

Gezici, Ferhan; Muderrisoglu, Burcu

Conference Paper

Analyzing the spatial distribution of manufacturing clusters in the Istanbul Metropolitan Area

50th Congress of the European Regional Science Association: "Sustainable Regional Growth and Development in the Creative Knowledge Economy", 19-23 August 2010, Jönköping, Sweden

Provided in Cooperation with:

European Regional Science Association (ERSA)

Suggested Citation: Gezici, Ferhan; Muderrisoglu, Burcu (2010) : Analyzing the spatial distribution of manufacturing clusters in the Istanbul Metropolitan Area, 50th Congress of the European Regional Science Association: "Sustainable Regional Growth and Development in the Creative Knowledge Economy", 19-23 August 2010, Jönköping, Sweden, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:

<https://hdl.handle.net/10419/119066>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

**50th European Congress of Regional Science Association
19-23 August 2010
Jönköping, Sweden**

**Analyzing the Spatial Distribution of Manufacturing Clusters
in the Istanbul Metropolitan Area**

**Ferhan Gezici
Burcu Müderrisoğlu**
Istanbul Technical University
Dept.of Urban and Regional Planning
Turkey

Abstract:

The relationship between the concentration of manufacturing industries in a specific geographic location and their performance has become one of the main concerns for both urban and regional economists and planners. While agglomeration economies encourage firms to cluster in particular locations, the role of agglomeration economies is defined as a crucial factor leading to external economies of scale in production. The concept of clusters means groups of inter-related industries with two key elements. Firstly, firms should be linked, and secondly groups of inter-related firms should be located in close proximity to each other. Further, Porter (1994) emphasizes the importance of geographic concentration, since proximity greatly facilitates the flow of the information.

Although there have been many studies on regional and national clusters, the studies which have been trying to explore intra-metropolitan distribution of manufacturing clusters are limited, while there has been an economic structural change in the metropolitan cities. This paper analyzes the spatial distribution of manufacturing clusters in the Istanbul Metropolitan Area (IMA), as the economic heart of Turkey. 42 determined clusters in 14 districts and in 10 sub sectors are evaluated. The main questions of the paper are: “how does location make a difference on the density of clusters?, what are the main differentiations according to the year of establishment and the size_of the manufacturing firms? and how do relocation trends change due to the location?” The findings of the analysis will provide information about the critical areas which are defined as transformation areas from manufacturing activities to the service-based activities in the master plan of IMA.

Key words: manufacturing industry, agglomeration, cluster, spatial distribution, Istanbul Metropolitan Area.

Introduction

Economists who have been working on economic geography (Krugman, 1991; Porter, 1994) have emphasized that space should be taken into account as local rather than national as a mainstream of the studies of economic geography. Therefore, the relationship between the geographic location and industrial concentration and their performance has become the main concern. While economic activities tend to agglomerate at certain places, the performance of the firms has been related to the local environment-territory to some extent (Malmberg, Sölvell and Zander, 1996). The economic geography of clusters is changing, with new industrial clusters developing in some locations, while some old ones disappearing (Porter and Ketels, 2009).

The empirical works mostly focus on clusters as the concentration of manufacturing firms on a national level. But there have been some works which are looking at the clustering pattern of an intra-metropolitan area. One of the significant characteristics of modern urban forms is the trend of clustering the economic activities in several centers/locations (Anas et al, 1998). This trend of spatial agglomeration has created a polycentric form especially in the metropolitan cities. The Central Business District (CBD) has been overloaded in several cases for years, therefore the distribution of population in the cities is forced to create new sub-centers. On the other hand, manufacturing industries used to be located in the center of the city. But then, manufacturing started to move out of the city to the periphery because of the new structure and fragmentation of production, and negative externalities of agglomeration, especially the cost of land and the problem of heavy traffic. Moreover, new transportation technologies facilitate the moving of people and economic activities from the central part and creating new business areas (Jackson, 1985; Hohenberg and Hollen Lees, 1995). Earlier, Hoover and Vernon (1959) argued that “the central city acts as a common resource base for small producers and mitigates uncertainties inherent in their markets, material supplies, labor pools, and services. Frequent subcontracting of small firms in city centers allowed for flexible responses to the uncertainties of customized manufacturing”. This form also meets the requirements of production fragmentation nowadays. Further, they put forward that firms producing standardized goods in large integrated facilities decentralized to the metropolitan periphery. The study of Holmes and Stevens (2002) asserts that small plants are concentrated in central locations and bigger ones have moved to peripheral cities, as Moses and Williamson (1967) documented a positive relationship between establishment size and distance moved by relocating manufacturers in metropolitan Chicago. In the case of Phoenix, OhUallachain and Leslie (2009) analyzed the relationship between establishment size and the distance from each sector’s mean geographic center in order to evaluate intrametropolitan distribution of manufacturing. Their findings highlight a heavy concentration of manufacturing establishments a few miles outside the heart of the CBD. Further, low technology firms are more clustered than technology intensive sectors. Another study done by Sweeney and Feser (1998) indicates that “the relationship between establishment size and clustering is roughly characterized by an inverted u-shape, which means clustering increases up to some size threshold and then decreases” in the case of North Carolina.

Marshall (1920) emphasized the importance of the presence of unique natural resources, economies of scale, proximity to markets, labor pooling, presence of suppliers, shared infrastructure for the geographic concentration of industries. Due to the spatial aspects, concentration is still dominant, especially among the industries which have relations with each other. Spatial integration and home-base characteristics are becoming more significant, related to assets such as human capital and cultural factors. The endogenous growth theory emphasizes the role of agglomeration economies as a crucial factor leading to external economies of scale in production (Romer, 1986; Lucas, 1988). The distinction between the localization and urbanization economies has been mostly less clear. In both cases, agglomeration economies have their roots in processes, whereby links between firms, institutions and infrastructures within a geographic area give rise to economies of scale and scope: the development of general labor markets and pools of specialized skills; enhanced interaction between local suppliers and customers; shared infrastructure; and other localized externalities (Hoover, 1948; Lloyd & Dicken, 1977). Presence in an agglomeration is held to improve performance by reducing the costs of transactions for both tangibles and intangibles (Appold, 1995). Further, recent studies put forward the importance of localized information flows and technological spill-overs when explaining the emergence of spatial clusters of related firms (Scott, 1995). In fact, in order to understand the forces behind spatial clustering, it is important to focus on knowledge accumulation effects.

Istanbul, as the economic heart of Turkey, is one of the significant case study areas for the analysis of manufacturing activities with its location decision and spatial clustering trend. In 2002 the number of manufacturing firms in Istanbul was 32.8% of Turkey, while the number of workers was 27.4%, value-added 23%, import 49.1%, export 45.1% and the investment incentives 33.8% (IMP, 2005). The domestic market was significant for location decisions of manufacturing activities within Istanbul as the main center for capital accumulation.

In this paper, we analyze the economic geography of the Istanbul Metropolitan Area (IMA) based on manufacturing activities. However, while there has been a policy towards decentralization of manufacturing activities from the IMA, the number of firms and workers is still high. The metropolitan plan of Istanbul has targeted to decrease the percentage of manufacturing firms in the metropolitan area and to change the economic profile towards service sectors as most metropolitan cities in the world do. The policies for the manufacturing firms which stay in the IMA are defined to support the high value-added and high-technology sectors, and improve within the certain existing areas (IMP, 2006). Moreover, in the central part of the city, there have been several attempts and projects to transform the area away from manufacturing activities. Therefore, how the location (center or periphery) in the metropolitan area makes a difference on the density of clusters, sectors, size, date of establishment and networks is defined as the main question for the paper as it has been discussed in the literature based on the different world experiences.

Analysis of the Location Pattern of Manufacturing Firms in the Istanbul Metropolitan Area

Istanbul contains 14.78% of the total population of Turkey, while its GDP was 21.48% in 2001 (TUIK, 2001). The manufacturing industry has been the main impetus of the economy, and it contributes to the development level of the regions in Turkey. Even though manufacturing employment decreased from 35.79% in 1980 to 33.52% in 2000, Istanbul is still the center of production in Turkey. Textiles is the major sector due to the employment ratio as a labor-intensive sector. Although it has created a low value-added, employment has doubled in the period of 1980-2001. Primary metal, chemistry and food production are other significant sectors in Istanbul. Also, 97% of the manufacturing firms are small and medium sized industries (TUIK, 2007).

Beginning in the 1950s, manufacturing activities were concentrated in the historical peninsula and mainly along the Golden Horn as small-sized industries. Those occupying large lands mostly located on the eastern (Anatolian) side of Istanbul, while labor intensive ones located on the western (European) side (Yüzer, 2002). In the 1960s, migration to Istanbul was influenced by the industrialization process, while the location of industry and development of the city started to sprawl. After 1980, relatively peripheral districts (such as Firuzköy, Kurtköy, Tuzla, Tepeören) became the new locations for manufacturing activities. Based on the decisions of the Master Plan of the Istanbul Metropolitan Area in 1995, two main organized industrial zones were established in the districts of Küçükçekmece (İkitelli Organize Sanayi) and Ümraniye (Dudullu Organize Sanayi) (IMP, 2007).

75% of manufacturing firms are located on the western (European) side of Istanbul. The total size of manufacturing land is 60% in the west, while 40% in the east. Among the 32 districts of the Istanbul Metropolitan Area, the manufacturing firms are concentrated respectively in Büyükçekmece (7.6%), Küçükçekmece (7.3%), Güngören (6.7%), Zeytinburnu (6.2%) on the European side, and Ümraniye (6.9%) on the Anatolian side.

Further, Tuzla (15.7%), Büyükçekmece (14%) and Küçükçekmece (11.9%) are the districts that have the largest manufacturing lands. The number of manufacturing units is increasing towards central districts, while the size of the units is increasing towards the peripheral districts (Gezici et al., 2009). Therefore, an industry looking for larger land has been going farther out. Especially construction of highways and accessibility reinforce the location of manufacturing firms in both east and west peripheries of Istanbul. This trend indicates a correlation between the firms locating in relatively peripheral districts (Tuzla, Küçükçekmece, Büyükçekmece) and the firms getting incentives.

Methodology and Data

The data are based on a research project conducted by the “Manufacturing Industry Working Team of the Istanbul Metropolitan Planning Center (IMP)” (a group of ITU’s Department of Urban and Regional Planning) and the Vezir Consultancy Firm. The aim of the research is to provide analytical data and synthesis of the manufacturing sector in order to contribute to the Master Plan of the Istanbul Metropolitan Area.

In this paper several questions are raised in order to evaluate the process emphasizing the relationship between the characteristics of manufacturing activities and their spatial pattern. These questions are: How does the location make a difference on the density of clusters? Do the central ones indicate a stronger cluster pattern than those on the periphery? Moreover, what are the main differentiations according to the year of establishment and the size of the manufacturing firms? And how do relocation trends change due to the location? The findings of the analysis will provide information about the critical areas which are defined as transformation areas from manufacturing activities to the service-based activities in the master plan of IMA.

The densities of clusters are defined through the manufacturing cluster analysis which was conducted by Vezir Consultancy for Istanbul Industrial Studies in 2006 (IMP, 2006). Classification of 14 sub-sectors was used based on Nace Rev 1.1 for 32 districts of the Istanbul Metropolitan Area. For each district and each sub-sector, 50 firms and 1000 employees were considered as the threshold value in order to define a concentration of manufacturing activities. Finally, clusters in 10 sectors and in 14 districts, a total of 42 clusters, were determined (IMP&Vezir Danışmanlık, 2006) (Figure 1). The density of clusters is measured based on the questionnaire data for the components of clusters (supplier, customer, competitor, linkage) (IMP&Vezir Danışmanlık, 2006; Bulu and Eraslan, 2004).

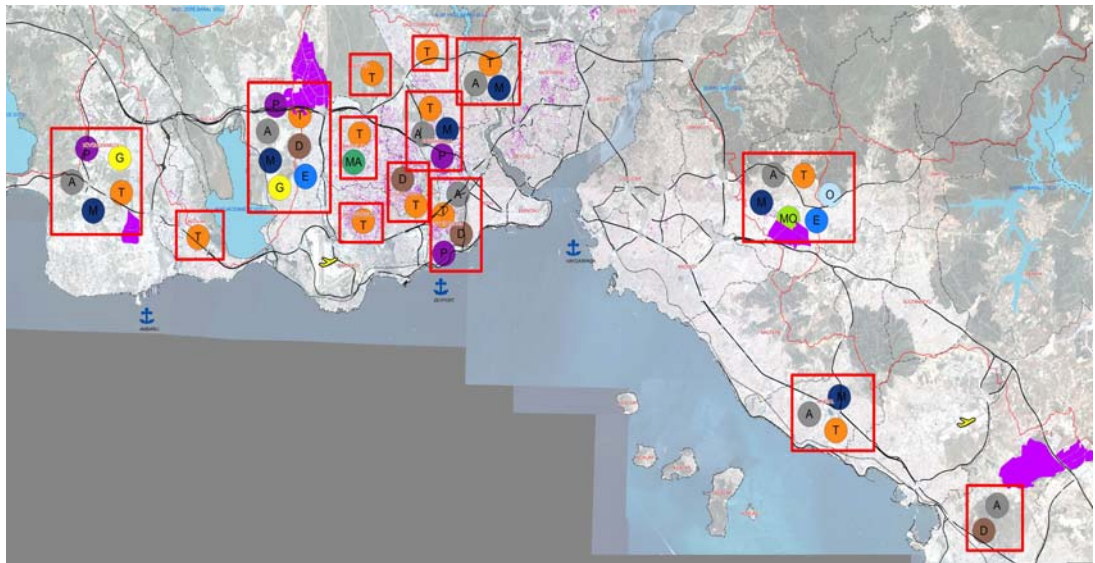


Figure 1: Location of main clusters (Cluster Analysis; IMP 2006)

Most of the 42 clusters are located in the west, while only 11 of the 42 clusters are located in the east side of Istanbul. Textile industry clusters, with its strong employment ratio, are defined almost in all districts as one of the main sectors in Istanbul. Five districts (B.Çekmece, K.Çekmece, Zeytinburnu, Bayrampaşa, Ümraniye) have 4 or more clusters as the main concentration areas of manufacturing activities (Figure 2). Zeytinburnu and Bayrampaşa are the locations for manufacturing activities that are sprawling out from the historical peninsula with the advantages of being close to the CBD, while Küçükçekmece has been developing industrially, especially in the İkitelli Organized Industrial Area, since the 1990s.

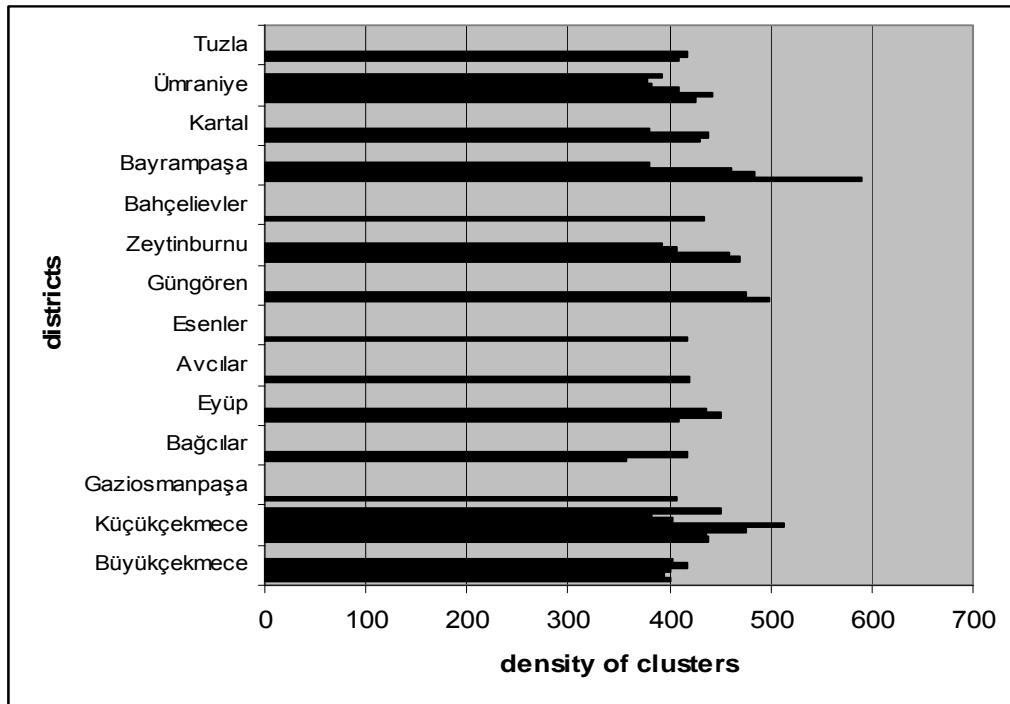


Figure 2: Density of manufacturing clusters according to the district (Gezici et al., 2009)

The Istanbul Metropolitan Area has been sprawling linearly, therefore manufacturing firms which are especially looking for larger lands have also been moving from the central part to the periphery. But the question is how this spatial pattern makes a difference on manufacturing clusters, and how the firms, located in the center and being in the relocation area according to the planning decisions, have been acting in terms of cluster behavior. From that point, three rings are defined in the metropolitan area as the center, the first ring and the second ring (Figure 3). The center has 13 clusters, while the first ring has 13 and the second has 7 clusters. The four districts of the center are all located on the European side, and the number of clusters decreases from the center to the periphery.

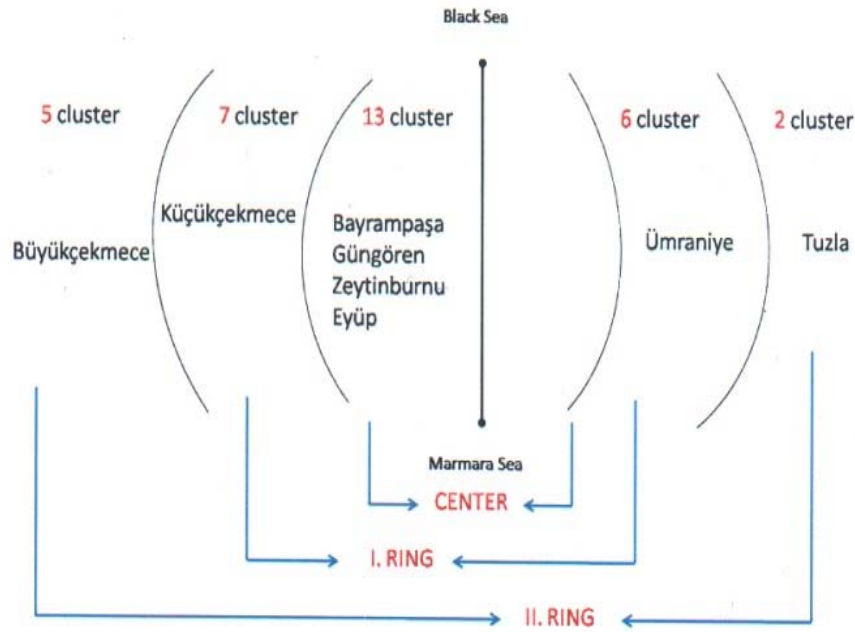


Figure 3: Definition of the rings

Findings of the Analysis

The findings of the analysis highlight that the clusters which are located in the center have a higher value of density than the median, while the clusters in the periphery have a lower value without any impact of the sector differentiation (Figure 4). Being in the center seems to provide the advantages of supplier, market and deep networks through the traditional structure of manufacturing activities rather than a new cluster approach. The existing/traditional networks would make difficult “to decentralize the manufacturing industry from the center of Istanbul” which is an emphasis in the vision and the planning policy of the city.

The center, just the surrounding area of the CBD, has 13 clusters of 5 manufacturing sectors. Four districts located in the center are all on the European side. However, Bayrampaşa and Zeytinburnu have four sector clusters each and a relatively high density of clusters, firms in the plastic and primary metal sector, intend to relocate from the Zeytinburnu district to the Küçükçekmece district in the first ring in order to be close to the Organized Industrial Area. The establishment date of the firms indicates that industrial investments have been increasing since 1980, even though industrial decentralization policy is one of the main concerns of the IMA. Another indicator for the analysis is the scale of the firms in the clusters. The center has always been the location of small sized firms (10-24 workers) with the percentage more than 40 among all the firms of the region. The number of the firms in the clusters in that region has been decreasing except for the leather cluster. Moreover, the clusters which indicate strong networks have mostly established before 1980, as they use the advantages of being in the center of metropolitan city. Even though the

density of clusters within the center is high, except for traditional service and suppliers, there are missing parts and actors, such as a partnership for research and development in the network analysis.

The surrounding area of the center both on the European side (the district of Küçükçekmece) and the Asian side (the district of Ümraniye) is called the *first ring*. These areas are the main locations of the manufacturing sector in terms of the number of firms and labor. Further, the clusters have the advantage of being close to the Organized Industrial Areas, logistic activities and accessibility. The primary metal, machinery and electric-electronic sectors are mostly located in both the eastern and western first ring. The clusters mostly have a higher value of density in Küçükçekmece, while they mostly have a lower value in Ümraniye. Textile clusters have lower value on both sides, however textile has been the major manufacturing activity in Istanbul for a long time. The results indicate that the sector has some transformation problems considering the competitiveness, and still utilizes the advantages of cheap labor. The establishment year of the firms in the clusters has told us that the firms were first established in the 1970s, but the establishment of Organized Industrial Zones has accelerated the development of clusters. The scale of the firms is changing, the number of small sized firms is fewer than 40%, while the firms which are looking for larger lands and have larger numbers of workers are mostly locating in the second ring. The first ring has the advantages of strong networks because of the complementary function of the organized industrial zones on the missing actors of the network in the existing clusters. Especially, the electric-electronic sector clusters located in this ring are strong on supplier networks and using high technology. Further, it is known that some of the firms in the center prefer to move to Küçükçekmece, while medium sized firms in the food and machinery sectors intend to move to the district of Büyükçekmece in the second ring.

In the *second ring* of the periphery of Istanbul, the clusters are mainly located in two districts, Büyükçekmece in the west, Tuzla in the east. Plastic, primary metal, machinery, food and textile are the major sector clusters which are found in Büyükçekmece, while primary metal and leather are two predominant clusters in Tuzla. The density of clusters is lower than the median. The clusters occurred after the manufacturing firms were established in that region in the 1990s. The size of the firms in these clusters is quite different from the other rings, since firms located in the central part and looking for larger lands moved to the periphery. While the number of firms with 10-24 workers is lower than 35% of all firms in the ring, large firms have 16.42% in Büyükçekmece. This is higher than all other rings. Further, the density value of clusters indicates that networks have been getting weaker towards the periphery.

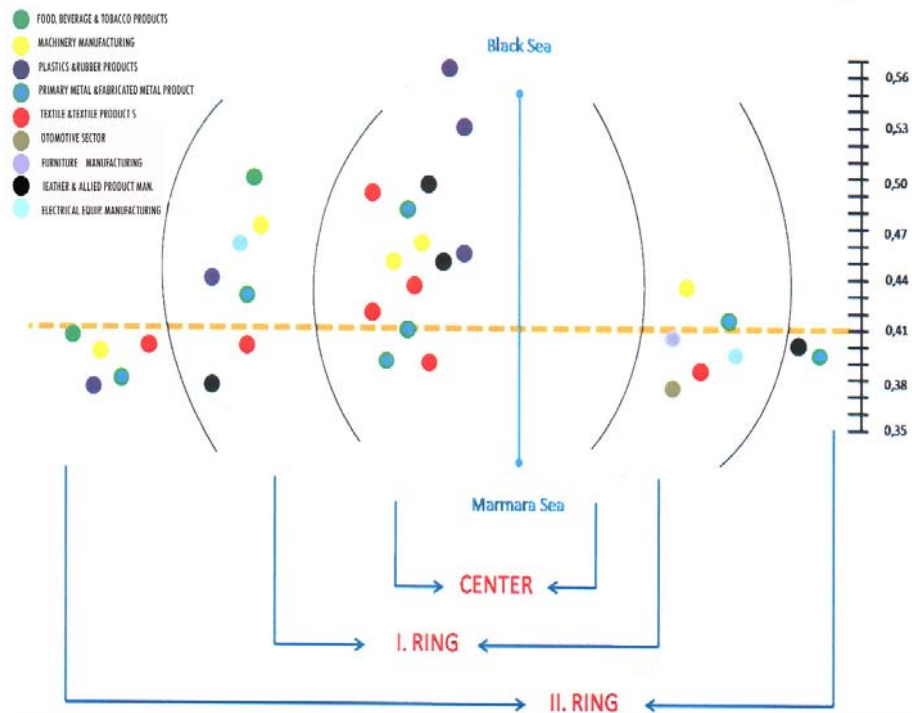


Figure 4: Density of clusters and their location

The location of small sized and traditional manufacturing firms does not indicate any differentiation as to whether it is in the center or the periphery. Traditional clusters prefer to locate in the center with its location advantages and existing relationship among the firms. However, the clusters in the center have an advantage and a relatively higher density of cluster, it does not mean that these clusters have a strong network since they have several missing actors. Electric and electronic clusters are only located in the first ring; even though they are out of the center, they have the advantages of agglomeration economies. Moreover, the analysis puts forward that the most advantageous region without any concern about sectors is the district of Küçükçekmece in the western part of the first ring. Network analysis generally indicates that the strongest parts in all clusters are logistic activities, technology and suppliers, while the weakest part is the research and development activities.

Conclusion

There have been increasing interest and studies on clusters of manufacturing activity. While several studies focus on the concept of cluster due to the industrial and regional/local development policy in order to increase the economic performance and productivity, the spatial concentration/ agglomeration of the manufacturing firms used to be the one of the main concerns of economic geography as well. Further, the location decisions and behaviors of manufacturing firms have become more important, since transformation of the way of production and the economic structure of metropolitan cities have been discussed. Therefore, we analyzed the spatial pattern and trends of manufacturing firms in the Istanbul Metropolitan Area. Although there

has been a decentralization policy for the manufacturing sector, in the IMA the number of manufacturing firms was 32.8% of Turkey, while the number of workers was 27.4% in 2002. Contrary to the policy, Istanbul is still one of the main areas for incentives, as it is an attraction point for investors. The initial advantages of being close to the market, having accessibility, and supplying a labor pool are the major strengths of Istanbul for manufacturing investments. But, the master plan of Istanbul puts forward that Istanbul has already reached at its thresholds in terms of spatial expansion of the manufacturing sector. Thus, the proposition of the plan is to limit the new demand for manufacturing investments and to improve the sector at its existing size. Moreover, the quality is significant and high-value added and high-technology sectors are supported for structural change and new vision in the IMA. From that point, the spatial clustering/agglomeration of the manufacturing firms would not be enough to realize the performance of manufacturing sector. Therefore, to analyze the networks within these clusters have become significant due to the concept and policy of cluster.

As a result of the analysis, the distribution of cluster densities highlights that the central and first ring on the European side, are the home of relatively strong clusters. Being in the center seems to provide the advantages of supplier, market and deep networks through the traditional structure of manufacturing activities. This would make difficult decentralizing the manufacturing industry from the center of Istanbul. Further, the clusters locating in the first ring use the positive impacts of new highways and accessibility and presence of organized industrial zones. Another result indicates that there is a relationship between the firm size and its location, while the small and medium sized firms are clustered in the center, the big ones had to move to the periphery, indicating relatively low cluster densities as relatively new establishments. Relocation trends show that the firms would prefer not to move to another city from Istanbul, however Küçükçekmece is the most preferable district for relocation of manufacturing firms in Istanbul related to the proximity of Organized Industrial Zone.

References

- Anas, A., Arnott, R. and Small, K. A. (1998), Urban spatial structure, *Journal of Economic Literature*, Vol. 36, 1426–1464.
- Appold, S. J. (1995), Agglomeration, interorganizational networks and competitive performance in the US metalworking sector, *Economic Geography*, 71:27-54.
- Bulu, M., Eraslan, H. (2004), *Sektörel Kümelenme Modeli ve Ekonomik Dönüşüm*, İstanbul.
- Gezici, F. et al. (2009), Policy and Existing Performance of Clusters in Turkey, Clusters, *Politics, Management, Good Clustering Practices in the World*, ed.by Ewa Bojar, Dom Organizatora, Poland.

Hohenberg, P. and Hollen Lees (1995), *The Making of Urban Europe 1000-1994*, Cambridge: Harvard University Press.

Holmes, T. J. and Stevens, J. J. (2002), Geographic concentration and establishment size, *The Review of Economics and Statistics*, Vol. 84, 682–690.

Hoover, E. M. (1948), *The Location of Economic Activity*, McGraw-Hill Book Company, New York.

Hoover, E. M. and Vernon, R. (1959), *Anatomy of Metropolis: The Changing Distribution of People and Jobs within the New York Metropolitan Region*. Cambridge, MA: Harvard University Press.

IMP-IBB Planlama ve İmar Daire Başkanlığı Şehir Planlama Müdürlüğü- BİMTAŞ (2005) (2006) (2007), *Istanbul Büyükşehir Alanı ve Çevresinde, Sanayi Sektörü Gelişim Süreçlerinin Mekansal Boyutu ile Birlikte İncelenmesi ve Araştırılması İş-Sanayi Grubu Çalışma Raporları*, İstanbul.

IMP&Vezir Danışmanlık (2006), *Istanbul Sanayi Kümelenmesi Raporu (Survey of Istanbul Manufacturing Clusters)*, İstanbul.

IMP&Vezir Danışmanlık (2006), *Istanbul İli Ana Sanayi Sektörlerinin Rekabetçilik Düzeylerinin Analizi, (Analysis of Competitiveness of Manufacturing Sectors in İstanbul)* İstanbul.

Jackson, K. T. (1985), *Crabgrass Frontier: The Suburbanization of the United States*, New York: Oxford University Press.

Krugman, P. (1991), *Geography and trade*, MIT Press, Cambridge, Mass.

Lucas, R. E. (1988), On the Mechanics of Economic Development, *Journal of Monetary Economics*, 22, 3-42.

Llyod, P. and Dicken, P. (1977), *Location in space, A theoretical approach to economic geography*, Second edition, Harper and Row, London.

Malmberg, A., Sölvell, Ö., Zander, I. (1996), Spatial Clustering, Local Accumulation of Knowledge and Firm Competitiveness, *Geografiska Annaler*, 78B, 85-97.

Marshall, A. (1920), *Principles of Economics*, 8th Edition, London and New York: Macmillan.

Moses, L. and Williamson, H. F. (1967), The location of economic activities in cities. *The American Economic Review*, Vol. 57, 211–222.

ÓhUallacháin, B. and Leslie, T. F. (2007), Postindustrial Manufacturing in a Sunbelt Metropolis: Where are Factories Located in Phoenix?, *Urban Geographies*, 30, 5, 1-28.

Porter, M. E. (1994), The role of location in competition, *Journal of Economics of Business*, 1:35-39.

Porter, M. and Ketels, C. (2009), Clusters and Industrial Districts: Common roots, different perspectives, *A Handbook of Industrial Districts*, ed. by G.Becattini et al., Edward Elgar, Northampton, MA, USA, 173-182.

Romer, P. M. (1986), Increasing Returns and Long-run Growth, *Journal of Political Economy*, 94 (5), 1002-37.

Scott, A. J. (1995), The geographic foundations of industrial performance, Competition & Change. *The Journal of Global Business and Political Economy*, 1:51-66.

Sweeney, S. H. and Feeser, E. J. (1998), Plant size and clustering of manufacturing activity, *Geographical Analysis*, Vol. 30, 45-64.

TUIK (2001), Industrial Establishments Statistics, www.tuik.gov.tr

TUIK (2007), Industrial Establishments Statistics, www.tuik.gov.tr

Yüzer, A. Ş. (2002), *Yerleşmelerde Sanayi Alanları Yerleşimi Eğilimi Alan Tahsisleri ve Yeni Düzenleme Stratejileri: İstanbul Örneği*, Doktora Tezi, İTÜ Fen Bilimleri Enstitüsü, İstanbul.