

The Urban Sprawl Model for an Affected Metropolis: Bursa – Istanbul Example

1. Urban Sprawl Concept

Urbanization occurs as a result of the self evolution of a city or a society completed industrialization in the developed countries. Urbanization is seen as a result of the consensus with the developments in transportation, communication and production technologies, realization of the diversification and organization facts (Suher, 1996).

According to Suher “Metropolitan areas have a dynamic structure since;

- The physical growth of the central city rapidly spreads to the large areas,
- City effect on the peripheral country-city settlements and the strengthening of the mutual connection with the developments of the transportation-communication facilities,
- The closing gap between the life standards of the people who live in the metropolitans and those leaving around it” (Suher, 1996).

After the second half of the 20th century, the developments in the transportation and communication technologies has been efficient on the developments and formation of the urban places. In parallel with this development, metropolitan cities has had a tendency to spread from center to the peripherals.

In his book Megalopolis Gottman (1961) expresses that; within the development process of the metropolitan cities, the rural area surrounding the city turns to urban area rapidly, and there is a transition region without any continuity and containing empty areas. This transition region is defined as “urban sprawl area” (Doğru, 2002).

Keleş defined urban sprawl as “ as a result of excessive crowding of the cities, increase on the value of land and inability to perform its functions; immigration of the urban population and the functions to the suburbs using the existence of the transportation vehicles” (Keleş, 1998).

Sprawling means the spreading of the urban area towards the rural area surrounding it and it has several definitions in the literature;

- Low density dwelling development beyond the borders of the city,
- A transition area between the urban and rural disposal areas,
- Low dense development on the urban development area depending on the transportation by private automobiles,
- A development that harms the local sources and open areas and scattering with traffic (Gillham, 2002).

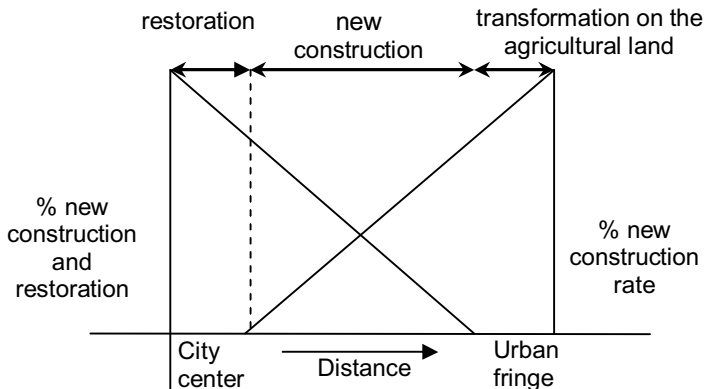


Figure 1: Urban sprawl and construction in the metropolitan urban fringe (Goodal, 1974 in Doğru, 2002)

According to Goodal; spreading around the city peripherals is explained by the construction rates. As it can be seen from the Figure 1, while the old construction, restoration and sanitization rates are increasing in the city centers, sprawling areas are the areas where the transformation on the agricultural land and new construction are at the top (Doğru, 2002).

Galster at all classified the 8 dimensions of urban sprawl in the metropolitan areas as density, continuity, concentration, clustering, centrality, nuclearity, mixed use and proximity (Knaap et al., 2006).

Galster et all (2001) classified sprawling as linear development, development by jumping on the green area, continuous but dispersed development and other such different ways on the basis of their level of compactness or sprawling (Batty et al, 2003). Urban sprawl examples can be seen in the following figure.

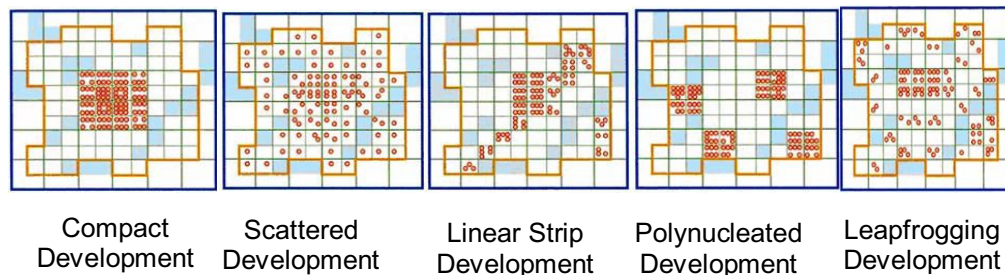


Figure 2: Physical patterns Defining Sprawl (From Galster et.al., 2001 in Batty et al, 2003)

Characteristics of urban sprawl are low dense development, loss of open rural area, development of single function settlement areas, car dependent societies, spontaneous, unplanned an unsuitable developments (Heirman, 2007).

1.1. Reasons of urban sprawl

European environmental agency states that sustainable urban planning strategies that can struggle with urban sprawl can be efficient only when the reasons of urban sprawl is understood completely. In the analysis made on this area; depending on the developments of the transportation network, it can be seen that the real reasons of the urban sprawl are dwelling dispersion and developments of the economical functions. Global economic changes related to the developments of the information and communication technologies effect the location dispersion of the population and the employment and causes urban sprawl (EEA, 2006a). European environment agency lists the reasons of urban sprawl as follows;

Table 1: Drivers of Urban Sprawl

Macro-economic factors ▪ Economic growth ▪ Globalisation ▪ European integration Demographic factors ▪ Population growth ▪ Increase in household formation Inner city problems ▪ Poor air quality ▪ Noise ▪ Small apartments ▪ Unsafe environments ▪ Social problems ▪ Lack of green open space ▪ Poor quality of schools	Micro-economic factors ▪ Rising living standards ▪ Price of land ▪ Availability of cheap agricultural land ▪ Competition between municipalities Housing preferences ▪ More space per person ▪ Housing preferences Transportation ▪ Private car ownership ▪ Availability of roads ▪ Low cost of fuel ▪ Poor public transport Regulatory frameworks ▪ Weak land use planning ▪ Poor enforcement of existing plans ▪ Lack of horizontal and vertical coordination and collaboration
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Source: EEA, 2006a

1.2. Effects of urban sprawl

Sprawl development might cause several social and regional problems and negative effects such as;

- “Increased and insufficient land use and energy consumption,
- Increased traffic congestion,
- Negative environmental effects, such as reduced air and water quality and loss of open space and other natural gases,
- Higher public costs for new facilities and services for the newly developed areas (e.g., road constructions, sewer/water systems),
- Loss of community character,
- The decline of inner cities as people leave them for sprawled areas” (EPA, 2002).

2. Examination of Urban Sprawl in Istanbul - Bursa Example

2.1. Istanbul province

Istanbul is located in the north west of Turkey and it is surrounded by Tekirdağ in the west, Kocaeli in the east, the Black Sea in the north and the Marmara Sea in the South. Being a seventh grade center, Istanbul is the unique center at the highest grade and it affects the whole country with the goods and services offered by it. With its areas of 5,512 km² Istanbul covers 0,97% area of the country. According to 2007 census, 12,573,836 lives in the city and it is the most crowded city in Turkey and 17,8% of the population of the country lives in the city. Average population density is 2281 prs/km². With its 39 provinces, Istanbul is a rapidly developing metropolis in Turkey.



Figure 3: Marmara Region (www.dpt.gov.tr)



Figure 4: İstanbul and Bursa

While in 1960s 78% of the city population living in the western shore and 22% on the Eastern shore, after the construction of the Bosphorus bridges the growth of the city towards the east gained acceleration (İBB,1995). Today 65% of the population lives in the western and 35% lives at the eastern part (Övür, 2008).

With the decision on the decentralization of the large and pollutive industries within the city towards to the peripherals, the increase on the land prices in the center, transportation and other such problems accelerated urban sprawl. New settlements appearing around the decentralized industrial areas were in the form of urban sprawl. The city growing as an oil-stain with the effect of the new plans and the motorway, reached to the İzmit /Gebze border in the east and Tekirdağ/Çerkezköy in the west and has had a linear and multi centered macro form.

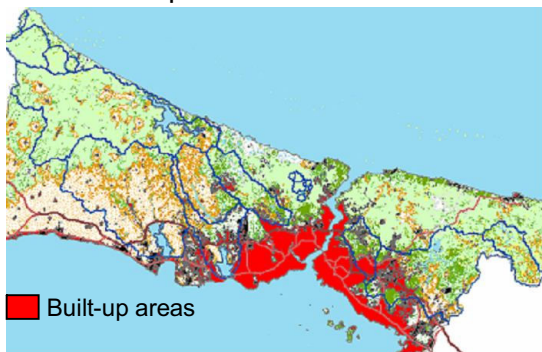


Figure 5: Classification of land use with 1995- 2005 Landsat images

In the work of Geymen and Baz examining the change on the land use within the Istanbul metropolitan area, it can be seen that dwelling and industry areas increased in the regions surrounding TEM and D-100 in parallel with the rapid and unplanned population growth. While

the settlement areas were 11% in 1990 this figure reached to 16% in 2005 and the agricultural areas decreased to 23% from 27% within the same period (Figure 5, Geymen and Baz, 2007).

Since the urban sprawl can not be restricted in Istanbul and the urban sprawl is continuously increasing, economic, ecologic and social problems of the city are increasing day by day. Some of these problems are increase on the urban pressure on the natural sources in the north, occupation of the public land around the basins, insufficient land use, traffic jams, increase on transportation and public service costs, apparent social and location separation.

In parallel with the developments on the Bursa, İzmir and Ankara axis, which enables the connections of Istanbul with the country and the region, some diversifications occur in the region. Urban macro forms of Kocaeli and Bursa provinces, which can be counted as the hinterland of Istanbul, have started to change. The decision on decentralization of the industrial areas in Istanbul and increase on transportation alternatives and the developments on the transportation infrastructure has a great affect on this change. The sprawling fact which was thought for Istanbul metropolis scale at first is considered to be realized from Istanbul towards these cities. The plans to protect the forest areas and water basins in the north of Istanbul city and high transportation costs in Istanbul have become effected for the selection of the places for dwelling and industrial purposes.

2.2. Bursa Province

Bursa is located in the East of the Marmara Region and surrounded by the Marmara Sea and Yalova in the north, Kocaeli and Sakarya in the north east, Bilecik in the East, Kütahya and Balıkesir in the south.

Bursa is on the significant transportation axis of the Eastern Marmara Region. It has a strategic position since it is located on the Ankara-İzmir State motorway and has connections with Istanbul and other cities. Cargo and passenger transportation is made by land and sea and air transportation has a development potential. Sea transportation is made in Mudanya and Gemlik districts and the air transportation in Yenişehir district.

There are 17 districts of the city. At the establishment of the metropolitan municipality there used to be Osmangazi, Nilüfer and Yildirim districts but with the decision dated 10.7.2004, Gemlik, Gürsu, Kestel and Mudanya districts were also included in the borders of Metropolitan Municipality.

With its area of 10,819 km² it covers 1.4% land of the country. According to 2007 census it has a population of 2,439,876 and this corresponds 3.46% of the country population. Bursa is the fourth most crowded province and the fourth biggest metropolitan (1,630,940) in Turkey. Average population density is 225 person/km². Bursa is a 5th grade center.

3. Development of Bursa City Macro Form

3.1. Urban development process of Bursa and reasons for urban sprawl

Pre 1923 period

Bursa had been a significant trade center in every era in the past. Silk production and export stated after the silkworm eggs brought to the city in 552 AD during the Byzantine period. Bursa was became the first capital of the Ottoman state in 1326. Textile factories were established in the city after 1908. The export products such as olive oil, tobacco and timber were carried to Istanbul and Europe using Bursa – Mudanya railway (Abaci, 2007).

1923-1955 Period

Policies encouraging the development of the industry in Bursa applied during the republic period. In this period we can see that private sector established factories in food, textile, machinery, production industries and they develop and improve with the state support. In 1938 Merinos wool factory started production. Some of the workshops established in 1938 became significant institutions for the automotive industry which developed in 1950s. In

1940s large scaled institutions were established in the machinery construction and metal ware industry.

The industry which developed rapidly with the state incentives effected the urbanization and formed the city macro form. Opening of the Merinos and İpek-iş factories which were established on the north of the existing settlement increased the migration from rural to urban areas (Kaprol, 2002). Shared landing and illegal constructions started to the dispersion process of the city toward to the plateau (Vardar, 2007). In 1944 Yunuseli Airport which is 8 km away from the Bursa city center started to serve for the city.

After Çekirge region which is known with its thermal waters and historical and natural beauties was declared as a tourism region in 1941 and opening of Altıparmak Street, a dense construction has started in the region. There used to be culture, trade and education centers in the Atatürk Road developed during the same period (Kaprol, 2002).

1955-1975 Period

After 1950s the population coming from the migration from Bulgaria located on Hürriyet quarters in Bursa-Mudanya road and the population increased rapidly. Apartments started to be built rapidly in the city center (Vardar, 2007).

In 1960 Luigi Piccinato prepared a city plan and proposed the linear development of the city on Ankara-Bursa-Mudanya axis. Bursa Organized Industrial Region(Bursa OSB) included in the city plan for the first time (Arslanoğlu, 1998).

In 1970s Tofaş and Renault automobile factories were opened in Yalova road and due to its cheap land and infrastructure facilities this axis became a center of attraction for automotive industry. With the developments on the qualifications of Mudanya-İzmir-Ankara and Yalova highways, dwelling and industrial areas were formed on these areas, and urban development accelerated. As a result of some economical decisions such as the establishment of Bursa OSB, the automotive-machinery-textile industry investments and in parallel with these the immigration movements and urbanization problems increased in the city (Arslanoğlu, 1998).

1975-1995 Period

After opening the university in 1975, dwelling formations started in Görükle area. In the Settlement plan prepared in 1976, it was proposed that the city would develop in a linear format in east-west direction, the plateau would be protected and the population would be gathered in the center densely.

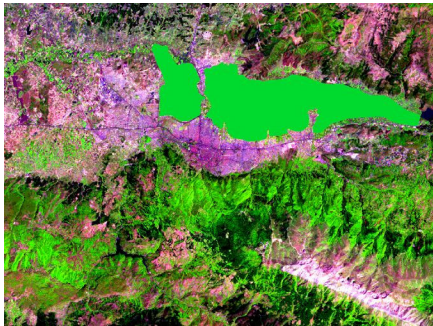


Figure 6: Bursa Plateau Protection Protocol Area 1976, Bursa Plateau: 11.224 ha.

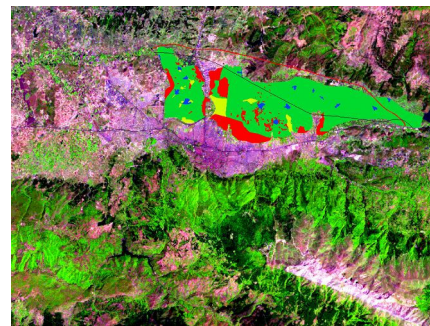


Figure 7: Urbanization at Plateau Protection Protocol Area 1976-2002, Bursa Plateau: 9.040 ha.

In 1977, in order to avoid the dispersion of the city towards the plateau, the plateau protection protocol was signed. But the plateau could not be protected and the city developed towards to the north. Demirtaş region on the Yalova way started to develop with illegal dwelling areas, factory and workshop buildings (Arslanoğlu, 1998).

The need for dwelling facilities increased after the migration from Bulgaria in 1989, the city started to spread toward to the peripherals (the plateau) and unplanned construction continued.

1995-2008 Period

Developments in the transportation and communication technologies started to change the structure of the retail trade. When the accessibility problem is eliminated in the 1990s, big shopping centers requiring large areas and who chose their locations on the basis of transportation axis and cheap land values on the places far from the city center.

Light rail system (LRT) which was started in 2002 in order to solve the in city transportation problems was efficient for the establishment of dwelling-industry relation. LRT which is on İzmir- Ankara and Mudanya axis decreases traffic and air pollution stem from the vehicles (Ministry of Environment and Forestry, 2007).

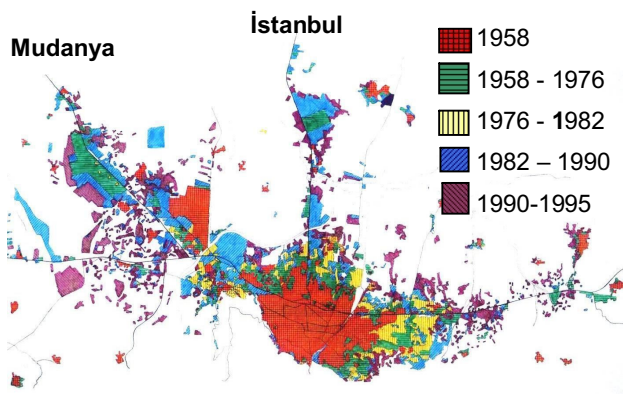


Figure 8: Urban Development of Bursa
(Bursa Büyükşehir Belediyesi, 2007)

Bursa bus terminal was moved to the north of the city in 1997. Bypass ways were opened in 2001 and 2006 and the empty places among the dwelling areas around Mudanya and İzmir ways were filled. The dwelling areas in the east were also spread along Ankara way and combined with Gürsu and Kestel provinces.

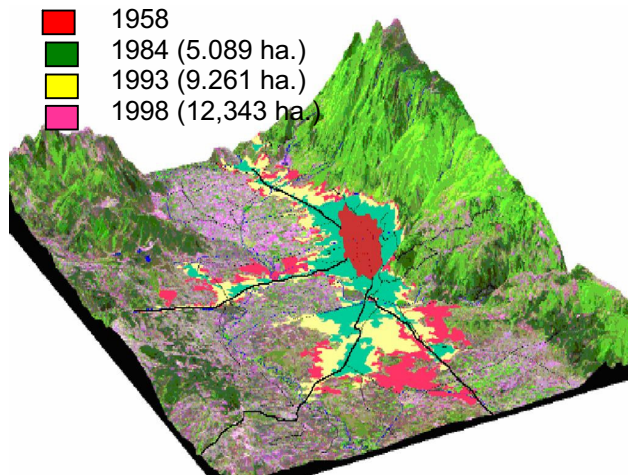


Figure 9: The trend of urbanisation and urbanised territories near and in whole Bursa,
(Aksoy and Özsoy, 2007)

Aksoy and Özsoy, with using the Landsat satellite outputs of 1984, 1993, 1998, has scrutinised the interaction of territory and urbanisation in Bursa. Industrial and residential areas are seen to be develop in the lands that have got huge agricultural potential and the ways which ties Bursa to Ankara, İzmir, İstanbul and Mudanya. Urbanised areas which was 5.089 hectares in 1984 have reached 12.343 hectares in 1998 with the rise of % 142.

It can be seen that the macro form of Bursa was changed during its historical development process. Today Bursa has reached a linear macro form which lines in east-west direction and spreads to the plateau in the north, restricted with the inclined areas in the south.

3.2. Planning Decisions and Their Effect on Macro Form

Besides the social, economic and political decisions, high scale plans has a significant effect on the city macro form formation.

▪ 1962 – East Marmara Plan

This is the first regional plan prepared by taking the fact of unavoidable development of Istanbul metropolis. In this plan it is aimed to find solution are found to the social and economic problems of Istanbul and determine the development centers and minimize the negative effects of excessive growth (DPT, 1963).

The fact of decentralization of Istanbul covers the shift of the functions that are within the city but have now advantage of being there to the alternative places within the region (İMP, 2006).

▪ 1976- Bursa Settlement Development Plan

In the Settlement Development Plan prepared in 1976 it was proposed that the city is to develop in east-west direction and the plateau is to be protected and the population is to be collected densely in the center (Bursa Metropolitan Municipality, 2007).

▪ 1984 - Bursa Settlement Development Plan

Demirtaş Industry Region and Organized Industrial Regions were addressed and it was stated that no other industrial regions are to be supported (Bursa Metropolitan Municipality, 2007).

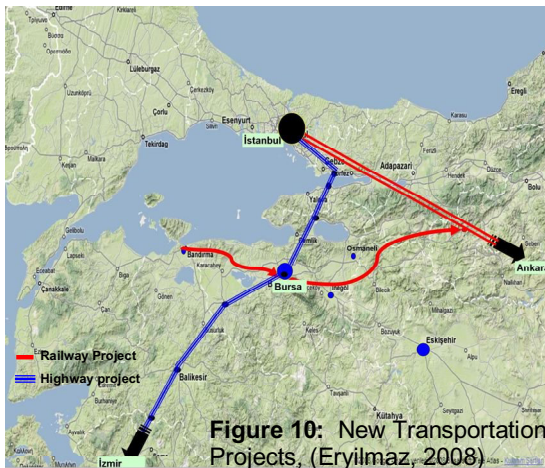
▪ 1998 - Bursa Environmental Plan (1:100.000 scale) and Bursa Settlement Development Plan (1:25.000 scale)

Decisions were taken in compliance with the sector targets of Bursa under the frame of the country's development plan in such a manner to industrialize by avoiding the agricultural pollution. The aims were the decentralization of the partial industry from the center, protection of the special product areas and development of the agricultural industry. East Marmara Region (İstanbul-İzmit-Adapazarı-Eskişehir and Çanakkale) were determined as the interaction area of the city within the whole country (Bursa Metropolitan Municipality, 2007).

▪ 2006 –Bursa Environmental Plan (1:100.000 Scale)

It was aimed to decentralize Istanbul and develop Marmara region. The highway projects for the Bursa- Karacabey, Bursa –Mustafa Kemalpaşa, Gemlik - Bursa - İnegöl - Bozüyük-Eskişehir axis within the region improves the existing transportation infrastructure. Due to the increasing importance of the marine transportation for passengers and cargo, it was aimed to use Gemlik-Mudanya ports in a more efficient manner (Bursa Metropolitan Municipality, 2007).

3.3. New Transportation Projects



Within the concept of railroads and high-speed train projects started by Ministry of Transportation; at the Bandırma-Bursa-Ayazma-Osmaniye line 291 kilometers of investment on high-speed train has been scheduled (www.rayder.org.tr). Within this Project, it is aimed to tie Bursa to Ankara-Istanbul high-speed rail line via Osmaniye or Inönü (<http://www.ntvmsnbc.com>).

Besides, for the purpose of shortening transportation duration, Gebze-Orhangazi-Izmir highway –containing Izmit Gulf transition- will be

constructed. The project has been complemented by General Directorate of Highways. It is composed of 377 kilometers of highway and 43 kilometers of connecting road thus being 420 kilometers total. Kocaeli-Istanbul highway line will pass via Bursa (Mustafakemalpaşa-Orhangazi districts) and a cable-stayed bridge of 1,7 kilometers will be constructed between Yalova Hersek Cape and Kocaeli Dilovasi (www.ekoayrinti.com.tr).

4. Bursa-Istanbul Interaction

Transportation affects the place of the cities' in the region and their developments. The importance of the connections of Bursa with Istanbul under global conditions results with an increase on the communication-transportation facilities between Bursa and Istanbul (Tosun, E.K, 2007). Due to the different transportation alternatives to Istanbul, Bursa has become like a neighborhood of Istanbul.

In the past the marine transportation from Istanbul to Bursa was made via ferried between Eskihisar in Kocaeli - Gebze District to Topçular port and between Istanbul - Pendik district to Yalova. The sea bus port built in Güzelyalı district by Bursa Metropolitan Municipality and Istanbul Marine Transportation Institution in order to shorten the transportation time between Istanbul and Bursa started to render services in April 2007 (Tosun, E.K, 2007). The number of the ports in the south of the Marmara sea, the speed, capacity and frequency of the sea buses were increased. Thanks to the fast ferry and sea buses between Istanbul and Bursa, the number of daily trips for house-work, house-recreation purposes increased. In parallel with the developments of the marine transportation among the cities, one can reach from Bursa city center to Istanbul city center in 75 minutes (www.ido.com.tr).

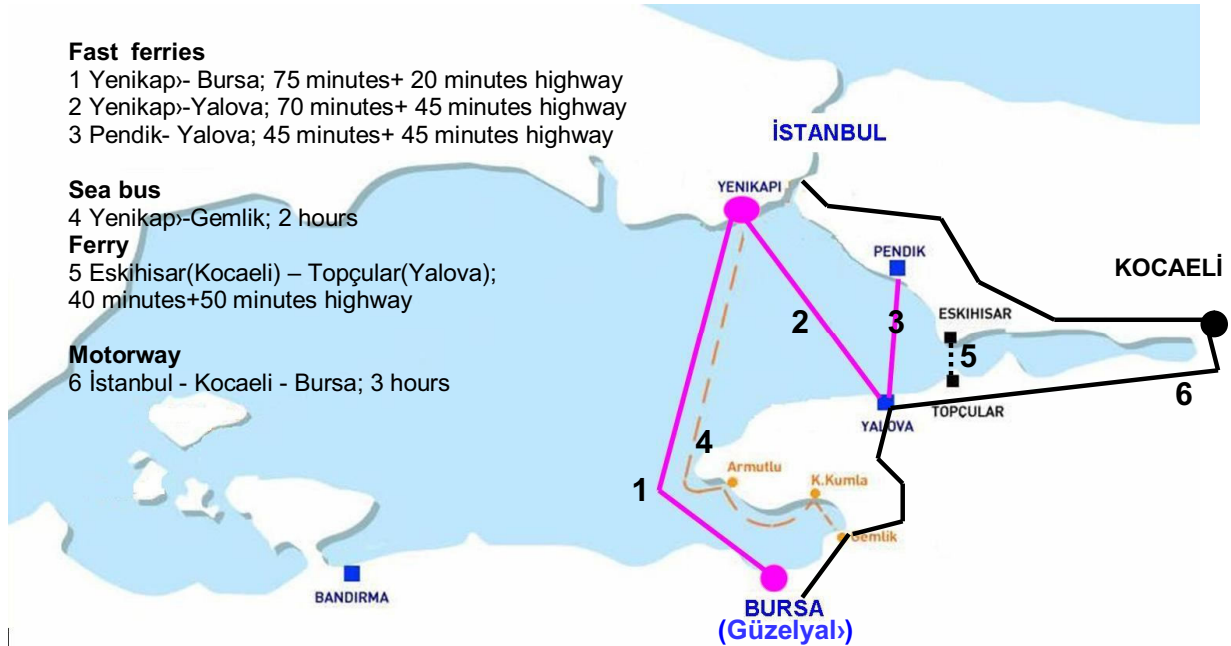


Figure 11: Transportation alternatives between Bursa and İstanbul (www.ido.com.tr)

Thanks to the fast ferry transportation, the number of the daily trips for work, stay and travel has increased and changes can be seen in both cities. The urban sprawls occurred on the northern axis where highway transportation is made between Istanbul-Bursa city centers and the north western axis where the marine transport is made. It can be seen that the functions on this axis came closer to Istanbul in accessibility and the number of luxurious dwellings have increased.

When we consider the interaction between Bursa and Istanbul cities on the basis of “fraction point theory” separating the trade areas of two different sized cities; the calculation for the border separating Bursa from Istanbul shall be as follows (Arslan, 1996).

The distance of fraction point from the smallest city

Distance between to trade centers

$$\frac{1 + \sqrt{\text{population of the largest city}}}{\text{population of smallest city}}$$

Fraction point = From Istanbul to Bursa: **166**
From Bursa to Istanbul : **77**

The breaking point between the Bursa-Istanbul is 166 km. far from İstanbul; that shows Bursa city is under effect of İstanbul metropole.

According to the interaction theory to determine the trade hinterland of the cities; economical action potential of the cities are deemed to be dependent on their populations and the distance is accepted as a relative factor for the attraction and pushing of these relative measures. According to this theory which is called Reilly's retail trade attraction law; "the cities are affected from each other directly proportional to their populations and inversely proportional to distance between them (Arslan, 1996).

Since Istanbul is the most crowded city in Turkey, it affects the surrounding cities on their use of land. Bursa can be counted as an economical hinterland of Istanbul. The industry of Istanbul benefit from the sources of the cities surrounding it and after that it transfers investments to those cities.

Interaction index

$$\frac{\text{Population of 1}^{\text{st}} \text{ City} \times \text{Population of 2}^{\text{nd}} \text{ city}}{\text{Distance (km)}}$$

When we examine the relation between Istanbul and the surrounding cities it can be seen that Bursa has a strong relation with Istanbul.

Bursa –İstanbul
Interaction Index rate = **87,618,166,658**

Interaction index

$$\frac{\text{Population of 1}^{\text{st}} \text{ City} \times \text{Population of 2}^{\text{nd}} \text{ city}}{\text{Transportation time (minutes)}}$$

Interaction in terms of time space of access according to the different transportation mods between Bursa-Istanbul cities:

	Existing highway network		Maritime communication		Average communication (existing highway+maritime)		New highway project	
	minutes	km	minutes	km	minutes	km	minutes	km
	180	243	95	108	137	230	69	138
Interaction Index rate	118,284,524,988		224,118,047,346		154,845,196,348		308,568,326,057	

Rate of interaction shortens as the time of access shortens. By the maritime communication from İstanbul to Bursa, the interaction will increase % 89 in proportion to existing highway

network. By the construction of the new highway project, the interaction will increase 37% to maritime communication, 160% to existing highway network.

5. Effects of Urban Sprawl on Bursa

Urban sprawl is defined as the dispersion of the development of low dense dwelling, trade and industry areas towards the rural areas surrounding the city randomly (EPA, 2002). With the help of fast access from Bursa city to Istanbul metropolis Bursa has become a focal point in transportation and linear sprawl formations became stronger. Sprawling causing water, air and earth pollution and loss of fertile agricultural lands in Bursa city.

The total areas of Bursa city is 1,081,900 ha and 17% of this is covered by plateaus. The Bursa plateau has an area about 40,000 hectares and the size of the protection areas is about 11,224 hectares (Eke ve Ataç, 2006; www.bursa.bel.tr). In the fertile agricultural lands of the plateau agricultural products and products with high added value such as fig, olive and chestnut are grown. Sprawl formation effects the economic relations between Istanbul-Bursa metropolises in positive direction but the fertile agricultural land of the city in negative direction. Bursa Plateau has lost plantation areas dramatically due to the construction of the settlement areas and industrial facilities in the last years. Unplanned urbanization which has not considered the fast immigration rate to the city and the topographic and geographical structure of the city resulted with the decrease on green areas and unhealthy environmental conditions. The traffic sourced emissions have a big contribution to the increase on the air pollution in the Bursa city center (Ministry of Environment and Forestry, 2007).

The industry based pollution in the city also caused the earth contamination. Besides these, due to the urban growth dispensing to the plateau, domestic and industrial waste waters pollute the underground and surface water sources. The agricultural land using waters containing especially textile, dyeing, canalization and chemical wastes are over polluted (Ministry of Environment and Forestry, 2007).

Besides the industry and heating based air pollution, the use of private cars on the urban settlement on the Mudanya - Yalova - İzmir - Ankara axis, also causes air pollution stem from motor vehicles.

Sprawl areas which enable the connection of the city with Istanbul and strengthen its regional position and contribute to its development result with the decrease of the fertile land and green areas in the plateau and disturb the natural balance. Under this frame, the sprawl fact causes the problem of sustainability of the natural and economical sources.

6. Result and Evaluation

Bursa city macro form was affected from the decisions taken in city and regional scales. Development of the city as being a textile and automotive industry city, increase on the immigration from rural areas due to industrial investments, increase on population, insufficient dwelling supply, dispersion of unplanned dwelling areas towards the plateau and other such factors result with sprawl.

Social, economic and location changes in Istanbul are the regional effects that cause sprawl in Bursa city macro form. The closeness of Bursa to Istanbul metropolis, in addition to the highway connection, fast ferry marine transportation, the decision on decentralization of the industry in Istanbul to the regional cities, the cheap land prices in the surrounding areas of Bursa city and other such reasons have accelerated and strengthened the sprawl fact in Bursa city.

Besides the dwelling areas in the city, industry and trade functions also continue to spread on Istanbul-Bursa and other axis. It can be seen that sprawl fact resulted with increase on Bursa urban population, threaten the sustainability of natural sources, increase the infrastructure-public services, time and cost of transportation to the downtown.

Bursa which became neighborhood of Istanbul under this context should follow sustainable urban development policies. Negative effects of urban development formed depending on the location selection decisions of the urban functions should be tried to be minimized.

The highway planned to be constructed between Istanbul and Bursa shall increase the pressure on Bursa. As a result of this in order to have the region turned into a orderly settlement area the requirements of planned construction should be met first, the constructions that are illegal or damaging natural or historical structure should be avoided, developments should be considered under the frame of the regional plan and the local administrations should be strengthened. First of all in order to have the developments of the personnel required for the planning and management staff in the desired direction they should be equipped with the required qualifications.

Communication distance and time will decrease between Bursa- İstanbul, İzmir and Ankara, within the context of the railway and highway transportation project that will be realised. But these investments will affect in the negative meaning Bursa city macroform and Bursa grassy plain. Bursa's strategic importance will increase and will be more alluring place for industry, in the center of Ankara, Istanbul and İzmir triangle. Migration-based population escalation will happen in paralel to this. High-speed train project that will be realised on Balıkesir (Bandırma) and Bilecik (Osmaneli) will increase Bursa's lineer urban sprawl on east-west line. Highway Project will raise sprawl pressure on southwest and north axes of the city. Existing and prognosis residential should be evaluated in the concept of industrial areas.

The regional plan should be changed with priority on the basis of the motorway construction. It should be taken into account that there shall be great changes on the environment arrangement plan and Bursa province settlement plan. Today, by considering the transportation costs of the industrial regions stuck in Istanbul - Gebze - Kocaeli and the dwellings around them it is expected that location changes shall occur with the new highway system. Some part of the growing population in Istanbul shall develop around the highway and sprawling should be regulated with the new settlement and transportation plans.

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