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RESEARCH ARTICLE

Istanbul: Industrialization and Sustainability Urban Transformation with Newly Developed Housing Projects

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Abstract

This research put forward a recent city problematic of İstanbul as one of the largest Metropolis in the world undergoes a transformation process from a historical city to a sustainable city paradoxically. The primary aim of this study presents an updated city planning perspective on the Istanbul's recent problematics today while the cities evolved more sustainable world. The cities have been ongoing for many years, initially focusing on residential-areas and later continued to expand with development of the industrial-areas with industrialization. However, in recent times there has been a growing emphasis on creating healthier cities living environments, leading to rapid transformation from traditional urban forms to the sustainable cities.

Istanbul, as one of the world's megacities, is currently undergoing a complex process of transformation due to city's rapidly changing agenda various specific issues such as Climate-change, migrations, and earthquakes since the 2000s. The industrial facilities which have already created problems in city for many years, their relocation outside the city still a specific matter importance. Furthermore, to protect the green-areas, and forests that have been under threat for unplanned urban sprawl in years is another problematic is becoming a sustainable city. On the contrary, to protect city's green-areas and forest from the threat of the industrial areas and car traffic and pollution, the industrial facilities are planned to relocate to the outside of the city or to nearby town, and the city is expected to planning with newly opened healthy and sustainable residential-areas refrain from to interfere with more.

The research examines the current dimension of industrialization of Istanbul, its socio-economic and ecological consequences, and focuses on developing new Architectural and Urban project proposals for the planning of the city. Studies conducted in this context have revealed that the extent of an ecological threat alarmingly which stemmed primarily from increasing transnational migration, densely population, heavily urbanization and industrialization. If urbanization and industrialization in the city cannot be controlled the city in under the threat of extinction of green-areas, forests and even vital water resources and pollution which spread the sea waters like mucilage problem that recently occurred.

Keywords: City Planning, Industrial Areas, Istanbul, Residential-Areas, Sustainable Design.

1. Introduction

Although the effects of industrialization have always been a vast problematic situation for the cities today's newly emerging climate-centered problems ultimately became a milestone for all humanity in not evaluating the size and results of industrialization. The research specifically examines a significant issue that has not been addressed, such as how the industrial areas of the city have evolved from past to present, especially in the context of climate-change, developed with the

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climate-summits and Habitat congresses since the late 20th century. Although the subject is approached purposely for the city of Istanbul, in this context, the approaches of the Habitat summits to the industrial development of the cities are also examined in this research, thought the not considered in the other studies. The recommendations in Habitat's guidelines and the criteria it determines are handled with a new and different approach. While industrialization has dominated cities for almost two more centuries, cities have also changed and transformed in this environment.

The perception of industrialization, which was supported until almost the middle of the 20th century, has now turned into a problem that needs to be questioned and solved with the Climate-crisis and global warming the increase in climate awareness after the 1980s, with the pioneering studies that specifically drew attention to the issue of climate (Register, 1987). Since the 2000s, climate change started to know as a newly introduced and recognized term in worldwide innovative urban theories emerged led to rapid transform of existing cities from fragmentation to compaction (Lehmann, 2011).

Considering the world cities and particularly the city of Istanbul as a basis, the issue of climate crisis on industrialization took place with the Istanbul climate summit in 1996, just after the Rio Summit, Brazil, in 1992, when it was first emphasized (Habitat, 1992). The world is evolving in a different path and direction from the past with the climate crisis and other innovative developments. In the beginning of the 21st century city models evolved and freed itself from the old explanatory old norms whose limits that known by us (Paquot, 2012). The planning dynamics radically changed and new design paradigms developed in urban planning.

If the Habitat's declarations and future evaluations on the subject are examined, the basic principles of industrialization are also mentioned in detailed, especially in the context of the climate crisis in the city (Habitat, 1996). In these climate summits, the main issues in terms of the future of cities need to plan cities appropriate and oriented for human and human life principally, and in this context, the effects of the industrialization and industrial problems of the city could not be ignored.

In the late Istanbul Agreement in Climate-Summit in 1996, "Urban settlements clench a promise for future human development especially for protection of the world's natural resources to support large numbers of people while limiting their impact on the natural environment. In the many cities are witnessing harmful patterns of growth, of production and consumption, of land use, of mobility and of degradation of their physical arrangement. These problems are often synonymous with soil, air and water pollution, waste of resources and destruction of natural resources and development will depend on the capacity of urban and metropolitan areas to manage the production and consumption patterns as well as the transport and waste disposal systems which needed to preserve the environment." (UN Istanbul Declaration, 1996)

The determinations could be considered before the in cities reached such a level of harmful effects of industrialization when the urban land planning theories of the early 20th century were examined. But it is problematic in cities having a old historical past such as Istanbul, Paris and London. Despite these concerns, the uncontrolled growth of cities' demographic structures and populations, and their unplanned development and urban sprawl, is major challenges. This can be attributed to various factors, internal or transnational migrations, tend to concentrate in specific regions due to economic or other reasons, resulting in people relocating between regions and even countries. These over developed cities referred as as megacities or global cities with their large population exceeded over 10 million nearly 200 cities with a population of over 10 million in the world today like London, Beijing, Tokyo, Istanbul, etc. (Calderon, Stern, 2015, p.79).

As a city developed over the years, industrial areas remained within the city center or periphery, preventing the opening of new residential areas or new green areas, or creating industrial pollution threat in the cities, which would be serious implications for the future. The old cities of the world such as Paris and London, industrial areas within the city center have already been transformed with new identity or decentralized to the other cities or close towns and to other regions.

Today, Istanbul is faced with the problem of new housing areas and industrial areas opening in the green areas due to reserved land of the city limited. With climate crisis, the industrial areas led the destruction of green areas and forests that have faced threats the vast effects of the pollution, or waste pollution according to the World Intellectual Property Report, and 2022 CO2 and sustainability Report, (Borusan Holding

Reports, 2022). With the climate concerns the city confronted the urban pollution, and the increase in CO2 emissions would be long term dangerous effects on people due to overpopulation and industrialization. Even though multiple climate summits have been held so far, including one in Istanbul, in 1996, it is a statistical reality that the harmful effects of industrial areas and industrial pollution in the city have not been adequately understood yet. After the nearly thirty years Climate conference according to recent research the people do not have even awareness.

Although the post-research rate appears to be high it is more likely to be much less. Even if it is accepted that there is awareness in the theoretical base, the rate of reflection in practice does not seem to be quite high as a percentage. There are still serious problems regarding the sustainability of the city, recently, new regeneration projects that comply with sustainability and green architectural planning, as well as new settlements such as garden-cities planning and eco-city, have been re-planned for the renewal of the ecosystem. Many measures taken on this issue regarding sustainability are included in the city's 2040 Vision plan, these are not yet considered sufficient in this regard. Even though there are not many places left in the city to open new housing areas other than the northern forests, the planning of some new housing projects as new settlements by rehabilitating the old industrial areas of the city and the sustainable and eco-city planning of these settlements should be considered as important steps towards the future of the city.

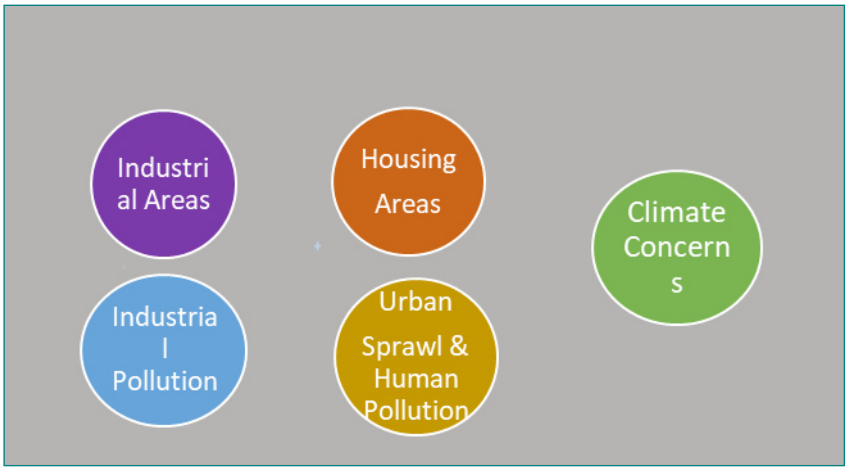

Figure 1. *The Industrialization and Housing, and Climate-change issues of Istanbul City.*

2. Methodology

The main paradigms the methodological approach is to conduct research the industrialization and industrialization effects in the world cities and particularly within the example of Istanbul within the context of the climate crisis. It was used a different approach in this research such as the problems of the cities which was created by industrialization, as well as the transformation or decentralization of industrial areas, specifically in historical cities such as Paris, London, and Istanbul. In this context, the industrialization process of the city of Istanbul, its problems spanning almost a century, approaches to these problems and solutions were investigated.

The determination of residential and industrial areas in the cities, it is needed to deliberate examine and evaluate separately the urban planning dynamics of the early 20th century and, like the pre-1980 and the urban planning dynamics in the post-1980, that is, the post-climate crisis period. Indeed, there will be very different paradigms and conditions in these two periods.

If how to design a sustainable environment is considered as a primary and important problem for cities today, if it is important to take the necessary measures in cities and decentralize industrial areas and create new areas outside the city or in nearby towns for them, the problem of how to use the regions resulting from the transfer of these industrial areas is a significant issue.

3. The Cities, Climate Crisis and the Problematic of Industrialization and Industrial Developments in Habitat Reports

In recent years, it has been observed that a significant approach to specifically considered on climate-based problems has been considered. The initiatives started with the world-wide organizations of Earth-Summits first Rio conference, Brazil, in 1992, and then Istanbul conference, in 1996, (Habitat, 1996) which could not create the necessary awareness in the city, although which was held in Istanbul and the other Istanbul

conference, in 1996, (Habitat, 1996) which could not create the necessary awareness in the city, although which was held in Istanbul and the other summits in Kyoto, Glasgow, and in Egypt, etc. After the recent Climate-change meeting, Cop-20 Istanbul Mayor made important statements about the immediate measures that will be taken regarding Climate-change in Istanbul drawing attention to certain issues of deforestation and water shortage, but the housing issue was not included (CNN, 2021).

In the Istanbul Agreement in Climate-Summit in 1996, it was issued some concerns on climate-change and the specifically the problematic of industrial areas in page 55; "Urban settlements hold a promise for human development and for protection of the world's natural resources through their ability to support large numbers of people while limiting their impact on the natural environment. Many cities are witnessing harmful patterns of growth, of production and consumption, of land use, of mobility and of degradation of their physical structure. Such problems are often synonymous with soil, air and water pollution, waste of resources and destruction of natural resources. Some human settlements are also subject to limited water supply, sanitation, and drainage and to dependency upon toxic and non-renewable energy fuel sources and irreversible loss of biodiversity. Demographic factors, combined with poverty and lack of access to resources and unsustainable patterns of production and consumption, particularly in industrialized countries, can cause or exacerbate problems of environmental degradation and resource depletion and thus inhibit sustainable development. Therefore, a largely urbanized world implies that sustainable development will depend very largely on the capacity of urban and metropolitan areas to manage the production and consumption patterns and the transport and waste disposal systems needed to preserve the environment." (UN Istanbul Declaration, 1996)

With the climate-crisis one of the most important problems of the city can be seen as the problem of developing both residential areas and industrial areas. Although spatially, a balance was observed in the development of residential and industrial areas at first, the other dimension of this issue and as a third pillar is now green areas. In this context, need to consider that the determination or transfer of industrial areas and residential areas is related to climatic issues.

There are various factors that vary according to the country's political and countries in the determinations or transfer of residential and industrial areas. In the case of Türkiye or Istanbul particularly, this responsibility is actually based on a two-pronged mechanism with the government on the one hand and the municipalities on the other, although in fact inner-city areas are under the responsibility of the Istanbul municipality, while the non-urban areas are specified as the regions under the state's responsibility, but there is a legal gap that has not been fully determined in this regard and problems still exist.

Istanbul, as a worldwide mega city which known with more complex problems for many years, the development of industrial areas, unavoidable internal migration due to industrial developments, and the problem of migration, which has transnational migrations by taking a different dimension today, are added to existing problems such as the unavoidable urban sprawl and decreasing of green areas and forests and even water reserves in the city are in danger today. Istanbul is known as one of the leading mega-cities in the world, with a significant population of 15 million according to the United Nations (United Nations Populations Fund, 2007). Until the 2000s, industrial related migration problem was seen as the major problem of the city.

3.1 The Cities Industrial Transformation Dynamics and Istanbul as Old, Historical City

Istanbul has own specific urban dynamics as an old historical city. The city, which developed within the boundaries of the historical part of the city on a small scale industrially until the beginning of 1900, enters a new process with the republican period, and the industrial development of the city is limited. The transformation of the industrial areas in the city and their decentralization to the towns close to the outskirts of the city now become the main planning criteria.

In its historical background known as a worldwide a prominent a port city for many years, Istanbul maintained its importance as one of the favorite cities of world trade. However, in recent years, climate-based problems such as Climate-change and global warming have put in the way of the urbanization of cities. As an old antique city Istanbul's industrial development reflected more spontaneous development based on the operability of old and ancient policies for many years.

Urban economies are integral to the process of economic transformation and development. They are a prerequisite for the creation of a diversified

economic base capable of generating employment opportunities. Many new jobs will need to be created in urban areas. Cities currently generate more than half of national economic activities worldwide. If other factors, such as growth of the population of cities and migration to cities, are addressed effectively through, inter alia, urban planning and control of the negative impacts of urbanization, cities could develop the capacity to maintain their productivity, to improve the living conditions of their residents and to manage natural resources in an ecologically sustainable way. Industry, together with trade and services, provides the main impetus to this process.

Cities have traditionally served as economic centers and have become the primary providers of services. As engines of economic growth and development they function within a network of supporting economic activities located in their peri-urban and surrounding rural areas. For this reason, specific actions also need to be taken to develop and maintain efficient and affordable transport, information and communications systems and linkages with other urban centers and with rural areas and to seek reasonably balanced patterns of development, both geographically and economically. Rapid changes in production technologies and in trade and consumption patterns will lead to changes in urban spatial structures that, notwithstanding their nature, need to be addressed.

Economic development and the provision of services can be enhanced through improved human settlements activities, such as urban revitalization, construction, upgrading and maintenance of infrastructural facilities, and building and civil works. These activities are also important growth factors in the generation of employment, income, and efficiency in other sectors of the economy. In turn, in combination with appropriate environmental protection policies, they result in the sustainable improvement of the living conditions of city residents as well as of the efficiency and productivity of countries.

It is possible to attribute this development of the city to some theories. Likewise, the urban relationship between the industrial land specification and the economy, geography and urban sociology have offered mainly some classic theoretical models, especially, equilibrium models depend on individual optimization, which can be traced back to Alfred Weber's *Theory of the Location of Industries* which is the a model most fundamental condition for industrial location choice is the lowest cost, including transportation costs and labor costs (Weber, 1960), (Li et al., 2020).

For this reason, the many years, the industrial areas of the city were mostly gathered near the antic harbours next old regions, such as the Historical Peninsula and the Golden Horn, which have been known as both next to next developed residential and commercial areas since ancient times. Indeed, these regions were considered where industrial facilities were seen most intensely in the city. Until the Republican period, the commercial axis of the city continued to grow with the newly opened factories from the Golden Horn axis to the Bosphorus axis. In areas supplied an easy access near the factories, such as slum settlements in Turkish known as (*gecekondu*) developed inexorably rapidly.

After the 1970s, with the mass migration continued with the industrial workers who came to the city to work in newly opened factories on that era. The industrial developments the city continued to grow mostly with the around the old city nuclei in the European and Asian Sides with the newly constructed motorways in European and Asian Side and via new connection supplied by newly opened Bosphorus Bridge. Indeed, after the 1960s, industrialization is based on where the industrial sector is more likely to be distributed on the edge of the city or even in the suburbs (Alonso, 1960, 1964) also Muth and Mills further developed theory likewise the to add the traffic costs to obtain the condition of local equilibrium (Bruecker, 1987) (Mills, 1967).

Thus, the change of the industrialization axis in the old regions of the city with respect to the new industrial zones outside the city can be seen. Likewise, the depend on an idea for occurred in other cities similar way, the business, commercial, and industrial functions that were once seen in the central city have been dispersed in much more broad areas with sprawling highway networks (Garreau, 1991), United Nations, 2007). Although this system is mostly based on the American cities that developed and industrialized through motorways, it is also used in Istanbul and other Turkish cities that developed in a similar way. For European cities industrialization was mostly condacted via harbours sea or rivers. In the 1980s, the laws made by the State for the rapidly developing slum housing areas besides the factories, on the contrary, led to the gained permanent status of these areas with amnesties deteriorated the situation rather than solving.

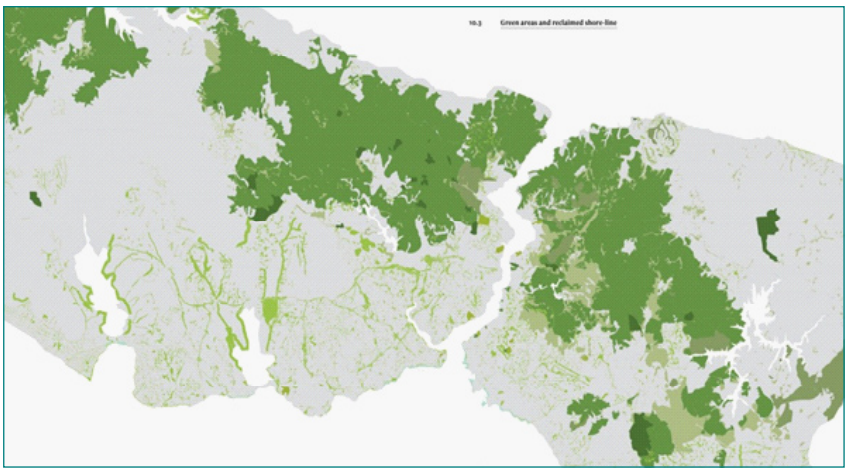

Figure 2. *Istanbul city The Ecological Map. In the North Green-Areas and in the South Along the Marmara Sea Urban Developments with Industrial Zones. Map, weebly.com*

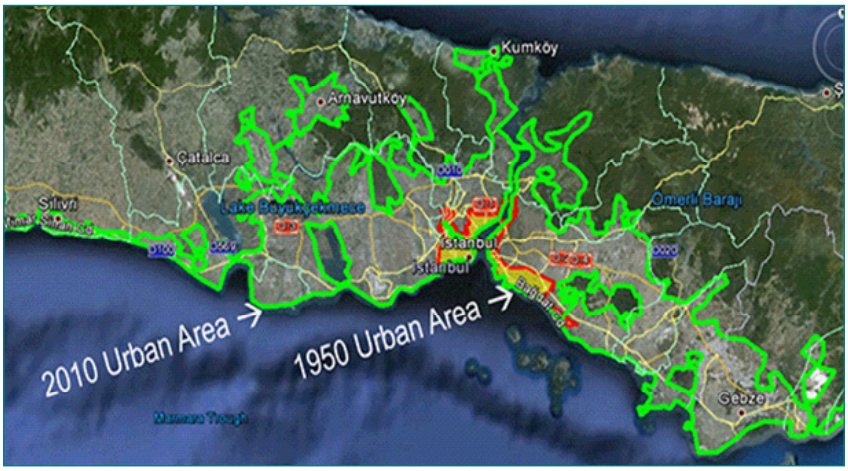

Figure 3. *Istanbul City, Urban Sprawl in Years, and the Decrasing of the The map. Istanbul Municipality 2040 Vision Plan.*

After the 1980s, the phenomenon of widespread industrial agglomeration attracted the attention of scholars, prompting the rise of the New Economic Geography. The CP model, which further considers transportation costs, external scale benefits and other factors, explains the phenomenon of industrial agglomeration (Hanson, 2001), (Kim, 1995), (Krugman, 1991). In the 2000s, the city's planning policies and regulations have changed with the 1999 earthquake, as a turning point. Today, while the industrial decentralization of the city is still being discussed, on the other hand the city continues to industrialize. Since the 2000s, the rehabilitation and regeneration of these old problematic slum areas and some poor-quality residential areas, because of the earthquake, are among the significant issues that are on the city's recent agenda. However, these decentralization and regeneration planning also have a very slow progressing process, since these works are mostly carried out by state or private enterprises with state partnerships.

In the 2010s, the new and innovative plannings has become significant as a new goal the city's planning specifically focused on industrial and urban pollution problematic considered to improve city's eco-system and sustainable design. Concentrated mostly European Side Küçükçekmece lake and region, and a large-scale regeneration project for Asian side Kartal projects these projects would be significant effects the city's eco system in near future.

While these projects could be very important and exemplary projects in terms of rehabilitating the future eco system of the city, these are could not be found opportunity to implemented for some reason. For the city, this valuable opportunity was missed when it could be both exemplary projects in the climatic context of the city and a serious solution to the current climate problems of the city and problems such as urban and industrial pollution.

In China, land specification is as a specific related to governments land specification or land transfer behaviors (Li et al., 2020). With the significance of the issue the planning of the city in the theoretical context, it was observed that the preliminary studies that Istanbul‟s problems were much more complex;

in the social, political, and economical context. As a main problematic planning "residential areas" and industrial areas" the jurisdictions of the city lands were shared with the state, IBB, Istanbul Büyük Şehir Belediyesi, (Istanbul Metropolitan Municipality) and local municipalities, to solve the problems of the city led authority and administrative confusion. (Coskun, 2021) In addition, government intervention on land market, such as land policy or land planning, has also received extensive attention in articles on land management (Wang, et al., 2012).

2020s, the recent sea disaster, climate responds planning, and the Covid-19 pandemic has caused to establish quite new dynamics induced the development of the city in the last 20 years. With the latest developments were truly a crucial turning point for Istanbul, the Turkish planners found themselves at a certain threshold of change. They needed to review and specify their strategies according to economical and implementation problems, also updating Istanbul's agenda on the major developments were needed new planning strategies in the world as well as the without losing sight of the earthquake issue and its timeliness.

3.2 The Zoning Regulation Could Be a Solution for Problematic of Industrialization and Industrial Developments

With the climate-crisis one of the most significant problems of the developing both residential areas and industrial areas. Although the problem of determining the residential and industrial areas in Istanbul was specified by the "zoning" plans developed at the beginning of the 20th century and the Istanbul Prost Master plans in the past, the future development of the city at the macro level could not be predicted at that time.

If considered the factors that were useful in the determination of residential and industrial areas before the 1980s, they are mostly established on "zoning" arrangements according to the primary and pioneered urbanism theories which was developed by the first-generation urbanists at the beginning of the 20th century. According to the zoning plans in the early 20th century, the main purpose was to separate the residential and especially the industrial areas that would be harmful to human health, and to direct these areas to the out of the city and outskirts, which are more convenient areas for the first supply of raw materials and then transporting the manufactured good.

This is also having similar urban planning idea like A. Weber's theory of the location of Industries and industrial location choice (Weber, 1960), (Li et al., 2020).

However, although there are still well known and effective ideas for the urban planning theories since the early 20th century, these theories have evolved into a much different paths with the climate crisis at the point the solution of the problematic reached today, and in the todays conditions they may have lost their validity. For the location choice of the industrial areas the primary criterion was that these areas were suitable for the supply of goods and raw materials. However, after the 1980s, it would evolve in a completely different planning paths as concerns such as the climate crisis principally came to the fore.

Indeed, these urban scale Master plans were more architectural based since H. Prost was an architectural originated urbanist, thus his Master plans considered some plans concentrated only on arrangement of some regions of the city rather and a macro-scale city planning (Prost, 1949). For ling years the macro-scale planning of Istanbul had not been evaluated in urban scale. Finally, the first macro-scale maps developed by Italian architect Luigi Piccinato in the post-Prost period. Mostly based on satellite-cities (Malussardi,1993) the indicated some plannings that the future industrial development of the city, as well as they obtained some the solution of the decentralization consensus, which was emphasized almost from the foundation of the Republic to that period. However, despite the important approaches to the solution of all these industrial areas, the lack of consistent policies on this issue until today, and mostly some administrative problems especially, between the state and municipalities on this issue.

Although spatially, a balance was observed in the development of residential and industrial areas at first, the other dimension of this issue and as a third pillar is now green areas. In this context, need to consider that the determination or transfer of industrial areas and residential areas is related to climatic issues. There are various factors according to the countries' political and economical the determinations or transfer of residential and industrial areas. In the case of Türkiye or Istanbul particularly, this responsibility is based on a two-pronged mechanism with the government on the one hand and the municipalities on the other, although in fact inner-city areas are under the responsibility of the Istanbul municipality,

while the non-urban areas are specified as the regions under the state's responsibility, but there is a legal gap that has not been fully determined in this regard and problems still exist. With the significance of the issue the planning of the city in the theoretical context, it was observed that the preliminary studies that Istanbul"s problems were much more complex; in the social, political, and economic context. As a main problematic planning "residential areas" and industrial areas" the jurisdictions of the city lands were shared with the state, IBB, Istanbul Büyük Şehir Belediyesi, (Istanbul Metropolitan Municipality) and local municipalities, to solve the problems of the city led authority and administrative confusion. (Coskun, 2021).

The problem of the moving the industrial facilities out of the city and decentralizing them, which has been seen as a solution to the urban problems of the city for many years, has now gained more importance with the increasing impacts of the climate crisis. The Istanbul Municipality also urged that the decentralization of industrial areas out of the city also aimed to decrease city's industrial activities only allowed to small scale industrialization known as OIZ, (Organized Industrial Zones) or *Küçük Sanayi* (small scale industries). These regulations would be needed less lands for industrialization also contribute to prevent uncontrolled urban sprawl and decreasing of green areas and forest. Indeed, it has been suggested for many years that the industrial areas of the city should be decentralized, out of Istanbul, and moved to nearby towns or cities with convenient transportation opportunities. Recently, considered this proposal the transformation of the city's industrial areas to nearby towns especially having ports was brought to the agenda by the Ministry of Industry to prevent the heavily industrialization of the city (CNNTürk, 2023). Additionally, there is an expansion of advanced services in the central city, contributing to its economic growth and development (Perouse, 2008). However, in the reports of the Istanbul municipality, there are suggestions to reduce these services, or at least to have a more balanced distribution between Asia and Europe between the two sides.

Indeed, despite political efforts to promote decentralization, Istanbul has been impacted by industrialization due to ongoing immigration and rapid development. Over time, the city's immigration profile has shifted from internal migrations from small towns in Anatolia to transnational and diversified multi-national migration. This influx of people has contributed to increased industrialization and unbalancing industrial centers in Istanbul, transforming it into a massive industrial center within its expanding economic hinterland and immediate surroundings.

While large industrial facilities and factories are decentralized towards the outskirts of the city, the industrial needs of the city are met by opening smaller industrial areas, such as OIZ, Organized Industrial Zones. These OIZs are also scattered in various parts of the city. Ikitelli, Dudullu, Tuzla, etc. The decentralization of industrial facilities and activities the two in nearby towns and one in Istanbul implemented by the state to develop Istanbul's economy these innovative Technoparks by National Science and Technology Development Policy also the government has taken steps establishing a national industrial and technological developments like logistics and textile the national agency KOSGEB small and medium-sized enterprises implement strategies their managerial and technological (Perouse, 2008). (Figure 1-2-3) According to the Istanbul Municipality Reports the Municipality envisioned the decreasing of number of working people in the Industrial areas. In a way, this is aimed at decentralization and reorganization of industrial areas in the city, as well as a more balanced use in terms of settlement and population. (Table 1)

Table 1. *The Decreasing of Industrial Areas. Table. Istanbul Municipality Web.page. Data from the Municipality Table and Determined as an Estimate. Table, by Autor.*

ISTANBUL	CURRENT POPULATİON 15.000.000	EXPECTED POPULATION 20.000.000
INDUSTRIAL ACTIVITIES	CURRENT 35%	EXPECTED TO DECLINE %25
GENEREAL SERVICE OF INDUSTRY	CURRENT 60%	EXPECTED 70%

However, the fact that consistent policies cannot be followed for the determination of both residential and industrial areas and there is still confusion between the state and municipalities on this issue creates a confusion and problem in taking the necessary steps in the solution of the issue. The problems like the state continue to being declared in the city as new industrial zones, moreover, these zones are in the green areas and forests in the north of the city. On the other hand, how the location of industrial areas to be decentralized will be evaluated in the future. In this case, since the lands in the regions where the old industrial areas are located, unfortunately, there is not much possibility to be revalued as clean agricultural land due to industrial pollution, it will be possible to build recreational parks and gardens in the city. Thus, a more serious and specific process is expected in for the future planning of the city, with significant and specific decisions to be taken in the industrial regions, both in terms of decentralization of industrial areas and industrialization of the city, which also includes the climate problems of the city.

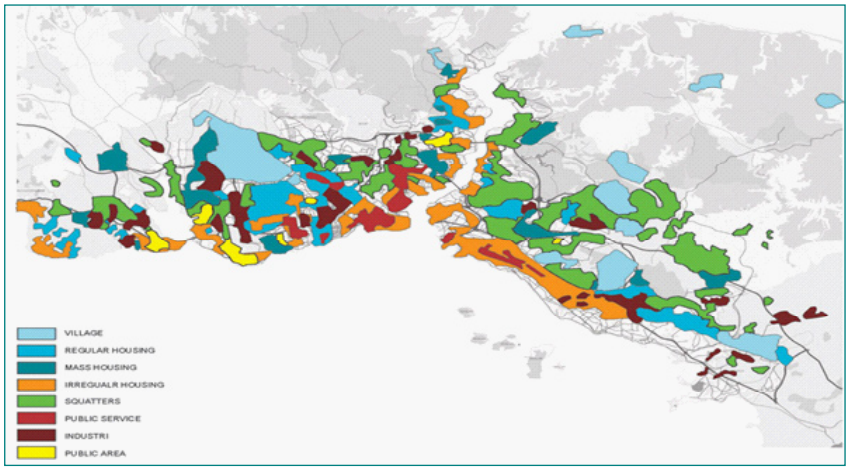

Figure 4. *Istanbul City, Land Use, Housing Areas, and Industrial Areas, Green Area According to the Regions. Map, Weembly.com.*

Figure 5. *Istanbul, Developments of Industrial Areas, (Tuzla, Esenyurt, Arnavutköy, Başakşehir, Büyükçekmece) and HousingAreas (Tuzla, Esenyurt, Başakşehir, Çekmeköy). Map. Autor originally from Haberturk.*

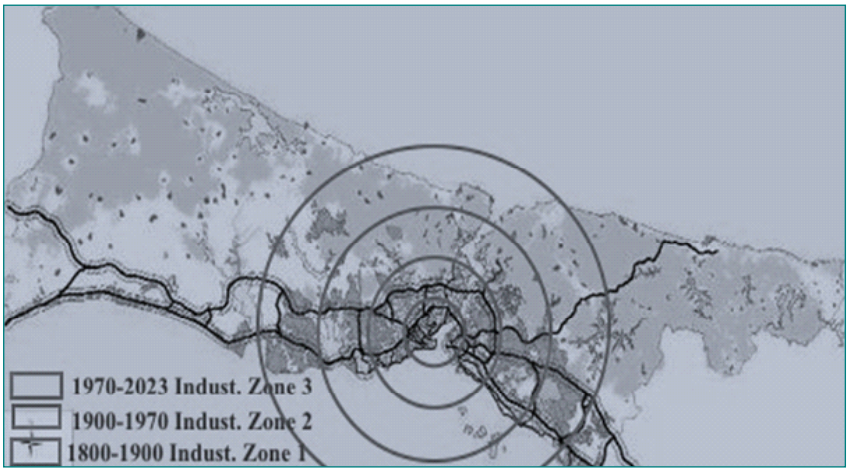

Figure 6. *Istanbul city Urban Developments, and Industrial Zoning Map in Years. Districts. Weembly.com.*

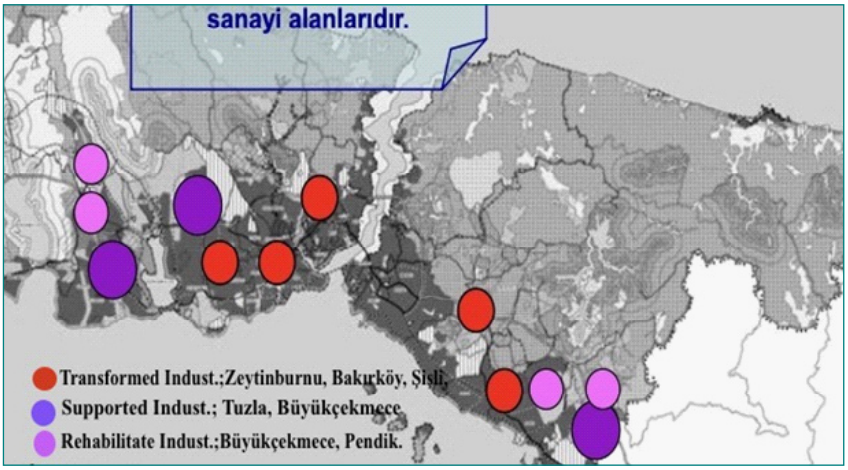

Figure 7. *Istanbul city Urban Developments with Industrial Districts and Zones in Years and Their Transformation. Map, Istanbul Municipality 2040 Vision Plan.*

Table 2. *Istanbul, Urban Decentralization of Industrial and Business Areas. The Data, Istanbul Municipality web.page. Table, Autor.*

EUROPEAN SIDE	EUROPEAN SIDE	ASIAN SIDE
ZEYTINBURNU, ŞIŞLI INDUSTRIAL ZONE TRANSFORMED TO	BÜYÜKÇEKMECE INDUSTRIAL ZONE TRANSFORMED TO	SULTANBEYLI-PENDIK-TRANSFORMED TO
•ASIAN SIDE ; •TUZLA NEW INDUSTRIAL ZONE	•NEAR TOWN •ÇORLU INDUST. ZONE	•ASIAN SIDE TUZLA NEW INDUST. ZONE

Table 3. *The Transformation Table of Istanbul's Industrial Areas. Table Autor.*

NEW INDUSTRIAL AREAS ;	THE AREAS INDUSTRIAL& HOUSING MIXED,	NEW HOUSING AREAS ;
TUZLA, ESENYURT ARNAVUTKÖY BÜYÜKÇEKMECE	TUZLA, ESENYURT BAŞAKŞEHİR BÜYÜKÇEKMECE,	TUZLA, ESENYURT, BAŞAKŞEHİR, ÇEKMEKÖY

Indeed, despite political efforts to promote decentralization, Istanbul has been impacted by industrialization due to ongoing immigration and rapid development. Over time, the city's immigration profile has shifted from internal migrations from small towns in Anatolia to transnational and diversified multi-national migration. This influx of people has contributed to increased industrialization and unbalancing industrial centers in Istanbul, transforming it into a massive industrial center within its expanding economic hinterland and immediate surroundings.

While large industrial facilities and factories are decentralized towards the outskirts of the city, the industrial needs of are met by opening smaller industrial areas, such as OIZ Organized Industrial Zones. The OIZs are scattered in various parts of the city such as; Ikitelli, Dudullu, Tuzla, etc. The idea decentralizing industrial zones to nearby towns,

new laws were made called "organized industrial zones" proposed to move them out of the city. These idea articulated plannings created a regionalization around the Marmara Sea (even regionalization-based industry) (Genç, et. al, 2021).

The decentralization of industrial facilities and activities the two in nearby towns and one in Istanbul. (Perouse, 2008). The Istanbul has taken steps establishing a industrial, and technological developments like logistics and textile the national agency KOSGEB, (small and medium-sized enterprises) with technological strategies (Perouse, 2008). (Figure 5) (Figure 6) According to the Istanbul Municipality Reports the Municipality envisioned the decreasing of number of working people in the Industrial areas. In a way, this is aimed at decentralization and reorganization of industrial areas in the city, as well as a more balanced use in terms of settlement and population. (Tables 3-4-5)

The industrialization of Istanbul continued rapidly until the 1990s (Özbay, 2014). Today, the industrial companies with capacity reports in Istanbul, many of them are primarily located in European Side; Başakşehir, Küçükçekmece, and Bayrampaşa, and in the Asian Side; Tuzla. (Figure 5) (Figure 6) (Figure 7) (Figure 8) (Figure 9) These enterprises were generally located in various OIZs or in the form of small clusters formed by themselves and operating in similar sectors in certain regions.

Despite the long-standing consideration of decentralization idea of industrial areas in Istanbul, there have been contradictory decisions made by the governmental side. While many industrial factories and facilities have been relocated out of the city, the government has also been opening new industrial areas in the Istanbul's vacant and possibly green-areas. Recently, there have been announcements of new industrial areas in Arnavutköy, and Esentepe districts according to Governmental Reports (Habertürk, 2021), indicating that the issue of industrialization and decentralization in Istanbul remains a complex and ongoing challenge. (Habertürk, 2021). (Figure 7) (Figure 8) (Figure 9)

3.3 Establishing a production structure that uses advanced technology in the industry, produces high added value and employs qualified workforce

1. Encouraging R&D and Innovation studies in industry sub-sectors using low and medium technology.
2. Promotion of design and branding in industry.
3. Educating the qualified workforce needed in the transforming industrial sub-sectors, equipping the existing industrial workforce with the technological and other professional skills required by the transformation.
4. Guiding the owners of companies operating in the industrial sector on technological and spatial transformation, creating awareness and volunteering for transformation in the industry.
5. Increasing productivity, competitiveness and added value in the industry through clustering studies.
6. Ensuring that the transformation in the industry is carried out within the framework of coordinated and integrated policies with the urban transformation studies in Istanbul, considering the spatial dimension.

3.4 F- Ensuring a spatial transformation that will reduce the burden brought by the industry to the city and allow the development of the industry

1. Making inventory work, economic and urban load analyzes of industrial areas and preparing a strategy document and action plan for the transformation and decentralization of industry in Istanbul.
2. Giving priority to the activities of industrial sub-sectors that make clean production in the city, use advanced technology, produce high added value, and traditional production based on crafts.
3. Decentralizing industrial sectors located in water basins, consuming excessive water, carrying disaster risk, and polluting industrial sectors, out of urban areas by taking measures to eliminate their environmental impacts.
4. Industrial sub-sectors, which are stuck in the city, limited to development by staying in historical places and residential areas, making labor-intensive production, and bringing burden to the city, are moved to areas where they can be developed by clustering, and the evacuated areas are transformed in a planned way with newly developed projects. (Figure 10) (Figure 11)

Figure 8. *Istanbul, Esenyurt District, Mixed Housing Areas, Industrial Areas. Photo, Shutterstock.*

Figure 9. *Istanbul, Esenyurt District, the Heavily Industrialization, in the front Industrial Areas, and Background is Housing Areas. Photo, Shutterstock.*

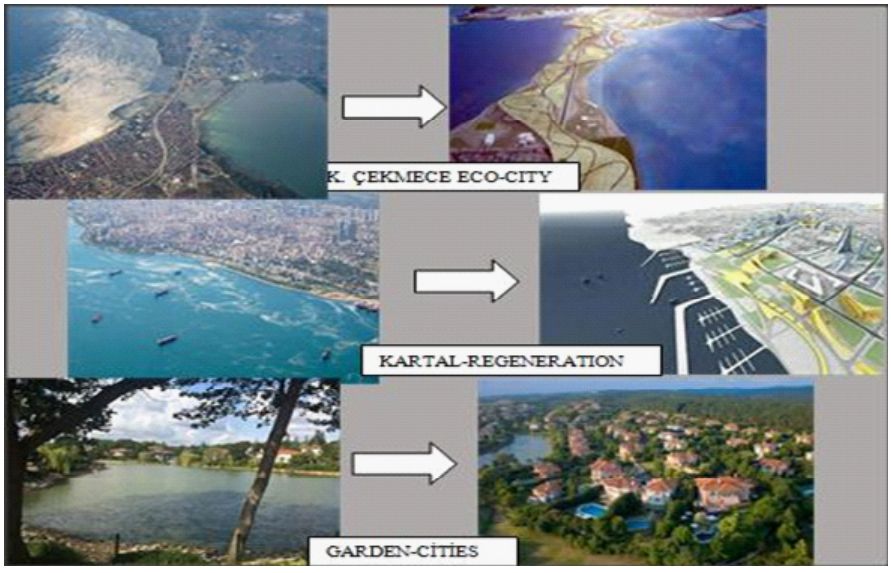

Figure 10. *Istanbul, Tuzla District, An Example of the Transformation of the Green-Areas to the Industrial Areas. Graphic, Autor.*

Figure 11. *Istanbul, Tuzla District, Transformation of the City with Newly Developed Sustainable Projects, such as Garden-cities, Eco-cities or Regeneration Projects. Graphic, Autor.*

4. Conclusion

The current problem in the city is the inevitable migration of the city and therefore the population development and the resulting need for new residential areas and business areas. In fact, ironically, there is a mutually interrelated dynamic between new business areas and new residential areas that support and feed on each other's development.

Although there has been a political foresight for many years in the city to move industrial facilities, large factories, and enterprises out of the city or to nearby cities and towns, it is possible to see that this has not yet become functional enough.

On the other hand, even though heavy industry, large factories, and businesses have moved out of the city, other industrial services continue to develop. Also, decreasing of the green areas, forest, continue and even extinction and pollution of water basins both industrial waste or urban and domestic waste in the city causes increasing pollution in the city.

Although the problems caused by industrial areas in the city are diverse, they can be grouped under the following main headings.

1. Industrial areas continue to develop in an inevitable way
2. The newly declared industrial areas are in the same areas as the residential areas of the city.
3. The decentralization of industrial facilities outside the city, which has been planned for many years in the city, has not yet been realized as planned,
4. Predicting that the new industrial areas in the city will develop into newly opened residential areas, and not preventing both the industrial areas and the newly opened residential areas from developing into the city's green areas and forest areas, resulting in the decreasing of green areas.

Another issue is, perhaps, as a problem specific to the city of Istanbul, there are still some jurisdictional problems between state and municipal institutions in the city, such as specifying, declaring, and constructing new industrial areas or residential areas.

Although the city has still serious problems regarding the climate concerns and sustainable issues recently, new regeneration projects that comply with sustainability and green architectural planning, and new housing settlements such as garden-cities and eco-cities planned for the renewal of the ecosystem. Although many measures taken on the climate issues regarding sustainability are included in the city's 2040 Vision plan, these measures are not yet considered satisfactory in this regard. Even though there are not many places in the city to open new housing areas other than the northern forests, and green areas the planning of some new housing projects by rehabilitating the old industrial areas of the city and the sustainable and eco-city planning of these settlements should be seen as important steps towards the future planning of the city.

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