBLEMS
a) Raw Material Problem	a) Competition among domes firms
b) Difficulties in Transportation	b) Problems in customs
c) Finance Problem	c) Diffuculties in finding foreign markets
d) Bureaucratic Diffuculties	d) Bureaucratic diffuculties in foreign countries
e) Packaging Diffuculties	e) Competition with foreign firms

APPENDIX B

LIST OF THE PATENTS GIVEN BY MINISTRY OF INDUSTRY IN ESKİŞEHİR

Table B.1 List of the Patents Given by Ministry of Industry in Eskişehir

Date of	Name of the Product	Owner	Adres
17.10.89	"Horizantal Stability System in Four Points Suspension"	Abdullah Sakmer İsmail Kenar	ESKİŞEH
21.6.90	"Glazed Tile"	Özaltın Toprak San.ve Tic. A.Ş.	AŞAĞISÖĞÜTÖNÜ KÖYÜ ESKİŞEH
22.3.82	"Canape closing opening mechanism"	Ömer Işık	ESKİŞEH
6.4.71	"Automatic headlight for automobile"	İsmet Okay	ESKİŞEH
26.2.85	"Electro Magnetic Tap"	İlyas Çakal	ESKİŞEH
27.5.87	"Warm Gas Circulation System For Kitchen Stoves"	Süsler Soba İmalat San.ve Tic. A.Ş.	ESKİŞEH
9.4.90	"Solid Fuel Stove"	Süsler Soba İmalat San.ve Tic. A.Ş.	ESKİŞEH
16.8.73	"Improvement in the Manufacture of Lignite Stove"	Simtaş Madeni Eşya Fab. Koll. Şti.	ESKİŞEH
3.9.87	"Perpendicular Waltz with Automatic Warning"	Sedat Kunduracı	ESKİŞEH
19.3.90	"Single Arm System"	Sedat Kunduracı	ESKİŞEH
17.7.87	"Solid Fuel Stove with silo"	Rasim Çayır Kasım Çayır	ESKİŞEH
26.2.87	"Automatic Air Entrance in Stoves"	Rasim Çayır Kasım Çayır	ESKİŞEH

18.286	"Smoke and Heating Filtred Stove"	Rasim Çayır Kasım Çayır	ESKİŞEH
6.5.86	"Improvement in Stove Design"	Rasim Çayır Kasım Çayır	ESKİŞEH
8.2.85	"Water Heating Adder without Pipe and Tank"	Prof.Ali Aydemir	ESKİŞEH
3.9.76	"Cover For Prefabricated Steps"	Osman Çengelli	ESKİŞEH
7.4.87	"Stove Pipe Extension	Nur Emaye	
11.3.80	"Coal Using Technic in Coal Stoves"	Mustafa İz	ESKİŞEHİ
17.7.90	"Recovering the Gasoil used in Cotton Print	Mehmet Rıza Altıohha	ESKİŞEHİ
30.4.91	"Front Heating System For Solid Fuel Stoves"	Isıtaş Soba Sanayi	OID ESKİŞEHİ
27.4.93	"Air Conditioning For Stoves"	Hüsnü Örken	ESKİŞEHİ
28.9.79	"Boiling Milk with Sun Energy"	Doç.Ali Aydemir	ESKİŞEHİ
17.7.87	"Solid Fuel Stove with Silo"	Rasim Çayır Kasım Çayır	ESKİŞEHİ
26.2.87	"Automatic Air Entrance in Stoves"	Rasim Çayır Kasım Çayır	ESKİŞEHİ
18.2.86	"Smoke and Heating Filtred Stove"	Rasim Çayır Kasım Çayır	ESKİŞEHİ
6.5.86	"Improvement in Stove Design"	Rasim Çayır Kasım Çayır	ESKİŞEHİ
8.2.85	"Water Heating Adder without Pipe and Tank"	Prof.Ali Aydemir	ESKİŞEHİ
3.9.76	"Cover For Prefabricated Steps"	Osman Çengelli	ESKİŞEHİ
7.4.87	"Stove Pipe Extension Apparat"	Nur Emaye San.Tic.A.Ş.	ESKİŞEHİ
11.3.80	"Coal Using Technic in Coal Stoves"	Mustafa İz	ESKİŞEHİ
17.7.90	"Recovering the Gasoil used in Cotton Print Factories"	Mehmet Rıza Altıohha	ESKİŞEHİ

30.4.91	"Front Heating System For Solid Fuel Stoves"	Isıtaş Soba Sanayi	OID ESKİŞEHİ
27.4.93	"Air Conditioning For Stoves"	Hüsnü Örken	ESKİŞEHİ
28.9.79	"Boiling Milk with Sun Energy"	Doç.Ali Aydemir	ESKİŞEHİ
28.2.88	"Air Conditioning System For Solid Fuel Stoves"	Eşref Güngör	ESKİŞEHİ
4.6.81	"Exantric Liqid Pomp"	Doç.Dr.Kirhor Yalçın	ESKİŞEHİ
27.7.90	"Press Work-bench For Arm Ironing"	Cemalettin Sarar	ESKİŞEHİ
28.10.88	"Special Profile Roll"	Basri Köseler	ESKİŞEHİ
2.7.87	"Astecor"	Asim Turan	ESKİŞEHİ
19.11.79	"Cooking Canned Vegetables by sun Energy	Ali Haydar	ESKİŞEHİ
5.9.86	"A Compresor Design"	Abdullah Sakmer	ESKİŞEHİ