

A Comparative Investigation of Spatial Organization and Industrial Location Interaction in Context of the Automotive Industry

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ABSTRACT

Otomotive industry has an important role as one of the locomotive sectors of the economy in the world due to the leadership of technological development. Today, as a strategic industry, it draw attention from all countries, rapidly globalization and competition is hardly exist. In recent years, Turkey has been an important peripheral region for European otomotive geography as a result of desantralization policies and development strategies towards new regions of European otomobile industry since second part of the twentieth century. Strength points of otomotive industry in Turkey in terms of competition are low labour cost, powerful capital structure, joint venture, strong first tier suppliers, proximity to developed European markets and developing regional markets. In this study, first, an introductory brief about the subject was given, following the literature review on the technological development and industrial space interactions specifically automotive industry. Then, case studies were example of otomotive industry regions regarded as successful within the European otomotive geography were presented and Kocaeli otomotive industry region is investigated comparatively. Finally, general conclusions are drawn.

Keywords: *Spatial Organization , Industrial Location, Otomotive Industry*

1. INTRODUCTION

The process of spatial and industrial restructuring depending on the comprehensive technological development has become very popular research area for geographers, economists and city planners. Dynamics of industrial locations, so different from other economic activities, have evolved significantly depending on the technological development.

Today, in addition to traditional location factors such as labour costs, proximity to market and raw material, transportation costs, and costs of production process, new concepts emerge like competitive advantages, innovations, proximity to qualified labour pools, local tacit knowledge, technological innovations, advantages of peripheral regions, development scale of suppliers, corporation between firms that produce same product, development strategies towards new regions.

Otomotive industry has played important role as one of the locomotive sectors of the economy in the world due to the leadership of technological development. Today,

as a strategic industry, it draw attention from all countries, rapidly globalization and competition is hardly exist. Within the world automotive geography consist of regions mainly America, Japan and European Union, sectoral developments in Turkey are greatly related to European spatial development strategies.

In recent years, Turkey has been an important peripheral region for European otomotive geography as a result of desantralization policies and development strategies towards new regions of European otomotive industry since second part of the twentieth century. Strength points of otomotive industry in Turkey in terms of competition are low labour cost, powerful capital structure, joint venture, strong first tier suppliers, proximity to developed European markets and developing regional markets.

In this study, first, an introductory brief about the subject was given, following the literature review on the technological development and industrial space interactions specifically automotive industry. Then, case

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studies were example of otomotive industry regions regarded as successful within the European otomotive geography were presented and Kocaeli otomotive industry region is investigated comparatively. Finally, general conclusions are drawn.

2. NEW APPROACHES IN INDUSTRIAL LOCATION THEORIES BASED TECHNOLOGICAL DEVELOPMENT

Discussions on location of industrial activities have continued since the beginning of 19th century until today depending on the technological, social, and economical changes. During this process, several theories have focused on optimum location for industrial activities as well as reasons for location. The main reason for numerous research studies on location phenomenon is the fact that this subject is highly dynamic and vigorous.

In the transition phase from 18th century, where production and consumption activities took place together in terms of location, towards 19th century, with the impact of the technological processes caused by the industrial revolution, economical activities searched for ways to be established in those locations by the purpose of cost minimization and benefit maximization. This search, as is well-known, has caused the emergence of three theories – namely, Land Use Theory, Central Places Theory, and Industrial Location Theory – which constitute the basics of location theory.

The first noticeable studies on this issue are the concentric circles model developed by Burgess, who dealt with the industrial location phenomenon within the framework of an urban model, in 1927; and the urban land use theory of Hoyt (1939) [1]. Multiple nuclei model published by Harris and Ullman in 1945 has been built on the hierarchical differentiation of metropolitan areas and sub centers by developing the central places theory of Christaller (1933) which established the hierarchy of settlements.

By the end of 1950s, the Incubator Hypothesis which is developed by Hoover and Vernon in their research and which has an important place in the development of industrial location theory, have been effective on the determination of location dynamics until recently [1]. Again in the same period, in the area of social sciences and economy, numerous studies conducted on economic activities and mobility in the city center and peripheral regions have established the regional inequality literature [2]. Péroux (1950) introduced an “economic space” concept which is based on relations and connections with the economical development in the region. Péroux explains his theory with a concept named growth pole (*pôle de croissance*). This theory is developed later by regional economists; Hirschman (1958/1967), Thomas (1969) and Lausén (1969).

Lasuén (1969), who has studied the emergence of new industries in parallel with technological development, indicates that while some regions rise and become prominent, some others lose their former importance

together with new industries’ becoming central in terms of location and starting to get developed [3]. According to the research of Gunnar Myrdal, which is regarded pioneering for studies on regional inequalities, countries and regions enter in to a process where economical activities are spatially concentrated together with the *innovations and know-how*. This situation causes some regions to grow and develop, and some others to lag. Myrdal argues that the regions proceed towards regional inequalities as a consequence of two important forces, which are regarded as *backlash* and *spread effects*.

Copus (2001) indicates that the rise of information technologies and e-commerce constitute a great hope for those regions which have fallen back and are regarded as peripheral regions and he asserts that the rise of information technologies and e-commerce is a great opportunity for decreasing the spatial inequalities that have emerged depending on the geographical distance [4]. As a result of the developments in information and infrastructure technologies, location has become insignificant for many industrial activities. Such a radical change has also affected the models and basic concepts which have been developed for the world’s economical geography. Polycentric development concept has started to replace the center and peripheral regions concepts which had been asserted in the growth poles concept.

Regional development literature that have been constructed on the classical theories have focused on issues such as the impact of location the competitiveness of local firms and the development of industrial policies. Within this framework, industrial regions, industrial agglomeration, information network, clusters and innovation concepts have gained importance.

The costs/benefits emerging as a result of the fact that economical activities, which are regarded as the agglomeration economies, are together in a certain area is regarded as a fundamental concept in terms of urban economies [5]. On the other hand, it is indicated that there are centrifugal and centripetal forces behind the agglomeration of economic activities in certain geographic areas and economic-geographic patterns emerging with the reciprocal interaction of these opposite forces is among the important issues that should be studied.

Since the suggestion of new concepts which reveal the relationships between innovation, knowledge, and economic development, an important interest in industrial policies is raised [6]. Concepts such as learning regions, knowledge networks, regional learning, and innovation are given considerable importance in the recent studies about sustainable development of the regions [2]. According to the innovative environments model, location for firms and industrial region formed by the concentration of the firms in the same spatial location decreases the fallback caused by changing conditions and increases the creativeness that provides knowledge spillovers in the

local environment, and this, helps the collective learning processes.

There is a profound literature about the clusters approaching the issue from different perspectives. In fact, clustering is not a new phenomenon; it is a phenomenon that has existed for ages. It could be seen that clustering is the key expression in the Marshallian dynamics, in the growth poles of Perroux, and in the forces of Myrdal. Clustering concept is described by Porter (1990) as follows [7]:

“Clusters are geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated organisations (such as universities, standard agencies, trade associations) in a particular field linked by commonalities and complementarities. There is competition as well as cooperation.”

A successful literature review on clusters is conducted by Morrosini in 2004 [8]. Morrosini basically discussed the issues of institutional conditions, geographical proximity, economic linkages, and common glue. The issue of clusters is closely related to the *spatial proximity* between the actors. Geographical proximity facilitates face-to-face relationships, common labor pool, and knowledge spillovers. When analyzed from the regional and local perspective, it is observed that clusters have started to be used as a means for promoting regional/local economic development.

It is also observed that clustering policies are often used as a means for determination of regional development strategies within the context of automotive industry which constitutes our subject matter and clustering policies are among successful examples of automotive region that are prominent in the literature. In order to understand the internal and external dynamics of clusters which emerge specifically in the automotive industry, first of all, it will be useful to deliberate on the spatial developments specific to the automotive industry in parallel with the technological change.

3. A COMPARATIVE REVIEW ON SPATIAL DEVELOPMENTS OF THE AUTOMOTIVE INDUSTRY

Activities of the automotive industry with a history of more than a century had emerged in Europe with the leadership of Germany and France, and have gained strength in the United States of America [9]. The automotive industry has always been in a continuous development and evolution with automobiles being dominant in the total production. Spatial dynamics of the automotive industry have not been developed much before mass-production period.

As is known, the spatial development of the automotive industry in parallel with the technological change has gone through important changes in the Fordist and Postfordist/Toyotist production periods. Developed with the leadership of the automotive industry and

significantly affected all industries, Fordist production period had started with Henry Ford's producing the automobile Model T with standard measures and at large amounts.

The fordist production technique, after which a period is named, is based on a moving assembly line and division of work to a great extent; it is a capital intensive production system where standard products are produced at large amounts by unqualified or semi-qualified workforce performing very simple operations on the production line.

At the beginning of 20th century, automotive industries entered into a different organization structure in spatial sense by progression towards mass production technologies. Because of the transportation conditions of that period, automotive assembly lines selected their locations so that they clustered near to water or railway. Hence, easy and rapid transfer of raw materials and finished products from one factory to another was ensured. The firms' collecting all their production process in a single area made it possible to decrease costs [10].

In 1930s, increasing automobile production and sales brought forward the market concept and decentralization process was started for some activities to be closer to the market places rather than the production area. Important changes in automotive production reverberated on the location rapidly emerged with the technological innovations obtained especially after the 2nd World War. The advances in transportation technologies caused the automotive production to leave the congestion in the city and decentralize to the wide areas on the peripherals of the city where land prices are lower. Machines replaced the production process which was previously based on muscle power and therefore a transition towards technology intensive production that caused unemployment of many people was realized. However, Fordism went through a crisis in the 1970s because of the petrol crisis' increasing the energy costs, the decreases in automobile demand, and the current system's not being able to respond the changing demands. The only phenomenon that could get Fordism out of the crisis was technological changes; a new production system, which was modeled by Japanese Toyota Company and referred as toyotist, post fordist, flexible, lean production system, was adopted. According to Hudson (1994), automotive manufacturers' search for new geographies for production and development of new spatial strategies had an important impact on the automotive industry's overcoming the crisis which it entered during the fordist period [11].

Today, with this new approach spreading all over the world, issues such as giving more importance to the procurement of the parts from the suppliers industry than vertical integration, decreasing the number of suppliers in direct relationship by generating echelons (keiretsu) among the suppliers, increasing the opportunities of cooperation with these firms, ensuring

active participation of suppliers in the product development, and especially establishing a just in time and more flexible supply system have gained importance [12,13,14].

In this period, large automobile manufacturers decentralized spare parts production activities from their facilities and since the product inventories were decreased with respect to the previous system, warehouses shrunk and spatial needs of the factory were decreased. As a consequence of this decentralization, first tier suppliers, which have rapidly gained importance in the automotive industry, either produce very few special suppliers or they produce at a single factory and they supply the whole market of the region from this factory, hence render their region suitable for successful economies of scale. In that case, labor costs constitute the most important factor for location of first tier suppliers.

Together with the development of a relationship based on cooperation between the original equipment manufacturers (OEMs) and the suppliers, OEMs give priority to research and development issues such as new model building, product improvement, quality improvement, low cost production, etc [15]. These firms share their marketing, production, and supplying strategies which they perform successfully through strategic partnerships which are increasing nowadays. Thus, these firms accelerate the innovation processes by learning together and dissemination of knowledge.

A great interest is formed about the spatial organization of automobile manufacturing activities in the Europe together with the changes occurred in the automotive industry, [13, 14]. The fundamental factors effective in the change of the European automotive geography have similarities with the developments in the world. Entrance of the North American and Japanese firms in to the Europe and global mergers occurred as a consequence of their strengthening existence in this sector and the expansion of the European Union towards Central and Eastern Europe are important dimensions of the issue.

At a first glance, the Europe's industrial heartland is regarded as the center of the automotive industry, the countries on the borders of this heart (Portugal, Central and Eastern Europe countries) form the peripheral areas, and the east of Spain and Germany have a hybrid status as mediator areas. When the issue is further analyzed beyond generalizations, it is observed that the separation between the center and the periphery is not such simple and this geography is continuously restructured by learning and competition dynamics [13].

From the second half of the 20th century, European automotive industry is defined by a multi-stage decentralization process towards new regions in terms of production. The process which started initially in Paris and Torino regions with several large scale agglomerations have rendered Belgian automobile manufacturers important hosts for the industry with the agreement signed in Treaty/Rome in 1957. In addition

to his, important investments were made in the peripheral regions of the automotive industry such as Seine Valley, Western France, and Northern Italy [13, 14].

The expansion of the union in the beginning of 1970s encouraged the automotive industry to grow towards regions such as Southwestern Europe – Portugal and Spain where numerous large production factories are located today. More recently, the investments made in Eastern and Central Europe were found to be as much successful as those investments in central regions of the Europe [13].

Some traditional automobile production regions of the Europe – Paris/France and Piemonte/Italy, United Kingdom and Sweden – were almost crippled by the closures of many long-established factories. Still, industrial heart of the Europe continues to get stronger because of its current advantages. The most effective point on this strengthening is new factories opened in the hybrid regions of automobile countries. Location decision of new automobile production such as Mercedes A series, MCC Smart, and Toyota Yaris, etc. in these regions of the Europe proves the attractiveness of these hybrid regions which have properties such as qualified labor force, successful supplier networks, proximity to the market, and proximity to design and decision centers, etc [13].

Geographical distribution of automotive industry in Europe is considerably affected by two factors, namely specialization and spatial concentration of the activities. Generally, design and engineering activities chose locations in central regions of the Europe. These metropolitan regions are development centers of not only automobile producers but also spare parts, design, and engineering firms. However, production activities are often located in the peripheral regions of the Europe. Spatial clustering of the activities is not a new concept for the automotive sector [13]. Together with the physical proximity between the firms, the advantage of clusters is the facilitation of solutions for arising problems by utilization and generation of common knowledge which is accumulated in the local area depending on cooperation. Mutual trust environment generated by cooperation between actors assists organizational propinquities, different firms' speaking the same language and building coordination between the firms. This case is observed when experiences from the Europe's leading and successful automotive industry regions (Austria- AC Styria, Germany–Nordrhein Westfalen (NRW), and Spain–ACICAE Basque) are analyzed. The characteristics/developments of these regions within the context of our topic are briefly summarized below and they are compared to Kocaeli Automotive Region in terms of fundamental characteristics (information and technology, cooperation, marketing, quality improving activities, and internationalization).

Austria-Styria Region and especially city of Graz are production centers on the periphery of European automotive industry which are rapidly rising [16]. The

establishment of AC Styria was realized in 1994 with the automotive industry's being selected as the pilot cluster within the framework of clustering policies of Austria Ministry of Finance [17]. Austria Business Development Agency-SFG (Steirische Wirtschaftsförderung) and Federation of Austrian Industry –FAI have taken important roles during the

development process of the cluster. By the help of directive supports of these institution, presently, large firms such as AVL List (system parts supplier-2000 employees), Steyr Daimler Puch AG (automobile manufacturer-4500 employees), and Eurostar Chrysler (automobile manufacturer-1600 employees) have chosen to locate in the region (Figure. 1).

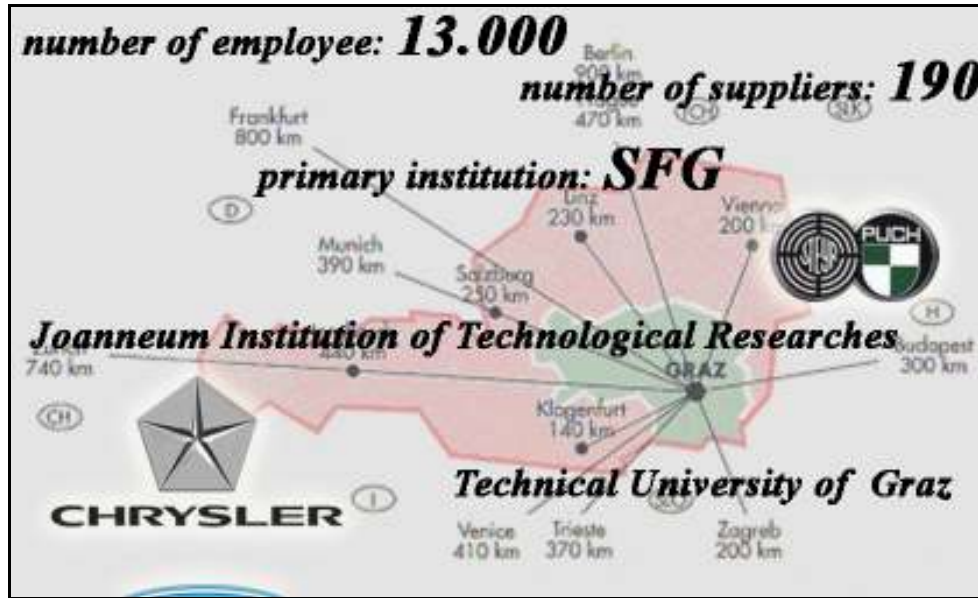


Figure. 1. AC Styria otomotive industrial region

Main goal of AC Styria is determined as developing cooperation among the firms and encouraging learning processes based on reciprocal interaction of the firms. According to the 1999 records, an industrial network is built in the region where a total of 13,000 employees work in 190 firms. Research institutions such as Graz University of Technology Automotive Engineering Department, Joanneum Research Institute, and Montanuniversitat Leoben which are in cooperation with this network have provided external contribution for the firms and internal contributions for the region especially in terms of innovation and research and development issues.

With its 200,000 employees and 800 supplier firms, Germany- Nordrhein Westfalen (NRW) Automotive

Industry Region is the strongest sector of this region from the economical point of view [16]. In the region where 1/3 of German automotive industry is located, approximately 55% of automobile suppliers perform production with less than 500 employees and the region provides important potentials for location from the viewpoint of SMEs. Large firms such as Ford, Opel, and Daimler Chrysler perform production at three different positions in the region. There are 26,000 employees working in Ford-Werke AG alone. Adam Opel AG-Bochum (15,000 employees) is the second important producer in terms of employment is and Daimler Chrysler is the third largest producer (Figure. 2).



Figure. 2. Nordrhein Westfalen (NRW) otomotive industry region

In 1990s, in parallel with the clustering oriented industrial policies of the regional government, a necessity to build supplier-auto producer network which has an important share in competition in the automotive industry and in 1993 *Werbundiniative Automobil NRW* is established. This institution is responsible for ensuring the coordination in the relationships among the production and suppliers within the cluster, trade and industry chambers, trade unions, banks, institutions creating science and technology, and ministries. Basic goals of the region are determined as to put coordination projects among the producers and the suppliers into practice, bring the industrial forces having great potential together, and increase quality and performance.

A network is established with approximately 750 member firms which are located in the region, and 283 cooperation projects are realized between 1993 and

1999. In order to ensure accumulation and dispersion of knowledge in the region, cooperation between science parks which are established based on technology and technology poles is increased. Ford's first research institution in Europe, which is one of the 30 research institutions located in the universities in Aachen region, is the main actor in most of the automotive research and development activities of the region. Automobile suppliers are provided with research and training activities in 60 technology centers located in the region.

Spain-ACICAE Basque Automotive Industry Region is established in 1993 as the result of developing a cluster approach in Basque region with the establishment of "automotive cluster work group" – ACICAE [16]. In the region where organization of the automotive industry and supplier industry is intended, a structure is built in 1999 with 27 main producers and 12,200 employees (Figure. 3).



Figure. 3. ACICAE Bask otomotive industry region

The region, where there are 260 firms together with supplier industry and other auto producers and a total of 50,000 employees, constitutes 25% of the gross domestic product of Basque region. Production of the region has continuously increased since 1990s and today it has turned out to produce twice as much of the year it was established. Important models of large automobile producers, among which there are also Daimler Chrysler's models, are also produced in this region. The main goal of Basque automotive region is to increase the competitiveness power at global scale and encourage activities intended for the cooperation of auto producers and supplier industries. ACICAE builds decisions about automotive industry through exchange of ideas with the public authorities. Trade union and cluster groups in the region provide important contributions to the development of industrial policies. In the Basque region, 9 technology centers, 4 sector centers, 3 laboratories, 9 research and development centers, 2 public research institutions, and 8 mediator organizations can be connected over the science and technology network [18].

Turkey-Kocaeli Automotive Industry Region was established as a consequence of automotive producers' search for providing competitive advantage in the global environment in 1980s. This region has become an important location for production with the effects of Europe's peripheral regions' strategies on location selection and decentralization of production activities. Today it is observed that the most prominent establishments of the automotive sector such as Chrysler, Hyundai, Honda, Toyota, Isuzu, and Ford have assembly lines in the region. In this section of the study, it is aimed to evaluate the basic potentials offered by Kocaeli Region and differences and similarities between automotive industry regions reflecting the new

developments in Europe and Kocaeli automotive industry region. These evaluations based on the research of Şenlier and Salihoğlu in 2009 [19]. In this study, they used a method with two stages. In the first stage, general conditions of Kocaeli automotive industry region are interpreted reports, researches and statistics related to the sector from institutions such as Turkish Statistical Institute, Universities, Kocaeli Chamber of Industry, Association of Automotive Parts&Components Manufacturers. In the second stage, it is investigated the factors which have had an impact on Kocaeli automotive geography. In this direction, spatial organization of the firms in the sector, changes in spatial development in historical period in the parallel of technological development are analyzed with questionnaires and face-to-face interviews. In below, after the presentation of general conditions of Kocaeli automotive industry region and its basic potentials, a comparative analysis of European automotive industry regions and Kocaeli automotive region is presented.

With its 23.8% industrial sector employees, Kocaeli as an industrial city is among the four cities with the largest share of production in Turkey's industrial production. Kocaeli region has important potentials in industrial viewpoint with reasons such as the fact that Kocaeli Gulf is a natural harbor, its proximity to a large commerce-finance and administration center such as Istanbul, the city's being on the important transportation axes, proximity to transportation nodes such as airports.

From the viewpoint of foreign capital investments which are the important drivers of urban and regional economies, it is observed that automotive industry is among the top three sectors in Kocaeli [20]. The advances in communication and transportation technologies which especially emerged in 2000s,

globalization and increasing possibilities for accessing to new markets have also had an impact on Kocaeli automotive geography. In the period after the 2000s, because the importance of assembly factories in global networks was increased, the region have become more conspicuous for the players of global supplier industry with its important competitive advantages and it has become a growing cluster.

As of 2008, there are 108 automotive firms in Kocaeli industry region (Figure. 4). Among these firms, Honda-Gebze, Ford-Golcuk, and Hyundai-Izmit are key industry firms regarded as assembly lines. Within the course of history, Kocaeli automotive region is an emerging cluster with the participation of supplier industry following the location decisions of assembly lines [19].

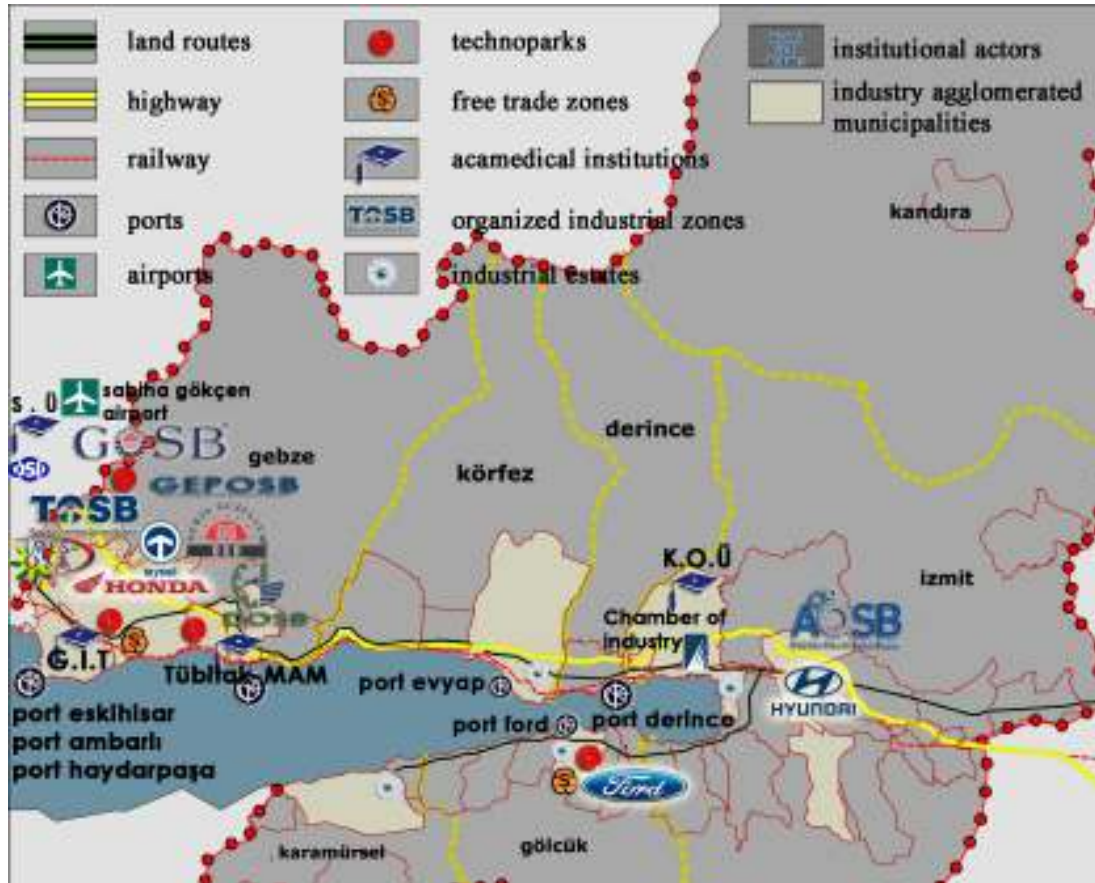


Figure. 4. Kocaeli otomotive industry region

When the distribution of suppliers that have selected locations in the region is analyzed, generally there is a concentration around key industry firms. There are 77 suppliers in Sekerpinar and its nearby where Honda is located. It is an important factor that TOSB (Automotive Parts and Components Industry Organized Industry Region), which is an experienced region in supplier industry, and Gebze Organized Industry Region, which has the most advanced and modern service and infrastructure of Turkey, are also located in this region. Firms, in turn, use the advantages offered by being located in such an experienced region such as cost sharing, cooperation and information sharing with firms in the same sector. Other supplier industry organizations are mainly concentrated around Hyundai and Ford. A cluster have formed in the center of Kocaeli where Hyundai-Assan is located with a concentration of 13 suppliers. This case indicates the existence of intensive supplier networks in the region.

While numerous scientific research institutions located in the region -TÜBİTAK Marmara Research Center, Kocaeli University, Gebze Institute of Technology, Turkish Standards Institute, TÜBİTAK Technopark, TUSIDE (Turkish Institute for Industrial Management), TEKMER Technology Development Center- provide important potentials for developing joint research and cooperation projects intended for the development of the industry, Kocaeli Chamber of Industry and TAYSAD provide important contributions with the reports and research papers they prepare for the development of the sector. Moreover, research and development departments within the body of assembly factories and suppliers carry out studies within the sense of research infrastructure and technological development.

It is showed Table 1 that basic potentials offered by automotive regions to the firms in their regions in order to interpret differences and similarities between European automotive regions and Kocaeli region.

Table 1. Comparison of Kocaeli Automotive Region to the Automotive Regions in Europe

Automotive region	Information and Technology	Cooperation	Marketing	Quality Improving Activities	Internationalization
Austria- AC Styria	Providing information for the firms in the region about current trends, market conditions, Europe Development Funds, allowing partner firms to access databases.	Developing organizational projects for quality improvement especially with the cooperation projects in research and development area.	International promotion of the cluster and the activities. Transformation of AC Styria into a brand, publishing periodical bulletins, firm-specific marketing efforts.	Conducting education and training activities intended for the workers and the firms via workshops organized by AC Styria.	International promotion of AC Styria, building networks with foreign automotive regions, providing location support to foreign firms.
Germany– Nordrhein Westfalen (NRW)	Building a database of the applied projects to establish examples for future projects and keeping this database open for the access of member firms of the cluster, preparation of a catalogue about the region at certain time periods.	Building cooperation for the firms in the region in terms of project preparation, partner detection/selection, and realization of the projects within the framework of cooperation, providing support for marketing, promotion, and funds when necessary.	Emphasizing the importance of cooperation and working together on technical journals and in professional meetings, fairs, etc., preparation of publications and presentations supported by the Ministry for dissemination of cooperation projects.	Realization of cooperation projects between the firms and technology development institutions (about areas such as research and development, production, marketing, transportation, organization, and information technologies, etc.)	Representation of the region at global level, participation in international cooperation, aids provided to the firms within the process of globalization, research on finding partners for cooperation outside the country and the region.
Spain–ACICAE Basque	Developing technology and innovation plan of the cluster, meeting the needs of the member firms in the region within the scope of a program.	Providing services intended for the development of reciprocal relationships of the firms in cluster and cooperation among them.	Building firm-specific web pages, promotion of the firms and the cluster, publication of a bulletin about the region and preparation of the automotive report of the region.	Developing the management levels of member firms of the cluster, organization of courses and conferences specific to the automotive industry, conducting certification studies with quality organizations such as ISO etc.	Presentation of the Basque automotive cluster at international level, providing support to the firms in the internationalization process, providing facilitation for location and finding partners depending on the firm capacities.
Turkey-Kocaeli	Numerous scientific research institutions located in the region provide important potential for the creation of knowledge and development of technologies. Moreover, Kocaeli Chamber of Commerce and TAYSAD (Association of Automotive Parts & Components Manufacturers) provide important contribution with their research about the industry.	The mission of developing automotive industry in the region is carried out by TAYSAD on a large scale. Meetings intended for cooperation with public institutions and private sector are successfully performed.	Promotion of the region, representation of the region in national and international industry and technology fairs, preparation of reports intended for the development of the sector.	Cooperation and information exchange carried out by TAYSAD, business development activities specific for the automotive industry, supplier and worker trainings can be regarded as quality improving activities.	International promotion of Kocaeli automotive region, meetings with foreign investors from outside the country and the region are among important activities of TAYSAD.

The strategies developed by European automotive regions on information and technology, cooperation, marketing, quality improving activities, and internationalization provide important competitive advantages in the Europe and in the world's automotive geography. The most important property of these automotive regions is the existence of technological networks which support the firms located in the region with its various activities. While these networks provide the firms with services at the international level on matters such as representation of the regions at global level, development of international cooperation, supporting the firms that are in the internationalization process, and location of firms and partner finding, etc., they also carry out projects intended for developing the reciprocal relationships and cooperation of the firms both at regional and local level. These cooperation projects include joint research with technology development centers located in the region on issues such as research and development, production, transportation, marketing, organization, and information technologies, etc. Another important service provided by the regional networks is the development of technological and innovation plan of the cluster and satisfaction of the needs of member states located in the region within the scope of a program. Within this framework, topics such as informing the firms in the region about issues like current trends, market conditions, Europe development funds, developing a database where application projects are also available and keeping this database open for access of member firms of the cluster, and regularly preparing a catalogue about the region at certain intervals gain importance. On the other hand, transformation of the region into a brand, preparation of the region's automotive report, periodically publishing a newspaper, conducting firm-specific market research and preparation of web pages, performing trainings intended for workers and firms, and carrying out quality improving activities such as organization of courses and conferences specifically for the automotive industry, all have a very important role in strengthening the organization capacity of the region.

In the light of these fundamental points, it is possible to arrive at these assessments about differences and similarities between European Automotive Regions and Kocaeli Automotive Region [19]:

Kocaeli automotive region is not a mature cluster in terms of organization. It is conspicuous that regional network activities are limited in terms of scale and concept and there is a lack of a strong technological network which could involve dominant auto producers of the region. The existence of an integrated organization within a well structured regional technology network is one of the main constraints of benefiting from the advantages of location in that region in European automotive regions.

It could be said the principle of "existence of an actor taking over the mission of developing automotive industry in the region" which is prominent in the examples about successful automotive regions in the literature is also fulfilled for Kocaeli successfully by TAYSAD even it is on a limited scale. Cluster-specific services such as meetings being held with public

institutions and private sector, cooperation and information exchange activities, external affairs and business development activities, representation in fairs, interviews with foreign investors, promotion of the region, and trainings for suppliers and workers are successfully carried out by TAYSAD [21]. At this point, TAYSAD is distinguished with its over-30 years of experience and knowledge in the areas such as strengthening the organizational structure of the region, developing the cooperation between the firms and encouraging learning processes based on the firms' reciprocal interaction. Being aware of the increasing importance clusters for global competition and regional development, TAYSAD should take the responsibility leadership in regional organization.

On the other hand, it is of utmost importance that a well structured technology network is built within the regional organization in European automotive regions. From this point of view, Kocaeli automotive region has very important potentials with its universities, technology centers, and technoparks. Nevertheless, there is no strong relationship between automotive industry and research institutes. Strengthening the relationships between the sector and research institutes and assuring cooperation is of critical importance in terms of developing the organization capacity of the region.

4. RESULTS AND DISCUSSION

Today, it is observed that concepts such as technological innovation, learning regions, knowledge networks are prominent in terms of sustainable development of industrial regions. In this direction, participation in international and regional networks, technology and innovation, information and communication, cooperation, marketing, and quality improving activities, etc. are also conspicuous specifically for automotive industry regions as well.

Although successful automotive industry regions prominent in the Europe have different dynamics, they have some common characteristics. Technological networks built in these regions have important roles on issues such as representation of the region in the international arena, participation in the global coordination projects, supporting the firms in their globalization processes, and conducting research about cooperation partners outside the regions, etc. Cooperation projects about research and development, production, transportation, quality improvement, organization, and information technologies are especially supported.

Specifically in 1980s, as a consequence of producer firms' search for new manufacturing areas in the global environment and in European automotive geography, Turkey and Marmara Region draw attention with its important competitive advantages as an important peripheral region. Within this context, Kocaeli region have become a conspicuous and continuously growing cluster for key industry firms and global supplier industry actors. With this study, an opportunity was found for analyzing the spatial changes that the automotive industry in Kocaeli region have gone through in parallel with

technological change processes in various dimensions. While the changes are parallel with European examples at some areas, it is observed that existing habits are continued for some other areas.

When the special conditions of Kocaeli automotive cluster are analyzed, it could be concluded that there are important potentials in the region. Factors such as the Gulf's being a natural harbor, proximity to the largest commerce, finance, and management center of the country which is Istanbul, Kocaeli's being a city located on the national and international commerce axes and the advantages provided by important transportation connections, Kocaeli's being one of the four cities which have the greatest share in Turkish industrial production, the city's having an industrial structure which is suitable of information and technology intensive nature of the sector, the existence of numerous and specialized organized industry regions with the free trade zone, the existence of research institutions such as TUBITAK-MAM, T.S.E., and KOSGEB, existence of a relatively cheap and qualified labor force, proximity to other key industries and supplier industries are effective on location phenomenon as they are the advantages offered by the region.

Kocaeli automotive region is a developing cluster in terms of organization capacity. The fundamental characteristic of successful examples in this area is the establishment of an integrated organization within a well structured regional technology network. From this viewpoint, it is observed that network activities in Kocaeli automotive cluster are limited in terms of scale and scope and there is a lack of a strong network which could involve the prominent auto producers of the region. However, it could be said that, this drawback is overcome by TAYSAD at some level. We share the view that with its over-30 years of experience and knowledge, TAYSAD should accept the leader role in regional organization with its studies on areas such as strengthening the organizational structure of the region, developing cooperation between the firms, and encouraging learning processes based on the reciprocal interaction of the firms. The region has very important potentials with its universities, technology centers, and technoparks in terms of structuring the technological network of the firm. Within this framework, strengthening the relationships between automotive industry and research institutions and assuring cooperation are of critical importance in terms of strengthening the organization capacity of the region.

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REFERENCES

- [1] Tekeli, İ., Şenyapılı, T., Güvenç, M., "Ankara'da Sanayi Üretiminin Tarihsel Gelişim Süreci", *Milli Produktivite Merkezi Yayınları*, Ankara, 31-36 (1991).
- [2] Nuur, C., "Cluster dynamics and industrial policy in peripheral regions", PhD, Stockholm: *Royal Institute of Technology*, İsveç, 27-36 (2005).
- [3] Meardon, S., "Modeling agglomeration and dispersion in city and country: Gunnar Myrdal, Francois Perroux, and the new economic geography", *American Journal of Economics and Sociology*, 60: 25-57 (2001).
- [4] Copus, A. K., "From core-periphery to polycentric development: concepts of spatial and aspatial peripherality", *European Planning Studies*, 9(4): 539-552 (2001).
- [5] Fujita, M., Thisse, J.F., "The Formation of Economic Agglomerations: Old Problems and New Perspectives", in Huriot, J.M., Thisse, J.F.(eds.), "Economics of Cities", *Cambridge University Press*, 3-73. (2000).
- [6] Raines, P., "The cluster approach and the dynamics of regional policy making", *The European Policy Research Centre*, Regional and Industrial Policy Research Paper No:47, Glasgow, 11-13 (2001).
- [7] Porter, M.E., "The Competitive Advantage of Nations", *The Macmillan Press Ltd.*, London and Basingstoke, 148-152 (1990).
- [8] Morrosini, P., "Industrial clusters, knowledge integration and performance", *World Development*, 32(2): 305-326 (2004).
- [9] DPT, "Türkiye'de Otomotiv Sanayii Gelişme Perspektifi", *Devlet Planlama Teşkilatı*, Yayın No: 2660, Ankara, 2-13 (2002).
- [10] Fasenfest, D., Jacobs, J., "An anatomy of change and transition: the automobile industry of southeast Michigan", *Small Business Economics*, 21: 153-172 (2003).
- [11] Hudson, R., "New production concepts, new production geographies? Reflections on changes in the automobile industry", *Transactions of the Institute of British Geographers*, 19(3): 331-345 (1994).
- [12] Lecler, Y., "The cluster role in the development of Thei car industry", *International Journal of Urban and Regional Research*, 26(4): 799-814 (2002).
- [13] Lung, Y., "The Changing Geography of the European Automobile System", *Groupement de Recherches Economiques et Sociales*, report no.2003-10, Bordeaux/Toulouse, France, 12-23 (2003).
- [14] Lung, Y., "The Challenges of the European Automotive Industry at the Beginning of the 21st Century", *Auto Industry Symposium: The 2003 RIETI - HOSEI - MIT IMVP Meeting*, Hosei University, Japan, (2003).

- [15] DPT, “9. Beş Yıllık Kalkınma Planı, Bölgesel Gelişmede Temel Araçlar ve Koordinasyon Özel İhtisas Komisyonu Raporu”, **Devlet Planlama Teşkilatı**, Ankara, 35-38 (2006).
- [16] Agiplan., “Cluster Building and Networking: Analysis of Transnational Technology Networking between Existing Clusters of SMEs and one or more Technology Poles”, **European Commission Directorate General Enterprise Report** (1998). <http://circa.europa.eu/irc/sme/euroinformation/info/d/ata/sme/en/library/agiplan.doc> (2008)
- [17] Internet: ACSTYRIA website, <http://www.acstyria.com/english/default.htm> (2008).
- [18] Internet: EC, http://ec.europa.eu/enterprise/automotive/pagesback/ground/competitiveness/cars21_hearing/acicae.pdf (2008)
- [19] Şenlier, N. ve Salihoğlu, T., “Endüstri Kümelerinde Değişim: Otomotiv Endüstrisi”, **Gebze Yüksek Teknoloji Enstitüsü**, Rapor no: 2008-A-22, Kocaeli, 172-182 (2009).
- [20] DPT, “İllerde Öne Çıkan Sanayi Sektörleri Araştırması”, **Devlet Planlama Teşkilatı**, Ankara, 330-336 (2006).
- [21] TAYSAD, “29. Olağan Genel Kurul Faaliyet Raporu”, **TAYSAD**, Kocaeli, 21-43 (2007).