

**RELATIONSHIP BETWEEN ECONOMIC PERFORMANCE  
AND CHARACTERISTICS OF INDUSTRIAL DISTRICTS: THE  
CASE STUDY OF MANUFACTURING INDUSTRY**

**Özer KARAKAYACI\***

**Abstract**

In economic geography literature, there is a consensus that qualitative concentration of economic activities in a region does not contribute solely to the economic performance of the region and that spatial and social factors are also effective as well as qualitative concentration of economic activities. In this context, the study depends on the assumption that **“there is a positive relation between economic performance of manufacturing industry and economic and non-economic characteristics of the manufacturing industry”**.

The aim of this study is to examine whether a relation between economic performance of manufacturing industry and economic and non-economic characteristics of the manufacturing industry in the case study of a statistical region called NUT 1 in Turkey. In this context, the performance of manufacturing industry in Turkey is evaluated in terms of economic value added. In this study, the relation between economic performance and characteristics of the manufacturing industry are analyzed by using statistical methods. As the result of this study, it is confirmed that there is a positive relation between economic performance of manufacturing industry and economic and non-economic characteristics of the manufacturing industry

**Keywords:** Regional Performance, Manufacturing Industry, Industrial Geography, Turkey.

**Türkiye’de Sanayi Bölgelerinin Özellikleri ve Ekonomik Performansı  
Arasındaki İlişkiler: İmalat Sanayi Örneği**

**Özet**

Ekonomik coğrafya yazınında; bölgedeki ekonomik faaliyetlerin niteliksel olarak yoğunlaşmasının, bölgenin ekonomik performansına tek başına pozitif katkı sağlamayacağı ve niteliksel olarak yoğunlaşmanın yanı sıra mekânsal ve sosyal faktörlerin de etkili olacağı konusunda bir fikir birliği söz konusudur. Bu bağlamda çalışma, **“imalat sanayinin ekonomik performansı ile imalat sanayinin ekonomik ve ekonomik olmayan özellikleri arasında pozitif ilişki vardır”** varsayımına dayandırılmıştır.

Bu çalışmanın amacı, Türkiye’de Nuts I düzeyindeki istatistikî bölgelerin imalat sanayi performansı ile özellikleri arasındaki ilişkilerin, istatistikî analiz-yöntem

---

\* Res. Ass., Selçuk University Engineering and Architecture Faculty Department of City and Regional Planning, 42079 Selçuklu, Konya-Turkey, [karakayaci@gmail.com](mailto:karakayaci@gmail.com), [karakayaci@yahoo.com](mailto:karakayaci@yahoo.com)

teknikleriyle belirlemektir. Bu kapsamda; Türkiye’de imalat sanayi performansı imalat sanayide elde edilen katma değer açısından değerlendirilmiştir. Çalışmada, Türkiye’de bulunan 81 bölgenin imalat sanayi ekonomik performansı ile özellikleri arasındaki ilişkiler istatistikî analiz-yöntem teknikleriyle incelenmiştir. Araştırma sonucunda, Türkiye’de imalat sanayi ekonomik performans ile özellikler arasında pozitif yönlü bir ilişkinin olduğunu tespit edilmiştir.

**Anahtar Kelimeler:** Bölgesel Performans, İmalat Sanayi, Sanayi Coğrafyası, Türkiye.

## INTRODUCTION

Economic essays in last three decades points out the congestions of traditional models that try to explain regional economic developments process. Congestions of traditional economic models have repaired the grounds for new theoretical studies to be arisen together with neo-liberal policies. Within the framework of these developments, trying to redefine the nature of economy has been the focus of theoretical debates described according as the many determinant factors and temporal-spatial with respect to social and cultural factors. Therefore, economy was no longer a discipline determined only by abstract contemporary rules and economic units behaving on their own (Eceral, 2006: 459). This point of view has caused that the evaluations regarding small-scale firms’ role in regional economic development/growth have evolved in economic geography especially since 1980s. The fact that large-scale firms have difficulty in adapting changing conditions, and that firms want to take less risk before changing conditions in vertical disintegration and horizontal disintegration of production stages, have caused firms’ behavior manner with respect to production and spatial. Therefore, shifts in regional development paradigms have triggered some changes in economic geography. These changes on economic geography literature also enforce changes in developing industry geography described factors as new technological developments, new production system, and new division of labor and spatial behaviors (Eraydın, 1992: 25). Thus, it is know that period of changes in production organization such as sectoral specialization, dominant status of small and middle-scale firms, intra-firm networks, quality-based competition environment and vertical and horizontal disintegration of production process play an important role in the generation of new industrial districts (Eraydın, 2002: 24).

In this respect, agglomeration of economic activities in one region in the last three decades has become the most important features of clustering. Geographical agglomeration of industrial activities was first handled systematically by Marshall (Kim, 1997: 2). Advantages of agglomeration based on Alfred Marshall’s study regarding small and middle-scale firms have generated as industrial districts concept as an important spatial element of economic defined properties such as local advances usage, information sharing, flexible labor force culture, cooperation and trust arising from intense social relations, service delivery network and

common usage of local infrastructure since 1970s (Eraydın, 2002: 20; Schmitz and Nadvi, 1999: 1504; Erendil, 1998: 71). Industrial districts have become an important indicator that the importance of “space” concept is comprehended. It is seen that policies regarding industry districts are being developed especially in developed countries that regional development is sustained and competitive features of the region are revealed. In this respect, successful economic regions such as Italian Industrial Districts in Italy<sup>1</sup>, Batten Württemberg in Germany, Silicon Valley in USA, Sinos Valley in Brazil, or New Industrial Districts have occurred.

Geographers, sociologists, economists and political scientists, apart from underlining the importance of spatial in the literature of new industrial districts, have realized the fact that social and cultural values have also important effect on space. In this respect, within the scope of spatial, cultural and political features of new industrial districts, many studies are conducted both on theoretical and empirical level with respect to economic performance and growth of the regions (Amin, 1999: 367; Markusen, 1996: 294; Schmitz and Musyck, 1994: 891-902).

In Turkey, new industrial districts were occurred to the end of 1970s. Regions such as İstanbul, İzmir, Ankara, Adana, Bursa, Kocaeli, Zonguldak, Karabük, Kırıkkale known as intensive industrial centers, maintain their focal status. While industrial regions established through the assistance of the state such as Zonguldak, Karabük, Kırıkkale show a recession inclination, regions such as Denizli, Gaziantep, Eskişehir, Konya, Kayseri, Kahramanmaraş, Çorum have arisen as the new spaces of industry (Mutluer, 2003: 16-20; Eraydın, 2002: 61-66).

In this study, relations between spatial, social and economic factors of industrial districts and economic performance of industrial districts are analyzed in terms of manufacturing industry in Turkey. The aim of the study is to determine the relations between economic performance and economic/non-economic features of manufacturing industry in Turkey. In the study, it is aimed to determine whether non-economic (spatial and social) indicators, apart from economic indicators, have effect on manufacturing industry performance.

The study consists of five main sections. Firstly are discussed theoretical approaches such as industrial geography, economic geography and regional development. Characteristics and changes of industrial geography in Turkey are investigated in the second section. The methodology takes place in the third section to evaluate of data and statistical analyzing methods for analysis relations between performance and characteristics of manufacturing industry. Research findings are discussed in the fourth section. In the fifth section is consisting of conclusion that evaluations and inferences connected with Turkey manufacturing industry geography in context research findings.

## I. THEORETICAL BACKGROUND: ECONOMIC GEOGRAPHY AND INDUSTRIAL DISTRICTS

Economic geography approaches have converted with criticisms of the flexible specialization-industrial districts thesis that has arisen with “*Second Industrial Divide*” (Piore and Sabel, 1984: 12-23). In this period, regional economic development theories were shaped in accordance with the neo-classical economy policies, Keynesian and Neo-Liberal economic policies. Approaches dealing with economic, social and political problems of industrial districts or generation processed of industrial regions have arisen within these policies. A Neo-classic approach was built on “*profit maximization*” and “*cost minimization*”. This approach of Smith, “*Homo Economicus*”, which underlines that individual economic benefits should be given place, points out a benefit leading from individualism to generalize. This approach which focuses on individual benefits of firms is unified with transportation/shipping costs and scale-economy approach. According to neo-classic approaches, it is observed that firms’ place choice differs according to technology used by the firms in their place selection of industrial districts and there is a relation between increase in capital intensive firms and firms that have moved out of city.

The most serious critique to neo-classic approaches has been came from Thorstein Veblen. Veblen finds neo-classic approaches so static that they cannot handle economic problems. Veblen’s effect has been significantly effective in drawing attention again to “corporate economy” approach, i.e. to approach which avoids on large scale the concepts extracted from pure theory in behalf of examining economy’s main institutions operation empirically (Barber, 2007: 101-125). Besides, it that is making categorizations about place choice of industry and reductionist point of view is the subjects that neo-classic approaches are criticized.

Structuralist approaches, defined as a kind of individual methodological solutions of Keynesian “Welfare State” policy leading in 1960s, generated with the crises of 1970s. Structuralist approach stresses on the necessity that in determination of economic geography not only firms’ behaviors but also social and cultural respects in which this behavior is shaped should be paid attention. Moreover, structuralist approaches, examined the topics that tendencies as vertical and horizontal disintegration of the firms, organizational integrations in spatial process, and flexible production forms arising in uncertain situations of 1980s, are not only limited to production but also started transformation in the space. This interaction between production processes and spatial organization were considered in a framework such as re-organization of labor and production scales and restructuring of social-cultural relations (Barber, 2007: 125-135).

Keynesian economy policies have been unsuccessful in sustainable growth that regional policies in 1960s have acquired firm-based, standardized and state-supported structure. Because weak economies of developing regions could not

compete with free market economy developed in 1980s. "Third-Way" concept, occurred between Keynesian approach that re-organizes income and employment distributions intra-regions and neo-classic Market powers that anticipates a transition from regions of high cost to regions of low cost, has been often used by the economic geographers (Cumbers et al., 2003: 327-329). In this concept, used as the Third Way, regional economic development mostly through extraction of the region's own local sources is anticipated (Amin, 1999: 366-368). This point of view has an important effect in emerging of new industrial districts and industrial clustering such as Italian Industry Districts, Batten Württemberg, Silicon Valley and Sinos Valley. Industrial districts defined as sectoral and spatial concentrations of firms are economic spaces occurred common strategy among firms, developed network structures, sharing or absorptive knowledge, positive externality that the firms provide to one another (Porter, 2003: 550; Schmitz and Musky, 1994: 891; Elsner, 2000: 412-414).

Increasing interest to industrial districts has generated different points of view to industrial districts concept. These approaches can be generally discussed in five stages. The first of these is the theory developed by Marshall that puts industrial districts on agglomeration theories. The studies of a group of researchers in Florence University, known also as Italian School, on Central Italy and Northern Italy from the ends of 1970s, are like the continuations of the theory developed by Marshall (Scott, 2000: 492). The second of these is "Californian School" approach. Californian School focuses on the theory that economic activities decreases firms' costs with respect to the properties such as local work force, market, horizontal disintegration and spatial concentration (Scott, 2000: 492-493; Storper, 1999: 211). The third is approaches led by Storper developed on concepts such as trust, social networks, flexible specialization and untraded interdependencies. Supporting local economies that untraded interdependencies has strengthened and underlining elements such as tacit knowledge, embeddedness, habits, norms and trust that are based on face-to-face relations basis the grounds of these approaches. Moreover, untraded interdependencies create a learning environment for the firms have resulted in the generation of new ideas such as information, technology and administration and have played an important role in the emergence of "learning region" in industrial geography (Storper, 1999: 211-214). The fourth approach is the group named as GREMI (Groupement Eurpeen des Miliexus Innovateurs) concentrated on the view of creating innovative environment. In this innovative environment, relations, roles and institutions between actors, producers, researchers and politicians and embedded behaviors in the social and economic period are analyzed. This group asserts the views that of analysis oriented to growth are conducted with respect to innovativeness; the most accurate results can be achieved. In the fifth approach, Porter and Krugman stress the importance of the theory of specialization and endogenous growth theory with the externality (Amin, 1999: 368-369; Benneworth and Henry, 2004: 1015-1017). As the result of the fact

that interest was redrawn to specialization and endogenous growth theory with externality theory, technological advantages and information sharing increased and transportation costs decreased. In this respect, spatial and social features have made positive contributions to the performances of the firms (Storper, 1999: 211).

In the light of these considerations, industrial districts have been to be considered as engine to new economic geography or regional development with respects to their different features. Industrial districts are defined as positive externality that firms of industrial districts have provided to one another due to their choosing of place in the same region, competitiveness created by the externalities, information, developed network structures and aim to reach markets (Porter, 2003: 551-558; Elsner, 2000: 415-422; Schmitz and Musyck, 1994: 890-891). Apart from these features, geographical proximity and spatial features, domination of small and middle-scale firms, intra-firm collaborations, trust enhanced based on intra-firm competition, innovativeness and social relations are also features of industrial districts (Schmitz and Musyck, 1994: 890-891; Eraydın, 2002: 71-92).

## II. EVALUATION OF MANUFACTURING INDUSTRY IN TURKEY

Turkey with its area of 780476 km<sup>2</sup> and population of 72.5 million is a country that has strategic importance in terms of strategic and economic. Turkey is a country live in cities whose %70 of its population, according to 2010 data and whose youth population ratios is high with %52,2 of its population is under the age of 30 and is separated into 81 administrative regions on Nuts I level<sup>2</sup>. Turkey showing significant developments with respect to both population and economic structure from its foundation in 1923, apart from being in a strategic location between Asia and Europe, is a leading country in the region with respect to its demographic, social and economic features. Especially with the administrative understanding transformed from empire to republic, significant developments in the economic structure have been experienced. Change and transformation periods in the economy from the foundation of the Republic in 1923 have caused to different impacts on the country. In other words, transformation in the economic system has generated different results for the regions. In addition to this, the fact adopted economy policies varied in certain periods has been important in shaping industrial geography in Turkey.

In this context, examining the transformation in economic and spatial structure in Turkey in four different periods have made more comprehensible with change and transformation periods that have occurred in the industrial geography. The first period is the period from the foundation of Republic (1923) to the World War II (1945). In this period, main industry investments were carried out by the state. Especially from 1932 onwards, the state became dominant in significant level

in shaping economic life as an investor, administrative and inspector element. In 1930s, investments to sectors such as textile, iron and steel that were determined as key sectors of growth were made by the state in İzmir, İstanbul and Karabük. In addition to this, Eskişehir, Tokat-Turhal and Uşak Sugar Factories were established by the state. In site selection of these investments, factors such as social and geographical features played an important role (Özcan, 1995: 50-51). From the World War II to 1960s, transformation to planned period was implemented is the second period when variation in economic policies is considered. This period was a period when both economic and social structures in Turkey went through a significant transformation. Transition to multiparty system in political life, mechanization in agriculture and rapid urbanization process are the important developments that occurred between 1945 and 1960. From 1946 onwards, protective policy of the state in economy was bulges and the road for private entrepreneurs started to be opened (Eraydın, 1992: 91-96). In this period, focals such as İstanbul, Ankara, İzmir and Bursa where population, industry and small-middle scale entrepreneurships were accumulated, emerged. In addition to this, important investment oriented to military-strategic industry in Kırıkkale and iron-steel industry in Zonguldak and Hatay/İskenderun was implemented. Third period is the period from 1960s to the beginning of 1980s which is accepted as the starting point of the implementation of neo-liberal policies, in which import substitution policies were dominant. In 1960s, with the foundation of State Planning Organization (SPO), Firstly Development Plan was prepared. In this period, import substitution policies were adopted and GBE (Government Business Enterprises) was stated to be founded by the state. In addition to this, within the implemented policies, significant developments were experienced with respect to manufacturing industry in 1970s. In this period, it is observed that cities such as Kırşehir, Rize, Samsun, Kırıkkale, Zonguldak, Karabük, Hatay and Malatya, in addition to İstanbul, Ankara, İzmir and Bursa, emerged as important breeding grounds with respect to industrial (Eraydın, 2002: 62-65). 1980s was a period in which the importance of market economy increased significantly and in which neo-liberal policies started to be implemented. It is observed that in this period, labor force working in the industrial enterprises owned by the state and in industrial enterprises established by the state decreased. But concentration process of especially small-scale firms on certain regions has begun. Changes in economic have emerged different dynamics and priorities in the space.

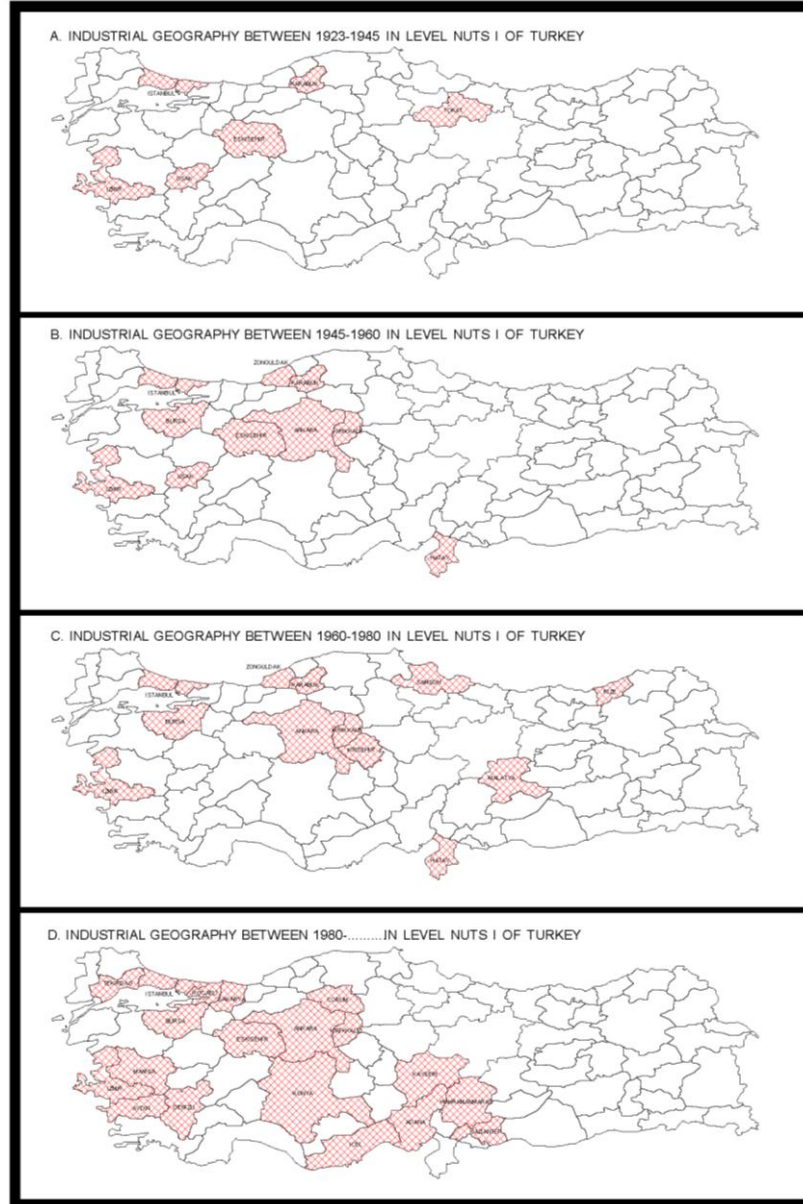
To sum it, it is seen that the Republic has experienced four break points with respect to economy from the date of its foundation. As result of mind and steel industries established on certain region by the state in the first years of the Republic and concentration of small and middle-scale entrepreneurs on certain metropolis centers from 1960s, industrial geography has differentiated. Industrial geography has expanded with the intention of close cities to be the new industry districts to metropolis centers from the end of 1970s. With the expansion period of

industry to metropolis centers such as Istanbul, Ankara and İzmir especially from 1960s, regions being centered in İstanbul metropolis and containing Kocaeli, Sakarya and Tekirdağ regions in the west and east line and Bursa in the south line; regions that is centered in İzmir metropolis containing Manisa, Denizli, Aydın regions; region that is centered in Ankara metropolis containing Eskişehir, Kırıkkale, Çorum regions; and region that is centered in Adana metropolis containing İçel, Gaziantep, Kahramanmaraş regions and Konya, Kayseri centered regions have emerged since 1980s (Figure 1) (Eraydın, 1999:58-61; Mutluer, 2003: 15).

In spite of that, it is possible to say that regions such as Hatay, Zonguldak, Karabük, Rize, Malatya, and Kırşehir have developed as result of import-substitution policies have experienced reduce after 1980s. The most important reason for this is that the state has left its role as investor with neo-liberal policies.



**Figure 1.** Industrial geography between 1923 and 2010 years in Turkey.



### III. METHODOLOGY

The aim of the study is to determine performance of manufacturing industry of regions in the level Nuts I in Turkey. In this context, the study depends on the

assumption that “**there is a positive relation between performance of manufacturing industry and economic/non-economic characteristics of the manufacturing industry**”. Regions in Turkey have different advantages with respect to their transportation and infrastructure facilities and that the opportunities they possess regarding human capital show differences is seen the most important factor in the emergence of differences with respect to the performances of manufacturing industry. With new economic geography theories coming to the forefront from 1980s instead of neo-classic theories, the scope of the studies intended for putting forward the regional differences has changed. The main element of this change is the process in which apart from economic indicators, also non-economic indicators are included in the analysis. In this study, relations between economic and non-economic indicators that affect manufacturing industry performance in Turkey are analyzed.

In this respect, by using statistical information belonging to 2000 of Union of Chambers and Commodity Exchanges of Turkey (UCCET), Ministry of Industry and Trade (MIT) and Turkish Statistical Organization (TurkStat) regarding 81 regions in Turkey, relations between performances and characteristics of manufacturing industry are analyzed. In the light of these data, 11 variables related to manufacturing industry are obtained (Table 1). These variables and calculation methods of these variables can be seen in Table 1. In this framework, relations between variables for analyzing of the hypothesis are analyzed with linear regression<sup>3</sup> method. General demonstration of linear regression model is as follows (Greene, 2003: 11).

$$Y = b_0 + b_1X_1 + b_2X_2 + \dots + b_nX_n + u \quad (1)$$

**Dependent variable (economic performance):** In the literature concerning economic performance of the manufacturing industry, many methods are used. Variables such as income, employees-wages, added value, employment indicator etc. are the variables used in order to determine economic performance. In this study, added value and employment indicators obtained from manufacturing industry are used as the measuring of regions’ manufacturing industry economic performance. According to this, VALPER variable is per capita added value employed in manufacturing industry in a region. This variable expresses a firms’ market share and labor force efficiency. Therefore, firm’s market share and labor force efficiency is in linear relation with the economic performance of the industrial districts.

**Table 1.** Variables relating to characteristics of manufacturing industry in Turkey.

Codes	Calculation Method	Notes
<i>Dependent Variables</i>		
VALPER	$\sum_{i=1}^n \frac{VaI(n)}{Emp(n)}$	Value added per a employee in manufacturing industry, 2000 (1000 dollar)
<i>Independent Variables</i>		
EXPVAL	$\sum_{i=1}^n \frac{Exp(n)}{Firm(n)}$	Export sales per a firm in manufacturing industry, 2000 (1000 dollar)
GDPEMP	$\sum_{i=1}^n \frac{GDR(n)}{Emp(n)}$	Gross domestic product per a employee in manufacturing industry, 2000 (1000 dollar)
SCALE	$\frac{\sum_{i=1}^n Emp(i)}{\sum_{i=1}^n Firm(i)}$	Scale economics of firms in term of firm size.
FORENT	-----	Number of foreign entrepreneurship in a region, 2000 (number)
EMPLOY1	$\frac{\sum_{i=1}^n Emp(n) - \sum_{i=1}^n ManVs(n)}{\sum_{i=1}^n Emp(n)}$	The ratio of skilled labour in manufacturing industry, 2000 (%)
EMPLOY2	$\frac{\sum_{i=1}^n Emp(n) - \sum_{i=1}^n ManVa(n)}{\sum_{i=1}^n Emp(n)}$	The ratio of unskilled labour in manufacturing industry, 2000 (%)
FIZCHAR1	$\frac{\sum_{i=1}^n KFF_i}{\sum_{i=1}^n KSS_i}$	The ratio of action parcels to total parcels in small industrial sites, 2000 (%)
FIZCHAR2	$\frac{\sum_{i=1}^n OFF_i}{\sum_{i=1}^n OSB_i}$	The ratio of action parcels to total parcels in organized industrial sites, 2000 (%)
LQ	$\frac{\sum_{i=1}^n Emp(n) / \sum_{i=1}^n TotEmp(n)}{\sum_{i=1}^n Emp(t) / \sum_{i=1}^n TotEmp(t)}$	Location Quotient

**Table 1 (continue).** Variables relating to characteristics of manufacturing industry in Turkey.

Codes	Calculation Method	Notes
GEOHHI	$\sum_{i=1}^n \left( \frac{Emp(i)}{TotEmp(n)} - \frac{Emp(i)}{TotEmp(t)} \right)^2$	Hirschmann-Herfindahl Index of regions
<p><i>Val(n)</i> = total value added in manufacturing industry of n region.</p> <p><i>Firm(n)</i> = number of firms in manufacturing industry of n region.</p> <p><i>Exp(n)</i> = export sales in manufacturing industry of n region.</p> <p><i>GDP(n)</i> = gross domestic product in manufacturing industry of n region.</p> <p><i>Emp(n)</i> = number of employee in manufacturing industry of n region.</p> <p><i>Emp(t)</i> = number of employee in manufacturing industry of Turkey.</p> <p><i>TotEmp(n)</i> = number of employee in all economic activities of n region.</p> <p><i>TotEmp(t)</i> = number of employee in all economic activities of Turkey.</p> <p><i>ManVas(n)</i> = number of skilled labour in manufacturing industry of n region.</p> <p><i>ManVsz(n)</i> = number of unskilled labour in manufacturing industry of n region.</p> <p><i>KFF</i> = number of action parcel in small industrial sites.</p> <p><i>KSS</i> = number of parcel in small industrial sites.</p> <p><i>OFF</i> = number of action parcel in organized industrial sites.</p> <p><i>OSB</i> = number of parcel in organized industrial sites.</p>		

**Independent Variable:** Factors that affect manufacturing industry economic performance are evaluated with respect to different factors. These factors are evaluated with respect to economic variables such as firms' export rates (EXPVAL), manufacturing industry gross domestic product per employee (GDPEMP), scale economies<sup>4</sup> (SCALE) of the region. Besides, characteristics of manufacturing industry are consist of non-economic variables that these factors are evaluated with respect to economic variables such as number of foreign direct investment (FORENT), located in a region, the rate of skilled labor (EMPLOY1), in all employment, the rate of unskilled labor in all employment (EMPLOY2), occupancy rate of small industrial sites and organized industrial sites in region (FIZCHAR1, FIZCHAR2), location quotient<sup>5</sup> (LQ) and Hirschmann-Herfindahl Index<sup>6</sup> (GEOHHI).

In this study, scale economies are considered as employment rate per firm. Scale economies, depending on market power that arises subject to the increase in production capacity in a region, causes concentration of economic activities. However, in this study, scale economies determined on employment rate per firm basis that is assumed true in conceptual aspect, are not sufficient for evaluation concerning market power of a region.

#### **IV. FINDINGS OF THE STUDY**

In this section, economic and non-economic factors affecting manufacturing industry economic performance in Turkey are analyzed empirically. First of all, relations between variables are tested by using statistical analysis method techniques. In the second stage, results obtained as result of the analysis are compared to regional data. In table 2, descriptive statistics concerning 81 regions of Turkey on Nuts I level can be seen. Correlation between variables can be seen in table 3. According to this, a correlation between economic performance and economic/non-economic characteristics of manufacturing industry are observed. However, relation between variables such as number of foreign direct investment and employment distribution, and economic performance is not found. In spite of this, when correlations between independent variables are examines, we can say that apart from the strong correlation between economic and non-economic variables. The highest relational level in correlation analysis is observed between number of foreign direct investment and export rate per firm with the value of 0.626 ( $p < 0.001$ ). This situation shows that foreign direct investment takes an important role in the access of firms in the region to international markets. In other words, foreign direct investment functions as bridge in firms' access to international markets. Correlation value of 0.539 ( $p < 0.001$ ) between scale economies and location quotient is considered as another high level relation. High relational level between scale economies and location quotient shows that agglomeration economies still keep their importance in the industry geography of Turkey. Because regional concentration and sectoral agglomeration are expected to increase in industrial districts that have scale economies (Akgüngör and Falcioğlu, 2005: 3). In other words, efficiency of firms on minimum level enforces firms' access to the market. Thus, scale economies make of new firms difficult to big-scale firms and affect to the increase of firms' concentration level in region (Armstrong and Taylor, 2000: 104-106). On the other hand, agglomeration economies provide significant explanations with respect to spatial concentration of the industry. Due to agglomeration economies, newly-established firms prefer dense industrial regions due to transportation costs. For this reason, spatial concentration is occurred in industrial districts (Boschma and Weterings, 2004: 4).

**Table 2.** Minimum, maximum, mean, standard deviation value for each variable

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
<b>VALPER</b>	81	.12	749.24	72.0245	134.38772
<b>EXPVAL</b>	81	.00	263.55	33.7247	48.79588
<b>GDPEMP</b>	81	.01	3.36	.4002	.45144
<b>SCALE</b>	81	.80	33.64	7.5511	6.21530
<b>FORENT</b>	81	.00	2641.00	54.7037	297.10307
<b>EMPLOY1</b>	81	.01	.48	.1998	.07966
<b>EMPLOY2</b>	81	.52	.93	.8063	.07153
<b>FIZCHAR1</b>	81	.00	1.00	.7522	.29243
<b>FIZCHAR2</b>	81	.00	1.00	.5560	.43429
<b>LQ</b>	81	.08	6.43	.9736	.83385
<b>GEOHHI</b>	81	.00	.80	.0516	.10243

Table 3. Correlation matrix

		VALPER	EXPVAL	GDPEMP	SCALE	FORENT	EMPLOY1	EMPLOY2	FIZCHAR1	FIZCHAR2	LQ	GEOHHI
VALPER	Pearson Cor.	.000	301*	598*	530*	.064	.056	.090	.023	205 <sup>†</sup>	241 <sup>†</sup>	.118
	Sig. (2-tailed)		.003	.000	.000	.285	.309	.212	.420	.033	.015	.147
EXPVAL	Pearson Cor.	301*	.000	.089	315*	626*	.060	.141	198 <sup>†</sup>	206 <sup>†</sup>	.134	.001
	Sig. (2-tailed)	.003		.214	.002	.000	.296	.104	.038	.032	.117	.498
GDPEMP	Pearson Cor.	598*	.089	.000	.003	.048	205 <sup>†</sup>	.125	186 <sup>†</sup>	151 <sup>‡</sup>	.049	.000
	Sig. (2-tailed)	.000	.214		.488	.334	.033	.133	.048	.090	.333	.498
SCALE	Pearson Cor.	530*	315*	.003	.000	.057	.324*	363*	.131	164 <sup>‡</sup>	539*	294*
	Sig. (2-tailed)	.000	.002	.488		.306	.002	.000	.122	.071	.000	.004
FORENT	Pearson Cor.	.064	626*	.048	.057	.000	.104	.083	.140	145 <sup>‡</sup>	.006	.061
	Sig. (2-tailed)	.285	.000	.334	.306		.177	.231	.107	.098	.480	.294
EMPLOY1	Pearson Cor.	.056	.060	205 <sup>†</sup>	324*	.104	.000	.918*	.020	159 <sup>‡</sup>	259*	.052
	Sig. (2-tailed)	.309	.296	.033	.002	.177		.000	.431	.078	.010	.322
EMPLOY2	Pearson Cor.	.090	.141	.125	363*	.083	.918*	.000	.073	231 <sup>†</sup>	276*	.086
	Sig. (2-tailed)	.212	.104	.133	.000	.231	.000		.260	.019	.006	.222
FIZCHAR1	Pearson Cor.	.023	198 <sup>†</sup>	186 <sup>†</sup>	.131	.140	.020	.073	.000	.085	162 <sup>‡</sup>	.120
	Sig. (2-tailed)	.420	.038	.048	.122	.107	.431	.260		.224	.074	.144
FIZCHAR2	Pearson Cor.	205 <sup>†</sup>	206 <sup>†</sup>	151 <sup>‡</sup>	164 <sup>‡</sup>	145 <sup>‡</sup>	.159 <sup>‡</sup>	231 <sup>†</sup>	.085	.000	308*	.046
	Sig. (2-tailed)	.033	.032	.090	.071	.098	.078	.019	.224		.003	.342
LQ	Pearson Cor.	241 <sup>†</sup>	.134	.049	539*	.006	.259*	276*	162 <sup>‡</sup>	308*	.000	758*
	Sig. (2-tailed)	.015	.117	.333	.000	.480	.010	.006	.074	.003		.000
GEOHHI	Pearson Cor.	.118	.001	.000	294*	.061	.052	.086	.120	.046	758*	.000
	Sig. (2-tailed)	.147	.498	.498	.004	.294	.322	.222	.144	.342	.000	

\* significant at the %1 level, <sup>†</sup> significant at the %5 level, <sup>‡</sup> significant at the %10 level

As result of regression analysis, it is found that variables such as gross domestic product per firm and scale economies, employment structure are effective in performance of manufacturing industry. In addition to this, it is found that variables such as location quotient and Hirschmann-Herfindahl Index have not been a determining affect on performance of manufacturing industry.

In this respect, it is found that location quotient cannot be the sole indicator with respect to economic performance of manufacturing industry or making deductions on economic performance of manufacturing industry on location quotient basis will create errors with respect to methodology. In the study conducted in the sample of Turkey, determining that there is not a meaningful relation between economic performance of manufacturing industry in the regions and location quotient with respect to statistics demonstrated this paradox. In other words, it is necessary to consider different variables. Because, an industry or service activities in a region which is undeveloped with respect to economic activities can be found high location quotient, the region can be evaluated as specializing a region due to the high coefficient of location quotient of the economic activities. However, this situation may not always show that prominent economic activities have a high value with respect to economic performance.



**Table 4.** Linear regression results for relationship between performance and characteristics of manufacturing industry in Turkey

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
<b>Constant</b>	755.745	360.760		2.095	.040
<b>EXPVAL</b>	.610	.260	.221	2.342	.022†
<b>GDPEMP</b>	192.772	20.840	.648	9.250	.000*
<b>SCALE</b>	10.631	1.852	.492	5.741	.000*
<b>FORENT</b>	-.016	.039	-.036	-.417	.678
<b>EMPLOY1</b>	707.681	333.219	.419	2.124	.037†
<b>EMPLOY2</b>	-826.198	376.654	-.440	-2.194	.032†
<b>FIZCHAR1</b>	-83.307	31.374	-.181	-2.655	.011†
<b>FIZCHAR2</b>	5.055	23.035	.016	.219	.827
<b>LQ</b>	12.516	22.065	.078	.567	.572
<b>GEOHHI</b>	-108.938	155.674	-.083	-.700	.486
F: 16.663      Sig: 0.000      R Square: 0.704      Adjusted R Square: 0.662					
Durbin-Watson: 2.097					
df1: 10		df2: 70		N: 81	

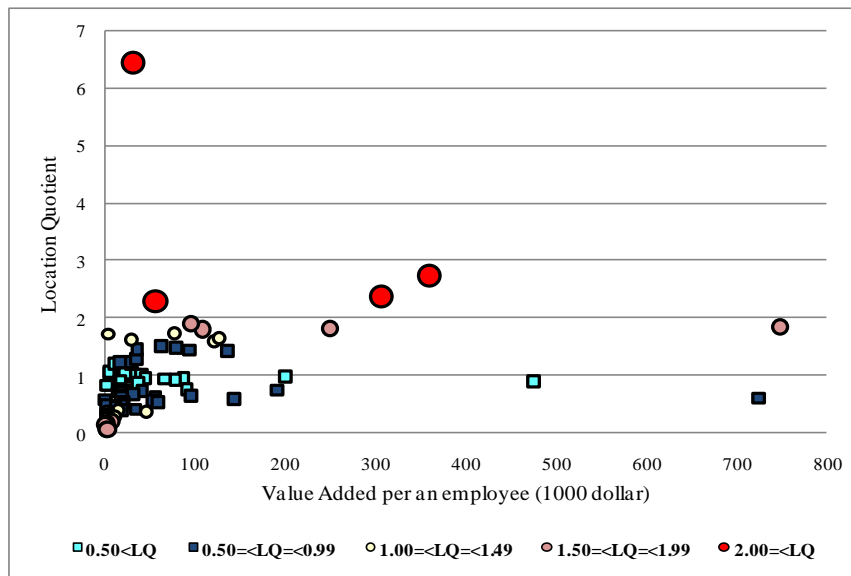
\* significant at the %1 level, † significant at the %5 level, ‡ significant at the %10 level

When figure 2 is examined, location quotient with respect to manufacturing industry in many of the regions is below 1, added value per employee is below 0.1 million dollars. In other words, regions that do not show geographical concentration with respect to manufacturing industry, added value rate per employment is low. Although this is an expected situation, location quotient in many regions is above 1, added value per employment is still below 0.1 million dollars. Therefore, it is seen that regions that show geographical concentration with respect to manufacturing industry and regions that do not show geographical

concentration do not differentiate with respect to economic performance. On the other hand, it is seen that in two regions where location quotient is above 2, added value per employment is below 0.1 million dollars and in five regions where location quotient is below 1, produced added value per employment is above 0.1 million dollars. As a result, while economic performance of the regions with high geographical concentration level is expected to be high, in the analysis conducted in the sample of Turkey it is found that economic performances of the regions cannot explained to be dependent on only one variable such as geographical concentration (location quotation) level.

Similar situation is seen in the relation between Hirschmann-Herfindahl Index and economic performance of manufacturing industry. GEOHHI index which shows in what extent of equality economic activities are distributed among regions is not determining on manufacturing industry economic performance in this study. In other words, it can be said that GEOHHI do not have a determining effect on performances of the regions, since manufacturing industry in Turkey is no distributed in balance among regions. As shown in Figure 1, manufacturing industry geography in Turkey has been concentrated on certain metropolises from 1950s onwards. Although some cities that are in the peripheries of metropolises have become a focus point with respect to manufacturing industry from 1980s, it is found that there is not a balanced distribution on national level and that it is not a determining element on economic performance.

**Figure 2.** Relations between location quotient and economic performance of manufacturing industry according to NUTS I level in Turkey.



Other variable such as the occupancy rate of organized industrial sites cannot be determined to effect on economic performance of manufacturing industry. Organized industrial sites are regions that are determined in the areas that are found appropriate. It is benefited from informational technology on optimal level, since firms can be gathered in certain regions (Anonim, 2010). Organized industrial sites are determined by political concerns. Therefore, %50 of the total area of organized industrial sites has not started to manufacture (Anonim, 2006). Although organized industrial sites exists all regions in terms of spatial, half of these areas have not started their productions. Therefore, regions that have not started manufacture have low manufacturing industry performance. It is found that small industrial sites occupancy rates have an inverse relation with economic performance of manufacturing industry ( $B=-83.307$ ,  $t=-2.655$ ,  $p<0.050$ ). Inverse relation between economic performance of manufacturing industry and small industrial sites occupancy rates can be explained as depending on two factors such as production type in small industrial sites and competitive structure of firms. Firstly, many of the firms operate in small industrial sites of Turkey are not carried out. Firms conducted manufacturing activities, nevertheless, make workhouse-type production and they make mostly manufacturing based on imitation. The competition opportunities of the firms are limited according to middle and big scale firms located in industry districts. For this reason, firms established in small industrial sites due to their micro-scale, contract and imitation based manufacture type don't provide significant contribution to added value. And this manufacturing type even reduces quality and economic added vale, because it has not made the transition to modern manufacturing type and as it does not produce anything new.

Region's employment structure is one of the most important variables that needs to considered in the analysis that will be carried out with respect to economic performance of manufacturing (Becattini and Ottati, 2005: 1145-1148; Porter, 2003: 553). In the analysis conducted within the scope of the study, it is found that employment structure has a strong effect on manufacturing industry economic performance. While skilled labor has a positive effect on manufacturing industry economic performance ( $B=707.681$ ,  $t=2.124$ ,  $p<0.050$ ), a negative relation with unskilled labor is in question ( $B=-826.198$ ,  $t=-2.194$ ,  $p<0.050$ ). It can said that values obtained in terms of employment data are expected results. Because of white-collar workers increase in an industrial district, it is expected that blue-collar workers decrease and economic output increases. Especially in regions that are integrated with technology the need for blue-collar workers are decreasing and efficiency is increasing. Efficiency increase makes a positive contribution to the increase in economic performance. On the other hand, possible contribution to economic performance in regions which have not completed sufficient technological development and where labor-intensive industry is dominant are

significantly lower compared to regions where skilled labor rate is high and which can comply with the technological developments.

Other variables that affect economic performance of manufacturing industry are scale economies (SCALE), gross domestic product per employment (GDPEMP) and an export value per firm (EXPVAL). As result of the analysis conducted to determined variables that affect economic performance of manufacturing industry in the sample of Turkey, scale economies ( $B=10.631$ ,  $t=5.741$ ,  $p<0.000$ ) and gross domestic product per employment ( $B=192.772$ ,  $t=9.250$ ,  $p<0.000$ ) are variables that have the strongest effects on economic performance of manufacturing industry. Export variable per firm ( $B=0.610$ ,  $t=2.342$ ,  $p<0.050$ ), on the other hand, has a weaker effect in compare to scale economies and gross domestic product per employment variables. Scale economies that used to explain the emergence of concentrations in regional economies can be defined as the increase in demand to products as result of concentration and increase in market power (Paluzie et al., 2001: 290; McCann, 2001: 51-60). In other words, minimum cost for firms are provided through spatial concentration of the activities and through market growth (Levy, 1985: 55-61). Thus, scale economies have significant effect on economic performance of manufacturing industry demonstrates the result which it supports new economic geography theories.

## CONCLUSION

It is found that economic performance of manufacturing industry on Nuts I levels in Turkey indicates distinctness among regions with respect to economic and no-economic characteristics of manufacturing industry. Differentiation of manufacturing industry characteristics according to regions in Turkey also causes differentiation of economic performances. Different performances are observed between industrial districts which have collaboration in local and regional or national and international level especially in terms of employment and market opportunities. In other words, industrial districts that have limited relation in terms of either employment structure or marketing, service and production relations have low economic performance.

Economic theories that are developed in order to the regional development have been focused on discussion about firms' integration to national and international markets. New economic geography theory accepts that in case those firms are close to another, especially those that can integrate to national and international markets and they develop network-focused collaborations. In this respect, scale economies that are stressed in new economic geography theory are considered within the framework of spatial concentration and localization economies (Armstrong and Taylor, 2000: 104-105). In this study, it is found that

scale economies have a strong effect on economic performance of manufacturing industry of scale economies in the sample of Turkey. A positive and strong effect of scale economies in Turkey is found on economic performance and during manufacturing industry spatial integration process. However, determining possible effects of scale economies on regional performance and detecting its relation with new economic geography theory may only be possible through dept-study. Trading indicators such as export and gross domestic products are strong indicators that affect economic performance of manufacturing industry like scale economies. In spite of that, it is found that Hirschmann-Herfindahl index does not have any effect on manufacturing industry economic performance. Findings regarding location quotient and Hirschmann-Herfindahl index demonstrate that manufacturing industry in Turkey has the trend to concentrate in some certain metropolises and in their peripheries rather than to have a balance distribution among regions. This result is so as to support discussion of the study – period of change in the geography of manufacturing industry in Turkey from 1960s- regarding manufacturing industry geography in Turkey. Moreover, it is found that spatial characteristics of manufacturing industry have a limit effect on dependent variable and spatial characteristics are not sole factor per se. Hence, it is seen that in the analysis intended for economic performance of manufacturing industry in Turkey, spatial factors do not have a determining role alone.

A relative strong relation between employment indicators and economic performance of manufacturing industry is found. However, while a positive relation with skilled labor is the point in question, a negative relation with unskilled labor is found. Hence, regions where skilled labor level is high, activities such as adaptation to technology, knowledge production ability and R&D studies are high, make a positive contribution on the economic performance of the region. Moreover, a strong correlation is detected between scale economies and employment indicators and location quotient. According to this, it is found that spatial factors are determinant with respect to employment dynamics. As competition level of regions that provide various opportunities to skilled labor in terms of spatial matters will be higher, their economic performance will be higher compared to other regions. Apart from that, also high relations between variables that are not included in the analysis of this study such as labor salaries, and employment dynamics are expected. Because regions where employees-wages are high, are areas that are open to skilled labor. In addition to this, it is found that number of foreign investors does not have a significant impact on economic performance of manufacturing industry.

Therefore, economic and non-economic factors that affect economic performance of manufacturing are detected. The fact that the reliability level of the model made in terms of variables to define especially economic and non-economic factors, has increased consistency level of the obtained results. On the other hand,

it is observed that obtained results show similarities with the results both in empirical and theoretical studies oriented to Turkish manufacturing industry<sup>7</sup>.

**Acknowledgements:** This paper is presented to benefit from datas and a part of master thesis prepared by Özer Karakayacı.

**Notes:**

1 Italy is separated three regions as First Italy, Second Italy, and Third Italy. First Italy placed North-West part of Italy is consist of Liguria, Piemonte, Valle D'aosta and Lombardy regions. Second Italy placed South part of Italy is consist of Sardunya, Lazio, Abruzzi, Molise, Puglia, Calabria, Sicilya, Basilicata and Campania. Third Italy placed North and Centre part of Italy is Tuscany, Umbria, Trentino, Alto-Adige, Friuli-Venezia-Giulia, Veneto, Emilia-Romagna and Marche. North-west regions, categorized as Second Italy, there generally resides firms whose sizes can be categorized as being bigger than country average and these firms have the capacity to create new technologies through R&D studies. Third Italy regions, on the other hand, include entrepreneurships that operate in traditional sectors and that can produce innovativeness through developing their production processes.

2 Data regarding demographic structure is taken from the 2009 database of TurkStat. Turkey has been divided zonings on NUTS I, NUTS II and NUTS III level in EU adaptation process. While Turkey is defining administration border of 81 regions that are divided on NUTS I level, NUTS II level are divided into 26 regions and NUTS III level are divided into 12 regions.

3 Linear regression analyses analyze relations between dependent and independent variable. In regression analysis, causality is certainly in question. Main aims of the regression analysis is to estimate the given values of independent variables and the given values of dependent variable, To examine whether independent variables have an important impact on dependent variables or not, and to anticipate average values of dependent variable and given values of independent variable or to estimate the value it will have in the future.

4 In increases subject to production capacity, the situation that unit cost of the product produced in big-scales is called scale economies (McCann, 2001: 54-55).

5 Location Quotient is the concentration level of economic activities in a region among all other economic activities. It is calculated as  $LQ = \frac{(\text{Manufacturing Industry Employment in Local}) / (\text{Total Employment in Local})}{(\text{Manufacturing Industry Employment in Nation}) / (\text{Total Employment in Nation})}$ . According to this, cities that bigger than LQ 1 are accepted as the regions of concentration in terms of manufacturing industry (Bendavid-Val 1991: 73-76).

6 Measurement techniques that show equal distribution level of a certain national industry among regions (cities) are defined as Hirschmann-Herfindahl Index (Kambhampati and McCann, 2007: 287).

7 See Akgüngör and Falcioğlu (2005), Eraydın and Fingleton (2006).

**REFERENCES**

AKGÜNGÖR, Sedef and Pınar FALCIOĞLU (2005), "Türkiye'de İmalat Sanayinde Bölgesel Uzmanlaşma ve Sanayi Kümeleri", Pamukkale Üniversitesi Kentsel Ekonomik Araştırmalar Sempozyumu'05, Denizli.

AMIN, Ash (1999), "An Institutionalist Perspective on Regional Economics Development", International Journal Urban and Regional Research, Vol 23; 365-378.

Anonim, (2006), “Bölgesel Kalkınma Araştırma Raporu”, KOSGEB, Ankara.

Anonim, (2010), “OSB Mevzuatı”, Organize Sanayi Bölgeleri Derneği Yayınları, Ankara.

ARMSTRONG, Harvey and Jim TAYLOR (2000), *Regional Economics and Policy*, Wiley-Blackwell Publications, London.

BARBER, William J. (2007), *History Of Economic Thought*, Wesleyan University Press, Middletown.

BECATTINI, Giacomo and Gabi Dei OTTATI (2005), “The Performance of Italian Industrial Districts and Large Enterprise Areas in the 1990s”, *European Planning Studies*, Vol 14; 1139-1162.

BENDAVID-VAL, Avrom (1991), *Regional and Local Economic Analysis for Practitioners*, Fourth Edition Praeger Press, London.

BENNEWORTH, Paul and Nick HENRY (2004), “Where is the Value Added in the Cluster Approach? Hermeneutic Theorising Economic Geography and Clusters as a Multiperspectival Approach”, *Urban Studies*, Vol 41; 1011-1023.

BOSCHMA, Ron and Anet WETERINGS (2004), “The Effect of Regional Differences on the Performance of Software Firms in the Netherlands”, Paper prepared for the European Regional Science Association (ERSA) Congress 25-29 August 2004, Porto.

CUMBERS, Andrew; Danny MACKINNON and Robert MCMASTER (2003), “Institutions, Power and Space; Assessing the Limits to Institutionalism in Economic Geography”, *European Urban and Regional Studies*, Vol 10; 325-342.

ECERAL, Tanyel (2006), “Ekonomik Coğrafya Kurumsal Yaklaşım: Denizli Örneği”, in *Değişen Mekan: Mekansal Süreçlere İlişkin Tartışma ve Araştırmalara Toplu Bakış: 1923-2003* (derleyen: A. Eraydın), Dost Kitabevi Yayınları, Ankara; 458-480.

ELSNER, Wolfram (2000), “An Industrial Policy Agenda 2000 and Beyond: Experience, Theory and Policy”, in *Industrial Policies after 2000* (Edt. W. Elsner and J. Groenewegen), Kluwer Academic Publications, London; 411-486

ERAYDIN, Ayda and Bernard FINGLETON (2006), “Network Relations and Local Economic Development: Some Causes of Differentiated Network Structures and Intensities Among Turkish Industrial Firms”, *Environment and Planning A*, Vol 38; 1171-1186.

ERAYDIN, Ayda (1992), *Post Fordizm ve Değişen Mekansal Öncelikler*, ODTÜ Mimarlık Fakültesi Yayınları, Ankara.

ERAYDIN, Ayda (1999), "Sanayinin Anadolu'ya Yaygınlaşması ve Son Dönemde Gelişen Yeni Sanayi Odakları", in 75 Yılda Çarklardan Chip'lere (edt. O. Baydar), Tarih Vakfı Yayınları, İstanbul; 257-277.

ERAYDIN, Ayda (2002), Yeni Sanayi Odakları: Yerel Kalkınmanın Yeniden Kavramlaştırılması, ODTÜ Mimarlık Fakültesi Yayınları, Ankara.

ERENDİL, Asuman (1998), "Using Critical Realist Approach in Geographical Research: An Attempt to Analyze the Transforming Nature of Production and Reproduction in Denizli", Unpublished PhD, METU, Ankara.

GREENE, William (2003), Econometric Analysis, Prentice Hall 5th Edition, New York University, New York.

KAMBHAMPATI, Uma and Philip MCCANN (2007), "Regional Performance and Characteristics of Indian Manufacturing Industry", Regional Studies, Vol 41; 281-294.

KIM, Sukkoo (1997), "Regions, Resources and Economic Geography: Sources of U.S. Regional Comparative Advantage, 1880-1987", Regional Science and Urban Economics, Vol 29; 1-32.

LEVY, John (1985), Urban and Metropolitan Economics, McGraw Hill Publications, New York.

MARKUSEN, Ann (1996), "Sticky Places in Slippery Space: A Typology of Industrial Districts", Economic Geography, Vol 72; 293-313.

MCCANN, Philip (2001), Urban and Regional Economics, Oxford University Press, Oxford.

MUTLUER, Mustafa (2003), "Türkiye'de Yeni Gelişen Sanayi Odakları: Denizli, Gaziantep, Çorum", Ege Coğrafya Dergisi, Cilt 12; 13-27.

ÖZCAN, Gül Berna (1995), Small Firms and Local Economic Development, Published by Avebury, Aldershot.

PALUZIE, Elisenda; Jordi PONS and Daniel A. TIRADO (2001), "Regional Integration and Specialization Patterns in Spain", Regional Studies, Vol 35; 285-296.

PIORE, Michael and Charles SABEL (1984), The Second Industrial Divide: Possibilities for Prosperity, Basic Books, New York.

PORTER, Michael. (2003), "The Economic Performance of Regions", Regional Studies, Vol 37; 549-578.

SCHMITZ, Hubert and Khalid NADVI (1999), "Clustering and Industrialization: Introduction", World Development, Vol 27; 1503-1514.



SCHMITZ, Hubert and Bernard MUSYCK (1994), "Industrial districts in Europe: policy lessons for developing countries?", *World Development*, Vol 22; 889-910.

SCOTT, Allen John (2000), "Economic Geography: The Great Half-Century", *Cambridge Journal of Economics*, Vol 24; 483-504.

STORPER, Michael (1999), "The Resurgence of Regional Economies, Ten Years Later: The Region as a Nexus of Untraded Interdependencies", in *The Economic Geography Reader* (edt. J. Bryson, N. Henry, D. Keeble, and R. Martin), John Wiley and Sons, Ltd., New York; 209-215.