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The Profile of the Organized Industrial Zones in Kocaeli/TURKEY

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ABSTRACT

Kocaeli is the most industrialized city which is situated in the east and 90 km far from Istanbul in Turkey. Kocaeli has always been a center of attraction for industrial investments due to its position on the road, sea and railway networks connecting Europe to Anatolia and near the major cities as Bursa and Istanbul. Today, there are 13 Organized Industrial Zones (OIZ). Although OIZs have been developed as an industrial policy tool to plan urban and industrial development, the Organized Industrial Zones are not efficient and effective in the sustainability. A lot of industrial establishments have still located in the city. A lot of problems have been in the OIZ. The aim of this study is to determine the profile of the 7 active Organized Industrial Zones in Kocaeli by exploring and comparing their locations, sectors, sizes, capacities, services and infrastructures. This profile is helpful to develop the displacement demands and preferences of the industrial establishments and the OIZs sustainability in Kocaeli.

Keywords: Industrial development, industrial sustainability, Organized Industrial Zones, Turkey, Kocaeli.

1. INTRODUCTION

For many nations industrial growth had been a major policy in achieving economic development. So many state policies promoted the industrialization process that was vitally important for the welfare of the country. The industry was determined to be “locomotive sector” in the planned development period starting in 1960 in Turkey and long-term targets have been set such as providing economic balance, realizing economic and social development. But after 1980’s, because of the fast industrialization and urbanization some environmental problems emerged in the Turkish cities. So, in industrial development, the Organized Industrial Zones implementations were started to discipline the industrial areas, contribute to planned development of the city, reduce the environmental effects of the industry, encourage sustainable industrialization and decrease the regional disparities.

Kocaeli, the city is situated 90 km far from Istanbul, developed as a focal point of industrialization attempts because of its proximity to Istanbul and transportation resources. So the state policies encouraged the industrialization in forms of OIZ. Today, Kocaeli accommodate 13 OIZs. 7 of the 13 of them are active; the others are in the infrastructure construction, planning or expropriation stage. But the results are not satisfactory. There are a lot of industrial establishments have still located in the city, a lot of problems have been in the OIZ.

This paper provides understanding the profile of the OIZ to be helpful to develop the change of location demands and preferences of the industrial establishments and the OIZs sustainability in Kocaeli.

We wish to answer two basic questions:

- 1) Are OIZs efficient on the sustainability of industrial development and on the change of location of the current industrial facilities in Kocaeli?
- 2) Are active OIZs in Kocaeli in the context of sustainability?

This paper is organized in the following way. Section two is mentioned the development and the implementations of Organized Industrial Zones in Turkey. Section three describes the case area, the general information, Vikor Method application and findings from the case study analyzes in shared tables. This section is followed by the conclusion.

2. THE DEVELOPMENT AND IMPLEMENTATIONS OF ORGANIZED INDUSTRIAL ZONE (OIZ) in TURKEY

OIZs have been implemented in many countries that have been originated from promoting industrial growth and improvement of economic capacities after Second World War. United Nations Industrial Development Organization (UNIDO) defined OIZs as follows:

“An industrial estate is a group of factories constructed on an economy scale in suitable sites with facilities of water, transport, electricity, stream, bank, post offices, canteen, watch and ward and first-aid and provided with special arrangements for technical guidance and common service facilities”[1].

OIZ applications in Turkey were initially started in Bursa in 1962 upon establishment of Bursa OIZ. Bursa OIZ was established with the loan provided by the World Bank.

OIZ continued in Turkey till 1982 without any legal regulation. “Ministry of Commerce and Industry Funds Regulation” was published in the Official Journal number 17591 and dated January 31, 1982 and enacted for filling the respective regulation gap.

Arousal of many legal problems due to rapid increase in the number of OIZs, their increasing importance in the economic spectrum of the country and OIZs’ being unincorporated has made a new legal regulation obligatory. As a result of the long term researches and studies, Organized Industrial Zones Law number 4562 was published on 04/15/2000. “Regulation on Organized Industrial Zones Place Selection” and “Organized Industrial Zones Implementation Regulation” to be prepared as per the respective Law were been enacted respectively upon their publication in the Official Journals with the following numbers and dates: 05/21/2001-24408 and 04/01/2002-24713. The previous regulation has been superseded by “Regulation on Organized Industrial Zones Place Selection” enacted upon publication in the Official Journal number 26759 and dated 01/17/2008 and gained its final version. OIZs have still been established and managed on the basis of the respective regulations in Turkey [2].

Organized Industrial Zones Law number 4562 defines OIZs (Organized Industrial Zones) as,

“Goods and services production zones whose borders are registered and which is formed by supplying the land parcels on the basis of particular systems and allocated for the industry, determined according to the requirements and also operated as per provisions of the OIZs Law, with the necessary infrastructure services and the social facilities, techno parks, and also with small production and renovation units, trading, education and health units, research and development regions for the purposes of ensuring that the industry is structured in the approved fields, directing urbanization, preventing environmental problems, allocating resources rationally, benefiting from knowledge and information technologies, placing and developing all kinds of industries according to a certain plan”[2].

Establishment purposes of OIZs may be summarized as follows;

- Disciplining the industry,
- Contributing to planned development of the city,

- Increasing productivity and profits by the industrialists, who are encouraging the complementary products and side products for each other, making production together on the basis of a program,
- Generalizing the industry in the less developed regions.
- Disciplining use of agricultural fields in industry.
- Establishing a healthy, cheap, reliable infrastructure and common social facilities.
- Preventing environmental pollution by means of joint treatment plants,
- Ensuring management of the zones by their own bodies under supervision of the state [2].

OIZs are grouped in two according to their subjects of investment as Combined OIZ and Specialized OIZs. Currently, there are 265 OIZs in Turkey.

3. CASE STUDY: KOCAELI ORGANIZED INDUSTRIAL ZONES

Kocaeli City is located in Marmara Region. It is 97,345 km far from Istanbul and Ankara respectively (Figure 1). The city has a 1.437.926 Population and fourth ranks in industry in Turkey.

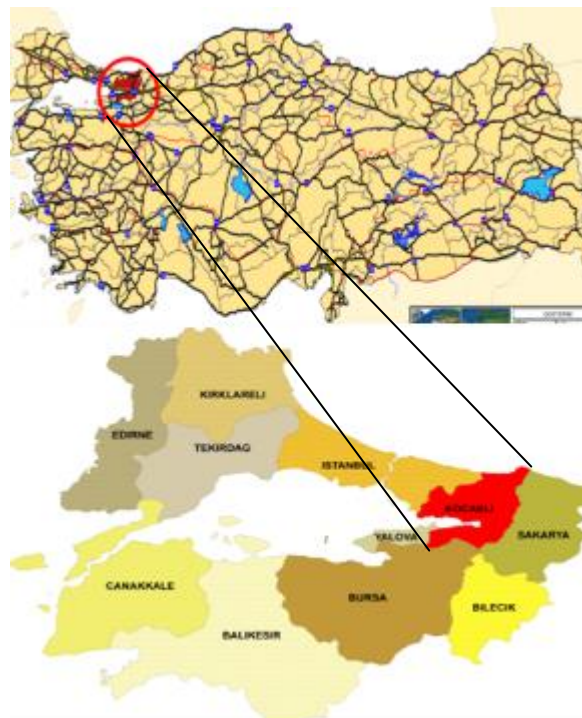


Figure 1. Kocaeli City Location

Kocaeli has always been a center of attraction for industrial investments due to some national, regional politics and its position on the road, sea and railway networks connecting Europe to Anatolia and near the major cities as Bursa and Istanbul.

Today there are approximately 2000 firms registered in Kocaeli. However, 22% of the management of these facilities is located in Istanbul. As is seen in Figure 2, there are 38 ports, 13 Organized Industrial Zones, 4 technoparks, 2 free trade zones in the city.

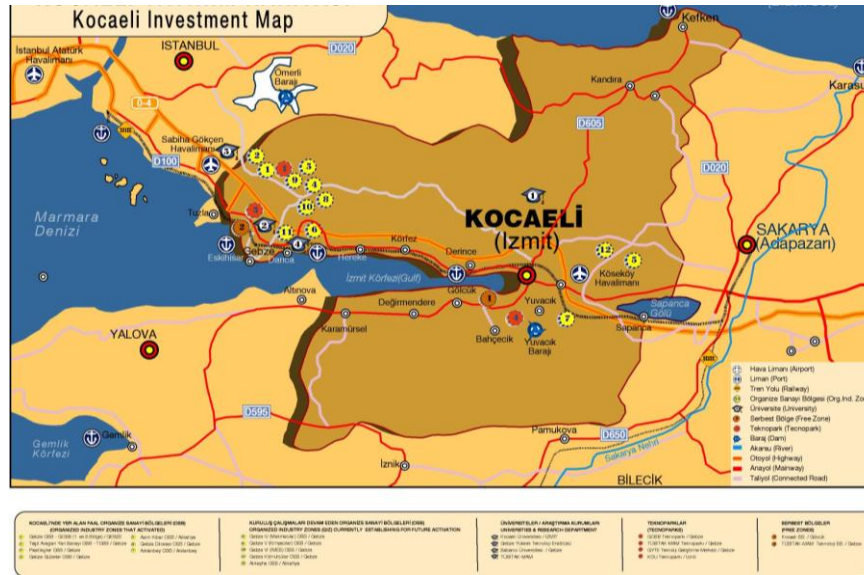


Figure 2. Kocaeli Investment Map

The Organized Industrial Zones are 38,410 acres and industrial facility areas are 28,708 acres. As total industrial area is 67,118 acres. This is equivalent to 1.85% of urban land.

Despite industrial development, inadequate service development and urban development brought about decrease in life standard and city status. Experienced in the last 50 years has been the negative effects of rapid industrialization and urbanization, primarily the bay contaminated with industrial waste, air pollution, soil pollution, noise pollution, visual pollution has emerged as the most important environmental problems. Today, Istanbul has been rescued of industrialization damages by decentralization of industry to Kocaeli and Kocaeli has been sacrificed in globalization attempts of Istanbul toward being a competing metropolis. Predictions over Kocaeli industrialization capacity have been passed with the invasion of industry from Istanbul [1]. On the other hand the survey with 380 firms which are located outside the Organized Industrial Zones made by Kocaeli Chamber of Industry is showed that; 46.8% of industrial facilities areas' would not suffice of the next 10 years, 43.8% of industrial facilities areas would suffice only of the next 10 years, and % 9.4 of industrial facilities areas' would suffice for the next 10 years or more. The demand causes are listed as; to have a narrow field, to not utilize the advantages of Organized Industrial Zones, environmental and municipal issues and to remain in urban areas [3]. As a result, today in

Kocaeli, largely proportion of the industrial facilities located outside the OIZs wants to change their location.

3.1. Evaluation of Kocaeli Organized Industrial Zones according to sizes

Planning industrial areas is vitally important for sustainable growth of industrial and urban areas. Kocaeli is the focal point for planned industrialization attempts in Turkey by accommodating 13 OIZs in. 7 of them are active; the others are in the infrastructure construction, planning or expropriation stage. In this study, 7 active and 6 non-active OIZs are evaluated systematically to enhance applicable information for Kocaeli present and future industrialization. The information concerning size and activity status of active OIZs, location, size and types of industries of non-active OIZs are presented. Table 1 are provided the information about the active Organized Industrial Zones.

Table 1. Active OIZs by sizes, activity status

Name	Year of Establishment	Area (acre)	Number of parcel	Company Activity Status	Employment	Assigned Ind. Ar (%)	Construction Completed IndAr. (%)
Asım Kibar	2004	2060	5	2 firms in operation	2200	100	88
Arslanbey	2003	1420	78	13 firms in operation, 3 firms in construction stage, 3 firms closed	2381	60	33
Gebze (GOSB)	1986	5368	194	117 firms in operation, 5 firms in construction stage, 9 firms closed	14600	97	71
TAYSAD (TOSB)	1992	2575	99	51 firms in operation, 9 firms in construction	6000	95	50
Plastikçiler	2001	1699	166	84 firms in operation, 8 firms in construction	8000	99	59
Guzeller	1999	1340	96	14 firms in operation, 23 firms in construction	1200	100	-
Dilovası	2002	9000	1312	212 firms in operation, 7 firms in construction stage, 6 firms closed	12500	97	-
Kocaeli OIZs in operation		23462	1950	493 firms in operation, 55 firms in construction stage, 18 firms closed	46881	93	-

After 2000, the number of OIZ has increased in Kocaeli. Only 3 OIZs were established before 2000 and 4 OIZs were established after 2000. The area of active Organized Industrial Zones

covers 23,462 acres of Kocaeli. Organized Industrial Zones employs 46,881 people, operates 493 firms. 55 firms are closed, 18 firms are in the construction stage [4]. 93 percent of the parcels were assigned. But their construction level is below of that rate [5].

The information of the OIZs that are in the infrastructure construction, planning or expropriation stage in Kocaeli is given in Table 2.

Table 2. Non-active OIZs by year, location, size, types of industries and stage

Name	Year of Establishment	Location	Area (acre)	Sectors	Stage	Assigned Industrial Area (%)	Construction Completed Industrial Area(%)
Kandıra Gıda	2010	Kandıra	2038	Food	Expropriation stage	-	-
Alikahya	2006	Izmit	1600	Mainly machinery, metals, manufacturing and textile sectors	Foundation stage	100	-
VLİMES	2006	Dilovası	3000	Mainly machinery, automotive parts, electrical and electronics industry sectors	Construction stage	21	0,22
IV:Istanbul Makine Imalatçıları	2001	Dilovası	5100	Mainly, machinery, machinery supply industry, metal and electrical and electronics industry sectors	Construction stage	90	1,24
V.Kimya	1999	Dilovası	2430	Chemistry	Construction stage	79	-
Komurculer	2003	Dilovası	780	Coal	Construction stage	99	-
KOCAELİ			14948			77,8	

The area of non-active Organized Industrial Zones covers 14.948 acres of Kocaeli. They are in the infrastructure construction, planning or expropriation stages [4]. Despite the construction rate is very low, 77.8% of parcels have been assigned [5].

3.2. Evaluation of active OIZs according to Technical, Social Infrastructure and Services by VIKOR method.

Below first VIKOR method is explained. Then VIKOR Method is applied to determine the best OIZ among active OIZs in Kocaeli.

3.2.1. VIKOR Method

The basic concept of VIKOR lies in first defining the positive and negative ideal solutions. The positive ideal solution indicates the alternative with the highest value, while the negative

ideal solution indicates the alternative with lowest value. The steps for a VIKOR analysis are summarized as follows [6];

Step 1: Determining the best and worst values. For all criteria, the best value is f_j^* and the worst value is f_j^- ; that is, for criterion $j = 1, \dots, n$, we have formulas (2) and (3), presented below:

$$f_j^* = \text{Max}_i f_{ij} \quad i = 1, 2, \dots, m \quad (2)$$

$$f_j^- = \text{Min}_i f_{ij} \quad i = 1, 2, \dots, m \quad (3)$$

f_j^* is the positive ideal solution for the j th criterion, and f_j^- is the negative ideal solution for the j th criterion.

Step 2: Calculating the distance. This step calculates the distance from each alternative to the positive ideal solution.

$$S_i = \sum_{j=1}^n w_j (f_j^* - f_{ij}^-) / (f_j^* - f_j^-) \quad (4)$$

$$R_i = \text{Max}_j [(f_j^* - f_{ij}^-) / (f_j^* - f_j^-)] \quad (5)$$

where w_j represents weights of criteria, S_i represents the distance of the i th alternative achievement to the positive ideal solution, and R_i implies maximal regret of each alternative.

Step 3: Calculating the index value Q_i . These index values are defined as:

$$Q_i = v \left[\frac{S_i - S^*}{S^- - S^*} \right] + (1 - v) \left[\frac{R_i - R^*}{R^- - R^*} \right] \quad (6)$$

Where $S^* = \text{Min } S_i$, $S^- = \text{Max } S_i$, $R^* = \text{Min } R_i$, $R^- = \text{Max } R_i$, and v is the weight of decision-making strategy, representing “the majority of criteria”. In other words, while “ v ” value represents a decision-making process that could use the strategy of maximum group utility, “ $(1-v)$ ” represents a decision-making process that could use the strategy of minimum individual regret [7]. Generally, v is used as 0.5[8].

Step 4. S_j , R_j and Q_j values are sorted descending, and ranking among alternatives is determined. Alternative which has the lowest Q_j value is the best option among the group of alternatives.

3.2.2. Application of VIKOR Method

In order to evaluate organized industrial zones in Kocaeli, firstly evaluation criteria were determined as technical infrastructure, services and social infrastructure based on OIZ Information System of OIZ [5]. Technical structure related criteria are Construction Of Water Distribution Network (%), Sewer Construction (%), Construction Of Gas Distribution Network(%),Electric Network Construction (%), Telecommunication Construction (%),Road Construction (%). Service related criteria are Telecommunication Network, Telephone Plant, Fully Equipped Fire Center, Internet Service Provider, Fighting Team, Material and Vehicle for Snow, Garbage Collection Service, Maintenance Repair Teams, and Security Service. Social Infrastructure related criteria are Ambulance Belonging to OIZ, Truck Park Field, Weighbridge, Sport Fields, Education Center, Banks Branches, Conference Halls, Food Factory, Restaurants. These criteria are presented in Table 3. Active OIZs in Kocaeli are GOSB, TOSB, Plastikciler, Guzeller, Dilovası, Arslanbey, Asım Kibar. Also we determine an illustrative OIZ named as “IDEAL” which has the best values of evaluation criteria. At the first step of VIKOR it is determined weights of criteria are accepted equal as presented in Table 3. Then situation of each OIZ is determined according to each criteria based on OIZ System of OIZ [5] as shown in Table 3.

After values of OIZs according to criteria are determined, the best values (f_i^*) and the worst values (f_i^-) are determined as presented in Table 4. At the next step, S_j and R_j values are computed by using Formula (4) and (5). And Q_j values are computed by using Formula (6). Here, v value is equal to 0.5. S_j , R_j and Q_j values are illustrated in Table 5 (a). Then, S , R and Q values are sequenced descending, and three rankings lists are created according to these sequencing. Sequencing of OIZs in Kocaeli according to their situation is as shown in Table 5 (b). According to results of the ranking, IDEAL is found the best OIZ according to technological, social structures and services. But IDEAL is an illustrative example in three rankings and it has the best values determined by us. It is not surprising, and we already expected that IDEAL is the best. When we investigated real seven OIZs, GOSB and Plastikciler has same and the lowest Q_j value. Also they are ranked the same in all three rankings. In this case, the most successful OIZs among seven active OIZs in Kocaeli are GOSB and Plastikciler. The worsts are Asım Kibar and Arslanbey.

Table 3. The weights and values of OIZs according to criteria

[illegible]

Table 4. The best value (f_i^*) and the worst value (f_i^-) for each criteria

[illegible]

Table 5. (a) S , R and Q valuesb) Ranking of OIZs according to S , R and Q values

Active Organized Industrial Zones in Kocaeli	S_j	R_j	Q_j
GOSB	0.044	0.044	0.522
TOSB	0.088	0.044	0.544
PLASTİKÇİLER	0.044	0.044	0.522
GÜZELLER	0.451	0.044	0.7255
DİLOVASI	0.825	0.044	0.9125
ARSLANBEY	0.957	0.044	0.9785
ASIM KİBAR	1	0.044	1
IDEAL	0	0	0

(a)

Ranking according to S_j values	Ranking according to R_j values	Ranking according to Q_j values
IDEAL	IDEAL	IDEAL
GOSB	GOSB	GOSB
PLASTİKÇİLER	PLASTİKÇİLER	PLASTİKÇİLER
TOSB	TOSB	TOSB
GÜZELLER	GÜZELLER	GÜZELLER
DİLOVASI	DİLOVASI	DİLOVASI
ARSLANBEY	ARSLANBEY	ARSLANBEY
ASIM KİBAR	ASIM KİBAR	ASIM KİBAR

(b)

3.3. FINDINGS

Gebze Organized Industrial Zone (GOIZ) was established in 1985 to discipline the industry in Gebze. GOIZ is located at the north side of the TEM highway, 7 km from Gebze city center and 55 km from Istanbul, Kadikoy. The zone is located at a convenient location with a distance of 15 km to the Sabiha Gokcen airport and 34 km to Derince Port. GOSB is built on an area of 537 ha. 117 firms are in production. The firms within the zone are employing approximately 14,600 employees. The types of mainly industries that accommodated in GOIZ are (1) machinery industry, (2) basic chemical industry, (3) automotive industry, (4) plastics industry, (5) food industry. 97 percent of the parcels were assigned. But their construction level is 71 percent. GOIZ is the most successful with Plastikciler Organized Industrial Zone in technical, social infrastructures and services among the other active OIZs but not IDEAL.

Plastikciler Organized Industrial Zone was established on 170 ha in Gebze in 2001. It is located at a distance of 15 km to Sabiha Gokcen airport, and 34 km to Derince Port. 84 firms and 8000 employees are in production. The types of mainly industries that accommodated in Plastikciler Organized Industrial Zone are (1) plastic industry, (2) machinery manufacturing industry, (3) chemistry industry, (4) textile industry, (5) food industry. 99 percent of the parcels were assigned. But their construction level is 59 percent. Plastikciler Organized

Industrial Zone is the most successful with GOIZ in technical, social infrastructures and services among the other active OIZs but not IDEAL.

TAYSAD Organized Industrial Zone (TOIZ) was established in 1992 along E5 highway which links Istanbul to Anatolian regions next to GOIZ. Being the first specialized organized industrial zone on automotive sector in Turkey, 51 firms exist in 258 ha TOIZ site and 6000 employees are in production. At present 95 percent of the parcels were assigned. But their construction level is 50 percent. TOIZ is the second successful in technical, social infrastructures and services among the other active OIZs.

Guzeller Organized Industrial Zone was established in 1999. Its area is 134 ha. It is located at a distance of 15 km to Sabiha Gokcen airport, and 35 km to Derince Port. 14 firms and 1200 employees are in production. The types of mainly industries that accommodated in Guzeller Organized Industrial Zone are (1) metal, steel industry, (2) packaging industry, (3) machinery manufacturing industry, (4) auto supply industry and (5) industrial kitchen industry. 100 percent of the parcels were assigned. Guzeller Organized Industrial Zone is the third successful in technical, social infrastructures and services among the other active OIZs.

Dilovası Organized Industrial Zone (DOIZ) was established in 2002 in Dilovası to avoid further disarray and establish co-ordination between the current various manufacturers. DOIZ area is 900 ha and 212 industry firms operate in this land. The zone is located 25 km distance to the Sabiha Gokcen Airport and 25 km to Derince Port. The firms within the zone are employing approximately 12,500 employees. The types of mainly industries that accommodated in DOIZ are (1) iron and steel industry, (2) chemical industry, (3) forest products industry, (4) non-ferrous metal industry. 97 percent of the parcels were assigned. DOIZ is the fourth successful in technical, social infrastructures and services among the other active OIZs.

Arslanbey Organized Industrial Zone was established in 2003 to transform non-organized structure of the industries that located in the region since the second half of the 1990s to the organized structure. Its location is 22 km far from the Derince Port, 6 km from Kosekoy Train Station and 68 km from Sabiha Gokcen Airport. On 142 ha there are 13 firms with 2381 employees in operation. The firms are mainly engaged in producing iron and steel, forestry, rubber, plastic and non-ferrous metal industries. At present 60 percent of the parcels were assigned. But their construction level is 33 percent. Arslanbey Organized Industrial Zone is

the worst with Asım Kibar Organized Industrial Zone in technical, social infrastructures and services among the other active OIZs.

Asım Kibar Organized Industrial Zone was established in 2004 in 206 ha area. The zone is located in İzmit 75 km distance to the Sabiha Gökçen Airport and 17 km to Derince Port. 2 industry firms are in operate and are employing approximately 2200 employees. The mainly industry that accommodated in Asım Kibar Organized Industrial Zone is automotive industry. 100 percent of the parcels were assigned. But their construction level is 88 percent. Asım Kibar Organized Industrial Zone is the worst with Arslanbey Organized Industrial Zone in technical, social infrastructures and services among the other active OIZs.

4. CONCLUSION

Kocaeli is a high densely industrialized district of Turkey, hosting the transformed industrialization attempts in forms of organized industrial zones with 13 OIZs. 7 of the OIZs are active; the others are in the infrastructure construction, planning or expropriation stage in Kocaeli. Although OIZs have been developed as an urban policy tool to plan urban development, the urban congestion and unplanned urban development that were products of rapid industrialization, couldn't be satisfied through years.

93 percent of the active OIZs' parcels were assigned. But their construction level is below of that rate. Nevertheless, today there are a lot of firms willing to locate in Kocaeli from İstanbul and also there are a lot of firms willing to change their location in Kocaeli.

As results, Kocaeli OIZs are NOT efficient on the sustainability of industrial development and on the change of location of the current industrial facilities in Kocaeli. Because there are a little bit parcels not assigned to supply future demands from İstanbul and Kocaeli.

OIZs in Kocaeli are NOT in the context of sustainability because they are NOT ideal about technical, social infrastructure and services.

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