SUSTAINABLE TRANSPORT IN CITY-REGIONS: THE CASE OF IZMIR CITY REGION

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ABSTRACT

SUSTAINABLE TRANSPORT IN CITY-REGIONS:
THE CASE OF IZMIR CITY REGION

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While the vast literature on sustainable transport emphasizes certain urban development patterns as those that should be encouraged in urban planning, it is a fact that there is an increasing tendency in many urban areas in the world towards becoming a city-region. However, whether these city-region development patterns can help attain a more sustainable urban growth and transport system is a relatively less studied area in the field of sustainable transport. In general terms, the study aims to bring together these two important fields of research in the planning literature: sustainable transport and city-regions, with a view to analyze whether they can co-exist, whether their policies comply with, and complement each other, eventually whether it is possible to attain transport sustainability in city-regions.

Regarding this aim, three aspects are identified as 'threats' for the attainment of sustainable transport and land-use development in city-regions: 1.Increase in need to travel and car dependency due to increase in interactions and longer distances in city-regions, 2. Economic objectives for city-regions conflicting with objectives of sustainable transport, and 3. Difficulty in ensuring policy coordination for an integrated approach to sustainability due to fragmentation of governments. Two most effective ways of achieving sustainable transport, land-use planning policies and

policies for improving public transport and non-motorized transport, are chosen as the main policy approaches to be analyzed. Through the analysis of planning experience in a selected case study area, the Izmir City Region, the study intends to find out whether these issues are real threats for attaining sustainable transport in city regions and whether they can be overcome.

Keywords: Sustainability, Sustainable Transport, City-Regions, Izmir

ÖZ

KENT-BÖLGELERDE SÜRDÜRÜLEBİLİR ULAŞIM: İZMİR KENT BÖLGESİ ÖRNEĞİ

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Sürdürülebilir ulaşım ve sürdürülebilir kentsel gelişme modelleri üzerine oluşmuş olan geniş yazın, kentsel planlamada desteklenmesi gereken belli kentsel gelişim modelleri üzerine vurgu yaparken; dünyada birçok kentsel mekânda kent-bölgeleşmeye doğru artan bir eğilim olduğu da bir gerçektir. Öte yandan, bu kent-bölge gelişim modellerinin, daha sürdürülebilir bir kentsel gelişim ve ulaşım sistemini elde etmeye yardımcı olup olamadığı konusu, sürdürülebilir ulaşım alanında üzerinde daha az çalışılmış bir konudur. Genel anlamda, bu çalışma, planlama literatüründeki bu iki önemli araştırma alanı olarak sürdürülebilir ulaşım ve kent-bölge yazınını bir araya getirmeyi hedeflemektedir. Çalışma kapsamında, kent-bölgelerde ulaşımda sürdürülebilirliğin sağlanıp sağlanamayacağı; kent-bölge gelişme stratejileri ile sürdürülebilir ulaşım stratejilerinin birbirleriyle uyumlu ve tamamlayıcı nitelikte olup olamayacağı konularının araştırılması amaçlanmıştır.

Bu amaç doğrultusunda, kent-bölgelerde sürdürülebilir ulaşımın sağlanmasına karşı tehdit oluşturabilecek üç konu belirlenmiştir: 1. Kent-bölgelerde artan mesafeler ve etkileşimler sonucu seyahat ihtiyacındaki artış, araba bağımlılığı ve trafik yoğunluğu, 2. Kent-bölgeler için öncelikli hedeflerin, sürdürülebilir ulaşımın elde edilebilmesi için gereken hedeflerle çelişme olasılığı, ve 3. Kent-bölgelerdeki çok

parçalı yönetim yapısının sürdürülebilirliği bütünleşik bir yaklaşımla ele almak için gereken politika koordinasyonunu olumsuz etkileme olasılığı. Ulaşımda sürdürülebilirliğin sağlanmasında en etkili iki yöntem olan, arazi kullanım planlaması politikaları ve toplu taşım ile motorsuz taşıtların geliştirilmesi için üretilen politikalar incelenecek temel yaklaşımlar olarak belirlenmiş; İzmir Kentsel Bölgesi olarak seçilen örnek alanda yapılan inceleme ve çözümlemelerle çalışma kapsamında kent-bölgelerde sürdürülebilir ulaşımın sağlanmasını olumsuz etkileyebileceği savlanan bu tehtitlerin gerçekten var olup olmadıkları ve bunların üstesinden gelinip gelinemeyeceği araştırılmıştır.

Anahtar Kelimeler: Sürdürülebilirlik, Sürdürülebilir Ulaşım, Kent-Bölgeler, İzmir

To My Family;

Ahmet Nuri, Selma and Ipek Nal

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In-depth interviews have been made as a part of the case study of this thesis with experts from the planning and transport departments of the municipalities in Izmir, Aydın and Manisa. Therefore, I would like to express my thanks to all interviewed persons as an important part of the qualitative information was gained by the participative efforts of these local actors.

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ADU	:	Adnan Menderes University
AMAP	:	Aydın Municipality Action Plan (2006)
AMAPSR	:	Aydın Municipality Action Plan Summary Report (2006)
AMSP	:	Aydın Municipality Strategic Plan (2006–2010)
MMSP	:	Manisa Municipality Strategic Plan (2006–2010)
AYKOME	:	IzGM Infrastructure Coordination Center
CSIRO	:	Commonwealth Scientific and Industrial Research Organisation
DPT	:	State Planning Organisation
EBSO	:	Aegean Region Chamber of Industry
ECMT	:	European Conference of Ministers of Transport
EFTE	:	European Federation for Transport and Environment
ESHOT	:	General Directorate of Electric, Water, Coal Gas and Public Transport
ICRMDP	:	1 / 25000 Scaled Izmir City Region Master Development Plan Report (2006)
IGES	:	Institute for Global Environmental Strategies
ITMP	:	Izmir Transport Master Plan
IzGM	:	Izmir Greater Municipality
IZTO	:	Izmir Chamber of Commerce
IZDENIZ	:	Izmir Sea Transport Industry, Shipping, Tourism and Trade Joint Stock Company
IZULAS	:	Izmir Public Transport Joint Stock Company
IUCN	:	International Union for Conservation of Nature
KGM	:	General Directorate of Highways
MMSP	:	Manisa Municipality Strategic Plan
MoEF	:	Ministry of Environment and Forestry (Republic of Turkey)
MOSB	:	Manisa Organized Industrial Zone
NLGN	:	New Local Government Network

OECD	:	Organization for Economic Cooperation and Development
TISK	:	Turkish Confederation of Employer Associations
TUIK	:	Turkish Statistical Institute
TUSIAD	:	The Turkish Association of Industrialists and Businessmen
UCTC	:	University of California Transportation Center
UKOME	:	IzGM Transport Coordination Center
URMDP	:	Urla Revision of Master Development Plan
WHO	:	World Health Organization

CHAPTER 1

INTRODUCTION

There is a vast literature on sustainable transport emphasizing certain urban development patterns as those that should be encouraged in urban planning. These arguments for sustainable urban form and sustainable transport have a significant impact on planning of cities and regions. While policies for sustainable urban development patterns feature in both the planning literature and planning agenda, there is also another trend affecting urban development patterns: it is the tendency in many urban areas in the world towards becoming a city-region. However, whether these city-region development patterns can help attain a more sustainable urban growth and transport system is a relatively less studied area in the field of sustainable transport. In general terms, the study aims to bring together these two important fields of research in the planning literature: sustainable transport and city-regions, with a view to analyze whether they can co-exist, whether their policies comply with, and complement each other, eventually whether it is possible to attain transport sustainability in city-regions. It can also be stated that the primary aim of the thesis is to examine whether the current city-region development tendencies impose threats for realizing a sustainable transport system, in terms of spatial organization, planning approaches, and policy-coordination.

Regarding this aim, three aspects are identified in this study as 'threats' for the attainment of sustainable transport and land-use development in city-regions: increase in the need to travel and car dependency due to increase in interactions and longer distances in city-regions; economic development objectives for city-regions challenging the attainment of sustainable transport objectives; and difficulty in ensuring policy coordination for an integrated approach to sustainability due to fragmentation of governments. Through the analysis of planning experience in a selected case study area, the Izmir City Region, the study intends to find out whether

these issues are real threats for attaining sustainable transport in city regions and whether they can be overcome.

With respect to the three main focus areas of the thesis, the **hypothesis** of this study can be stated in three parts:

"There may be very real challenges for city-regions to become sustainable in transportation terms due to three main reasons:

- Firstly, the city-region system brings with itself a large urban and regional system of settlements that have increased interaction between each other, possibly resulting in an increased need to travel, longer distances, and hence increased car dependency; all of which contrast with the objectives of sustainable transport.

- Secondly, polycentric macro form of city-regions, which refers to the growth of settlements with interactions, necessitates giving much more importance to sustainable development and transport in land-use & transport planning approaches. However, economic concerns, which mostly favour the improvement of interaction between the modes and hence increased mobility (resulting in more traffic), are more likely to be considered as priority objectives for city-regions as opposed to objectives of sustainable transport that aim at reducing traffic through reducing the need to travel. Therefore, the emphasis on sustainable transport and '*reducing the need to travel*' may not receive adequate emphasis in city-regions.

- Thirdly, city-regions, by nature, involve a high number of local authorities and participants in decision-making, resulting in a fragmentation of governments, and this can potentially make it significantly harder to attain policy coordination for an integrated approach to sustainability".

In the thesis, three **main research questions** are tried to be answered based on the hypothesis:

1. Are the traffic values of the selected city-region showing a sustainable or an unsustainable growth pattern in terms of transport in time? (To what extent such unsustainable traffic growth can be explained with city-region development, and to what extent can such growth be seen as a result of the normal traffic growth due to increase in car ownership and usage)

2. Is there an awareness of the significance of sustainable urban development and transport (particularly in environmental terms) in the selected city-region's and its settlements' land-use and transport planning approaches?

3. Is there a policy-coordination among different planning authorities for ensuring sustainability and effective implementation of policies in the selected city-region?

In order to attain the main aim and to answer the main research questions, some objectives and further research questions are identified. Besides, Izmir City Region is selected as the case study in this thesis because, this city-region has been analyzed and examined by many academic studies (Eraydın 2005, METU 2005, METU 2006) before, and those studies have already defined that Izmir, with its surrounding settlements, have been constituting a city-region in many aspects. Hence, in this thesis, without the need for studying the process about how and whether this region has become a city-region, it is mainly intended to concentrate on the effects of this process and its implications for sustainability in transport.

- **First objective** is to assess the results of the analysis done with the traffic data of the selected city-region in order to see whether there is a tendency towards an unsustainable traffic pattern in the city-region.

- **Second objective** is to evaluate the awareness of sustainability in the selected city-region and its settlements.

- **Third objective** is to assess the policy-coordination among different participants in the selected city-region's planning process.

In the thesis, in-depth analysis of a single case study, Izmir City Region is the main method of analysis. To attain the first objective listed above, and to answer its research questions, an analysis is carried out on the transport system and traffic growth in Izmir City Region. In order to attain the second and third objectives, an in-depth examination is made on the plans, plan reports, etc. and a semi-structured interview is formulated. The interview questions are determined according to thesis hypothesis with its main research questions and the objectives. It was carried out with experts from the planning and transport departments of the municipalities of nine selected settlements within the Izmir city-region.

The study is composed of three main parts. First part (Chapters 2, 3, 4) draws a "theoretical framework" on sustainable development, sustainable transport and the two most effective ways of achieving sustainable transport: *land-use planning policies* and *policies for improving public transport and non-motorized transport.* Second part (Chapter 5) of the study draws a "theoretical framework" on city-regions developments and provides a discussion on the spatial and administrative structures of city-regions in the context of sustainable transport using observations from some world case studies. Then after a chapter on the methodology of the study, the third part (Chapters 7, 8, 9) introduces the research on Izmir City-Region case and presents the evaluation of Izmir within the context of three objectives of the study associated with the defined hypothesis. The contents of each of the chapters are presented below:

In **Chapter 2**, with a literature review, sustainable development and sustainable transport are explained in detail as one of the two main focus areas of the thesis. After some definitions on sustainable development and sustainable transport, main principles of sustainable transport are determined and regarding these, the main policies and strategies for achieving sustainable transport are stated. Lastly, the main barriers that hinder the attainment of sustainable transport goals are expressed.

In **Chapter 3,** land-use planning policies and tools for achieving sustainable transport are discussed. In this chapter, firstly, for making an introduction to the related issue, land-use planning strategies are expressed in general. Then these land-use planning strategies are classified into two parts as *macro and micro* scale

policies. The section about the macro-scale policies points out to the urban planning approaches that promote sustainable urban form models: *compact, corridor and multi-centered urban forms*. Besides, the section about the micro-scale urban design approaches displays the land-use planning measures at strategic, local and neighbourhood levels such as density, land-use mix, locality, clustering, etc.

Chapter 4 is based on the environment-friendly transport issue that is directly related with making transport sustainable. This chapter presents the increasing importance of green modes (walking, bicycle, public transport modes) and the rising awareness about the importance of integration of land-use and transport planning policies.

In **Chapter 5,** the recent urban development trend, city-regions as the other main focus area of the thesis is discussed. In the city-region chapter, while expressing the historical background of city-regions; some definitions, its changing meaning and scale, and the new regionalism are described. Then, after defining the administrative structure of city-regions, their polycentric structure in spatial terms are discussed. In this chapter, parallel to the aim of the thesis, a discussion is made on the spatial and administrative structures of city-regions in the context of sustainable transport. Besides, three mega-city region case studies, which try to achieve sustainability objectives, are discussed and their main challenges are presented.

Chapter 6 introduces the theoretical framework and the methodology of the study which has been developed based on the literature review. The hypothesis, aims and objectives, the questions related to the objectives, and research method, covering case study selection and method of analysis and data collection, are presented.

In Chapter 7, the transport network in Izmir City Region is evaluated within the context of the first objective of the research. The results of the analysis on the traffic data of the selected city-region are discussed in order to see whether there is a tendency towards an unsustainable growth pattern in the city-region.

Chapter 8 presents the evaluation of the transport and land-use planning approaches in Izmir City Region with respect to the second objective of the research. In this

section, it is assessed whether there are environmental sustainability objectives and a significant awareness of the issue, surpassing economic objectives. For assessing the awareness; the thoughts, views and attitudes of decision-making authorities for transport and land-use planning in the related municipality in Izmir City Region are discussed based on mainly urban andr transport plans (when available) and then interviews.

Chapter 9 evaluates the policy coordination in Izmir City Region with respect to the third objective of the research. It is assessed whether there is a fragmentation of governments, which may act as an important barrier for attaining policy coordination between different settlements that form the city-region and between land-use planning and transport planning authorities. The analysis is carried out based on mainly the interviews and then to a lesser extent plans.

Chapter 10 summarizes the main findings of the study and reveals whether the three parts of the hypothesis are verified or falsified based on the analysis of the case study, Izmir City Region.

CHAPTER 2

TRANSPORTATION AND SUSTAINABLE DEVELOPMENT

2.1. Sustainable Development

'Sustainable development' has become a universally acknowledged term to promote environmental perspectives in spatial and economic changes and to show the need for fair human behavior to preserve the desirable qualities of the physical environment (de Roo & Miller 2000, 2). Sustainable development is about the capacity of human society to legalize permanent reforms for maintaining the delicate balance between humans and their natural life support systems (Pinderhughes 2004 cited in Buxton, M. & Jackson, J., 2004, 2).

The notion of sustainable development was introduced by the 'International Union for the Conservation of Nature and Natural Resources' (IUCN) publication, World Conservation Strategy in 1980[1]. However, the concept of sustainability became broadly popular in 1987 after the United Nation's (UN) 'World Commission on Environment and Development' (WCED; the Brundtland Commission) published its report, *Our Common Future* (WCED, 1987 cited in de Roo & Miller 2000, 2; OECD 1996, 10). The term, 'sustainable development' was given the status of a global mission and put on the agenda by the UN Conference in 1992 (OECD 1996, 10; McNeill 2000, 10).

In 1992, World leaders met at the 'UN Conference on Environment and Development' (UNCED), known as the Rio Summit, and then again at New York in 1997. There was a common agenda about the environmental damage, which was

[1] *"IUCN, the International Union for the Conservation of Nature and Natural Resources, has been using the name "World Conservation Union" since 1990, but the full name and the acronym are often used together"* (Official Website of IUCN: http://www.iucn.org/en/about/, Last accessed date: February 20, 2007).

caused by economic development, risking the well-being, and probably the survival, of present and future generations. The conclusion was a large set of declarations that was called Agenda 21. Agenda 21's aim was to develop the environmental sustainability of economic development, adopting the mostly agreed definition of sustainable development introduced by the 'Brundtland Report' (McNeill 2000, 10; Ravetz 2000, 6). The Brundtland Commission's definition is as follows:

Sustainable development is *"the development that meets the needs of the present without compromising the ability of future generations to meet their own needs"* (Brundtland Commission 1987).

However, WCED defines sustainable development in a more detailed way. It is identified as a process of diversity in which exploitation of resources, the direction of investments, the assumptions of technological development, and institutional change are all in *harmony and balance* in order to enhance both current and future potential to meet human needs (Akinyemi and Zuidgeest 2000, 31-32).

According to 'Organization for Economic Cooperation and Development' (OECD 1996), the Commission noted that its definition included two key concepts:

- *Needs:* meaning *" in particular the essential needs of the world's poor,"* and
- *Limitations:* meaning *"limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs"* (OECD 1996, 10).

Brundtland Commission's definition was not only about sustainability in the various meanings of the term, but also about *equity*. This is the equity among present inhabitants of the planet and equity among generations. For Brundtland Commission, sustainable development had ***environmental, social, and economic*** aspects. These three disciplines, which can also be argued as ecology, sociology and economics, are at the center of sustainable development studies (McNeill 2000, 15). Today, sustainable development is generally displayed schematically with using three circles for each dimension of it; environment, economy, and society (See Figure 2.1).

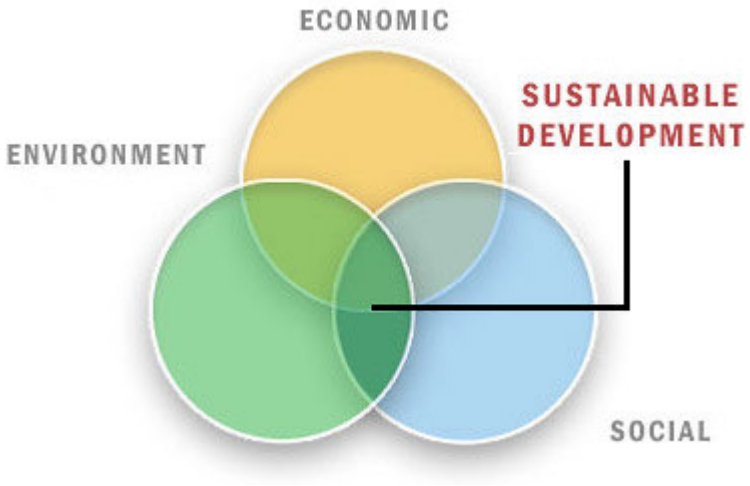


Figure 2.1 Three Dimensional Model
(Source: Federal Office for Spatial Development – ARE 2005)

These three dimensions of sustainable development are described in detail with some clauses by Federal Office for Spatial Development – ARE (2005). **First,** economic, social, and environmental processes are interconnected, so public and private agents cannot be let to behave one-dimensionally and in isolation; but their actions must consider the interaction between the three dimensions of environment, economy, and society. **Secondly,** sustainable development is more than environmental conservation and in order to satisfy the material and immaterial needs of people; economic prosperity and solidarity is required in the society. **Thirdly,** the proposals for the future of today's actions must be prepared in the intergenerational aspect for future generations to be able to satisfy their needs. **Fourthly,** sustainable development requires long-term structural change in economic and social systems. Because it aims to reduce consumption of the environment and resources to an endlessly affordable level and at the same time to sustain economic output potential and social cohesion. **Finally,** global interdependencies must also be thought. Sustainable development aims to manage a long-term improvement in the quality of life of the people that are living in severe poverty and inhuman conditions.

McNeill (2000, 15-16) examines these three dimensions of sustainable development

by distinguishing between the three competing or complementary sets of objectives. These are shown in the Figure 2.2.

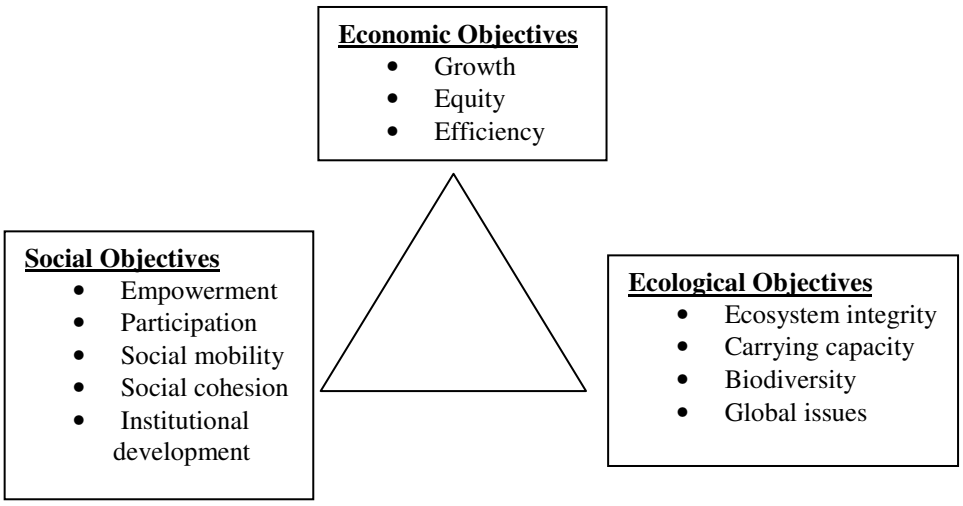


Figure 2.2 Objectives of Environmentally Sustainable Development
(Source: Serageldin and Steer 1994 cited in McNeill 2000, 16)

McNeill (2000, 16-17) defines sustainable development as the development that is environmentally sustainable, economically sustainable and socially / culturally sustainable. Sustainable development contains more than environmental conservation; it covers the need for equity (Burton 2000, 1970). Although each of the three should be conceptually seperable, and identified by name; in ideal, the goal is an integrated total that considers all three different perspectives and objectives (McNeill 2000, 17).

Analysis of many definitions shows that sustainable development consists of two main concepts; sustainability and development. Besides, the main idea is to adapt these two concepts in human activities. However, the analysis also shows that focus lies mostly on sustainability and its environmental aspect. For instance, Herman Daly (1991) defines a sustainable society as satisfying three basic conditions, i.e.:

- *"Its rates of use of renewable resources do not exceed their rates of regeneration;*

- *Its rates of use of non-renewable resources do not exceed the rate at which sustainable renewable substitutes are developed; and*
- *Its rates of pollution emission do not exceed the assimilative capacity of the environment"* (Daly 1991 cited in OECD 1996, 11; Akinyemi and Zuidgeest 2000, 32).

Therefore, Daly (1991) interprets sustainability in terms of keeping the natural environment in a good condition while sustainability is explained in theory in terms of three building blocks; environmental conditions, economic conditions, and social and political conditions. The environmental aspect somehow dominates the discussions in this field. This also seems to be the case in transport field, where the studies and policy documents focus mostly on the need to develop transport infrastructure and mobility and at the same time the need to protect the environment.

2.2. Sustainable Transportation

2.2.1. Transportation and Environment

Transportation is one of the basic sectors in the economy that affects both development and environmental conditions. The transportation system, as a whole, influences the economy, regional development, and consumption or production patterns. Regarding these impacts, it is a major consumer of resources (energy, land) and has potentially harmful effects such as causing urban sprawl and environmental pollution (Plaut and Shmueli 2000, 40). Therefore, as Cervero (2000, 1) emphasizes, the transport sector must be judged based on sustainability – "*maintaining or improving, as opposed to harming, the natural environment"*, as transportation has many costs from an environmental point of view.

At the local level, such costs contains noise, congestion, air pollution (CO2, CO, NOX, etc.), and traffic accidents (Plaut and Shmueli 2000, 40) and these costs make the 'sustainability' issue become more important for environmental protection at the local level. In addition, there is a common view that in the long term, 'sustainability' is more a global than local matter (OECD 1996, 23). For example,

rising concern about climate change and acid rain are also related to transportation pollution (Plaut and Shmueli 2000, 40) and sustainability is seen as a solution to these global problems. When an environmental impact is beyond the carrying capacity of the planet then the life is threatened. On the other hand, when it is beyond the carrying capacity of one area then that area may become uninhabitable, but life can most likely go on elsewhere (OECD 1996, 23).

Sustainability is now a comprehensive word to state the need for a long-term point of view where there is reduced demand on environmental resources. Besides, it also states the necessity to make changes in the attitudes of human beings that are economically and socially beneficial (Newman and Kenworthy 2000, 109). There is a consensus that the existing development pattern of transportation is not desirable. For example, the rate of the world's motor vehicle fleet growth, in the developed and in the developing world, is said to be threatening the social and economic well-being. Hence, quality of life, levels of basic freedom, health, education, access to resources, etc. can be said to be in danger (Akinyemi and Zuidgeest 2000, 31).

Newman and Kenworthy (2000, 15) emphasizes that cities show varying degrees of **automobile dependency** and (2000, 109) cities cannot be considered sustainable if they are automobile dependent. *"Automobile dependence exists where urban form and transport options are such that choices are limited to car use"* (Newman and Kenworthy 2000, 109).

The car dependency is related with many *environmental, economic,* and *social problems,* which are shown in Table 2.1. In fact, the most leading issue can be thought as how car dependency leads to heavy use of oil. As transport energy use is related with most of the other problems outlined in Table 2.1, it is mostly used as the key indicator of car dependency (Newman and Kenworthy 2000, 109).

When Table 2.1 is examined, it is seen that increasing usage of the car results in car-dependent life-styles and car-oriented urban development that create serious consequences in *environmental, economic, and social terms*. In other words, these environmental, economic, and social problems create a transport pattern that cannot be sustainable. As also Plaut and Shmueli (2000, 40) mention, all these issues have

motivated the rising interest in 'sustainable transport (or mobility)' as an essential element of 'sustainable development'.

Table 2.1 The Problems of Car Dependence

Environmental	Economic	Social
Oil vulnerability	External costs from accidents and pollution	Loss of street life
Photochemical smog	Congestion costs, despite endless road building	Loss of community
Toxic emissions such as lead and benzene	High infrastructure costs in new sprawling suburbs	Loss of public safety
High greenhouse gas contributions	Loss of productive rural land	Isolation in remote suburbs
Greater storm-water problems from extra hard surfaces	Loss of urban land to bitumen	Access problems for carless and those with disabilities
Traffic problems such as noise and severance	Petrol dependence	Urban sprawl
Urban sprawl	Urban sprawl	

(Source: Newman and Kenworthy cited in Williams *et. al.* 2000, 109)

2.2.2. Transport and Sustainable Urban Development

The city, as the living space of people, ensures high levels of access to services and facilities. While the city supports proximity and social interactions, it also allows the provision of a range of public transport. Nevertheless, there is a tendency in both Europe and the United States for people to move out of the cities; from the city centre to the suburbs and from the suburbs to the countryside; because, the city is seen by many as an unfriendly, dirty, dangerous and unsafe environment for living. On the other hand, the city has all the potential to supply a high-quality life with a friendly, clean, and safe environment. Therefore, *"The underlying rationale for the **sustainable city** must be to recreate the liveable city"* (Banister 2000, 115).

The rise in the numbers of vehicles, the development of more complex travel patterns, which are based on the car, has been seen as one of the major constraints to the achievement of sustainable urban development (EFTE 1994, Banister 1997 cited

in Banister 2000, 115). The 'use of fossil fuels' is usually considered as the indicator of unsustainability of transportation, because both consumption of a non-renewable resource and the pollution is caused by burning of fossil fuels. However, there are further negative effects of transportation that make it unsustainable or at least contribute to unsustainability (OECD 1996, 26). There are **key issues** to be addressed if transport assimilates the principles of sustainable urban development, originally giving referance to the list of EFTE (1994) and Banister (1997) in Banister (2000, 115).

Congestion in many urban areas has been rising in its duration and intensity, (EFTE 1994 cited n Banister 2000, 116) and the seriousness of congestion increases with city size (Dasgupta 1993 cited in Banister 2000, 116). Congestion takes the time available for other activities (OECD 1996, 29). In fact, it frequently results from a failure to **integrate land-use and transport planning** (ECMT 2000, 18).

Resource depletion is another feature of sustainability issue and currently transportation is unsustainable in terms of resource use. The world's transportation systems are almost completely fuelled by oil, which means more than 99 per cent of transport energy use in 1990 (OECD 1996, 16).

Increasing air pollution affects health, ecology, and reduces the quality of urban life (Banister 2000, 116). As many authors (Banister 2000, OECD 1996, ECMT 2000, Newman & Kenworthy) emphasize, transportation is one of the most important causes of air pollution. The major global impact of transportation results from *release of carbon dioxide* into the atmosphere, an almost inevitable consequence of the burning of fossil fuels (OECD 1996, 20). Therefore, air quality is deteriorating in many cities, with rapid growth in the car stocks through the addition of used and new vehicles with poor environmental performance (ECMT 2000, 9).

Traffic noise affects all city life (Banister 2000, 116) and transport has been defined as the main cause of environmental noise. For example, In Europe, transport noise is often felt as a more important issue than transport-related air pollution (OECD 1996, 28). Noise frequently ranks top of the environmental issues of concern in household surveys (ECMT 2000, 8).

Road safety is a major concern in cities and elsewhere (Banister 2000, 116) and death and injury from accidents are the most important issue in making transport systems more sustainable (ECMT 2000, 7).

Degradation of urban landscapes through the construction of new roads and transport facilities, the destruction of historic buildings and reductions in open space is another concern. Transport contributes to the decaying urban pattern and neglect of central city areas, as well as urban sprawl (ECMT 2000, 8; Ewing 1997 cited in Banister 2000, 116).

Use of space by traffic makes the movement of the motorist easy, but reduces the accessibility of others as transport routes become barriers, as parked vehicles form obstacles for pedestrians, cyclists and those with disabilities. *"Car dependency results in traffic domination in urban areas"* (Banister 2000, 116). Car ownership inevitably requires urban land consumption even when the car is not moving, thus reducing the opportunities for other land uses (Petersen 2002, 10).

Decentralization of cities has been facilitated by the car in combination with efficient public transport and this has resulted in a significant growth in trip lengths and the development of travel patterns that are dispersed rather than concentrated on the city centre. This in turn increases car dependence and reduces the possibilities of encouraging efficient public transport (Banister 2000, 116). This is called **urban sprawl**, which is mostly associated with low-density development of land that in turn is associated with high rates of automobile ownership and use (OECD 1996, 27).

Development pressures have taken place around car accessible locations that are not accessible to all people (including the edge city developments) and the spatial segregation of activities in urban areas again increases trip lengths and has strong distributional consequences (Banister 2000, 116).

Globalization and the relocation of industry (including the information economy) have resulted in new patterns of distribution. The transport intensity of freight has increased globally, regionally and locally (Banister 2000, 116).

As a result, land-use and transport solutions are required to promote the most efficient use of urban space that will reduce the amount of additional land which can be allocated to development (Banister 2000, 116) and that will increase the use of environment friendly transport modes which can reduce pollution, noise, congestion, etc. if the aim is to achieve a sustainable transport system.

2.2.3. Sustainable Transportation

In 1992, at the UNCED, national governments encouraged Agenda 21, which expresses that the various sectors of human activity should develop the expression of sustainable manner. Therefore, transport sector of several countries were also to develop a sustainable attribute. Referring to this, OECD (1996, 11) stated that *"**Sustainable transportation** is the expression of sustainable development within the transportation sector"*.

Transport sustainability, as it is defined in the sustainable development phenomena, is considered to be based on principles of 'environment-led', 'polluter should pay', and 'equity'. In particular, it stresses the use of regulation, market mechanisms and incentives in order to guarantee the payments of all social and environmental costs of transport decisions by the users. In this way, while trying to develop modes of transportation that are more environmentally friendly, sustainable transport idea accelerates technological developments in this direction, e.g., electric vehicles and alternative fuels (Plaut and Shmueli 2000, 41).

Plaut and Shmueli (2000, 41) states that the literature debates over sustainable transport are generally segregated from more general discussions of 'sustainable development'. Discussions of sustainable mobility[2] or transport mainly focus on *externalities*, (mostly air pollution and congestion), on energy consumption, and on the methods (regulation, market mechanisms, and land-use planning approaches) that can correct them.

[2] **Sustainable mobility** is a synonym used by the European Commission (OECD 1996, 11).

Plaut and Shmueli (2000, 41) also express that the proposals for **Transport Demand Management** (TDM) are often an integral part of the the literature debates. Öncü (2007, 11) defines TDM as a gathering of several strategies to influence demand with policies such as improving telecommunications, planning job locations at a walking distance of inhabitants, etc. and to ensure shifting from private cars to environment-friendly modes. TDM has three main objectives;

- **to reduce motorized travel demand for private cars,**
- **to promote use of public transport modes and non-motorized travel modes (walking, bicycle)**
- **to encourage investment and usage of less polluting transport modes** (Plaut and Shmueli 2000, 41; Öncü 2007, 11)

Referring to these objectives, Tranter and Lonergan (2000, 5-6) express that bringing about a **reduction in motor vehicle traffic** will

- reduce energy use and pollution (especially carbon dioxide levels),
- address the other relevant topics about sustainability in an effective way
- assist bringing economic gains at both the city centre level as well as national level
- promote healthy neighbourhoods, and
- distribute the benefits of transport more fairly among children, the elderly, the poor and the disabled.

Encouraging expanded use of telecommunication is also regarded as a component of ensuring sustainable transport (Banister & Button, 1993; Black, 1996; Davis, 1996; Plaut, 1999 cited in Plaut and Shmueli 2000, 41). In addition, there is an increasing emphasis on **land use planning,** as one of the most effective elements to influence transport demand and travel behaviour. It is discovered that the more intensive urban land use enables shorter travel distances and greater use of public transit (Newman & Kenworthy, 1991 cited in Plaut and Shmueli 2000, 41).

As a result, the term 'sustainable transportation development' is a combination of sustainable development and transportation and as a concept; it refers to the

implementation of the sustainable development idea to transportation systems (Akinyemi and Zuidgeest 2000, 31).

2.2.4. Definitions of Sustainable Transport

The most common definitions of sustainable transportation are made by international organizations, such as the United Nations Centre for Human Settlements (Habitat), and the World Bank. These describe a sustainable transportation system as the one which ensures that

- **transportation-related pollution levels** are kept at levels lower than those that people can safely tolerate and the environment's capacity can carry;
- **financial expenditures** for operation and maintenance are not higher than what the users can pay; and
- **each member of society** is supported to achieve basic social, cultural, educational and economic objectives (Akinyemi and Zuidgeest 2000, 32).

This definition can be summarized as, *"a sustainably developed transportation system, is a system that meets the people's needs, with the available or affordable environmental, financial and social resources"* (Akinyemi and Zuidgeest 2000, 31)

Besides, World Bank identified the three main types of sustainability of a transportation system as:

- **economic and financial sustainability**, that creates incentives for efficient response to needs with involving the efficient use of resources and suitable maintenance of assets;
- **environmental and ecological sustainability,** that promotes more liveable settlements and reduce adverse external effects with involving acceptable levels of environmental effects; and
- **social sustainability** focuses on the reduction of poverty with involving equity issues.

In order to be effective, transportation policy must satisfy these three requirements (Akinyemi and Zuidgeest 2000, 32 and OECD 1996, 12).

According to this type of classification, environmentally sustainable transportation (EST) is defined as; *"… transportation that does not endanger public health or ecosystems and that meets the needs for access consistent with;*

a. *use of renewable resources that are below their rates of regeneration,*
b. *use of non-renewable resources below the rates of development of renewable substitutes and*
c. *the rates of pollution that do not exceed the assimilative capacity of the environment "* (Green & Wegener, 1997 cited in Tranter and Lonergan 2000, 5 and OECD 1996, 11-12).

As well as the physical environment, the economic and social environment is asignificant component of sustainable transport. A transport system cannot be seen as sustainable if it has high levels of injury-producing accidents, if its regular usage generates greater demand for more infrastructural developments, or if there are huge inequalities in the access to transport. Equity among generations, nations, and individuals is also usually considered as an integral part of sustainability (Green & Wegener, 1997, 178 cited in Tranter and Lonergan 2000, 5).

Another aspect of sustainable transport is about its capability and capacity to survive, and adapt to changes in the future. Deen and Skinner (1994) state that a sustainable transport system is the one that can accommodate expected population changes, growth in economic activities and meet the changes in resource availability with considering environmental standards (Deen and Skinner 1994 cited in Akinyemi and Zuidgeest 2000, 33).

Finally, all of these definitions refer to sustainable transport systems that ensure a basic condition to meet the society's and the economy's mobility needs. They also refer to social equity elements of sustainability, meaning that transport systems should be affordable, accessible, and safe. Besides, all the definitions share references to environmental impacts, both in terms of operating within carrying

capacities and avoiding pollution of natural resources. The topics related to equity claims that road users and urban residents are affected from harmful effects of the pollutants and that *highway planning* can have an impact on levels of pollutants. This is both a health and equity issue for drivers if there are no alternative transport modes other than their cars. In addition, this issue is also related to the situation of cyclists and pedestrians who have little choice other than being exposed to pollutants (Williams 2005, 5, 9).

Some conclusions can be made referring to these definitions. According to Akinyemi and Zuidgeest (2000), there is a need for new interpretations about sustainable development and its application to transportation. The existing interpretations do not adequately describe development process and how sustainability and development objectives can be combined. They also stress that criteria for sustainability are defined in terms of general principles that can be interpreted in various ways. For example, *"there seems to be no consensus on what constitutes the environment and environmental limits in the short and long-term. In addition, what constitutes:*

- *the means to achieve fundamental social, cultural, educational and economic objectives?*
- *minimum danger, air and noise pollution, consumption of distance by passengers? and*
- *maximum social interaction as well as quality of life?"* (Akinyemi and Zuidgeest 2000, 33).

The authors secondly state that the researchers from several parts of the world do not address the real problems of sustainable transportation development exactly. Some of the questions which need to be addressed are:

- *"what, in both qualitative and quantitative terms, defines a sustainable transportation system?*
- *what characterises a developed transportation system and a developing transportation system? and*
- *how can the concepts of sustainability and development be harmonised in the planning and design of a transportation system in an area?"* (Akinyemi

and Zuidgeest 2000, 33).

This study intends to develop a more systematic and clear way of defining and analysing sustainability, by reviewing various definitions, principles, policies and strategies that are put forward for sustainable transport.

2.2.5. Main Principles of Sustainable Transport

Sustainable transportation development is mainly a process of harmonisation of sustainability and transportation development requirements. It is proposed by Akinyemi and Zuidgeest (2000, 33) that a transportation system can only be referred to be sustainably developing if two main criteria are satisfied. First, its performance should be developing towards the performance level needed by the users of the area. Secondly, its resources consumption should be less than the available resources capacity in the area. The key sentence is that;

> *"The challenge now is to find ways of meeting our transportation needs that are environmentally sound, socially equitable, and economically viable"* (OECD 1996, 35).

According to Roberts et al (1992), there are a number of **guiding principles** for sustainability in transportation. The most important ones are:

- **Transportation is a vital element** in economic and social activities but it must be a service tool for them, not bring an end to them;

- **The consumption of distance** by freight and passengers should be minimised as far as possible and at the same time the potential for locally based social interaction and locally based economic activity should be maximised;

- **All transportation needs should be met** with giving least damage to the environment;

- **There should be a consciousness in physical land use planning** that rejects those activities, that will attract a large amount of car-dependent users with their size and importance;

- **All transportation investment plans should consider health** and proposals which are potentially damaging to health should be rejected;

- **All transportation investment plans should have clear objectives** that will cover social, economic and environmental concerns and should be evaluated by an independent and experienced authority;

- **All transportation investments should be monitored** in time in order to see if they have met the defined objectives and if they have damaged the environment;
- **There should be a transportation policy directorate** that is only responsible with transportation issues**.** The responsibilities of the directorate should be implementing specific policies that concentrate on minimising danger, minimise air and noise pollution, maximise social interaction and urban quality of life, etc. (Roberts et al 1992 cited in Akinyemi and Zuidgeest 2000, 32-33).

From another perspective, in the OECD (1996, 35), the nine principles of sustainable transportation is put forward by the Canada's Minister of the Environment which is also a remark of Canada's National Round Table on the Environment and the Economy (NRTEE):

- *"entitlement to access*
- *intra- and inter-generational equity*
- *individual and community responsibility*
- *protection of health and safety*
- *education and public participation*
- *integrated planning*
- *conservation of land and other resources*
- *prevention of pollution, and*

- *economic well-being"*

OECD (1996, 36) summarizes these nine principles by giving the most important points of each principle. **First of all,** for a sustainable transportation, **access** to people, goods, and services should be developed. **Secondly,** while **decision-making** about transportation, people should follow a comprehensive attitude that takes account of all impacts and conclusions of their decisions. **Thirdly,** in **urban planning,** preventing sprawl, planning mixed-used local facilities, renewal of public transport, designing to enable walking and bicycling, conserving ecosystems and cultural heritage, proposing more recreational facilities, and ensuring reasonable movement of goods is extremely important. Williams (2005, 6) gives Joachim Scheiner and Birgit Kasper's investigation as an example. They investigated the impact of different lifestyles on both residential mobility and travel behaviour. They found that, development of mobility has a social aspect and it is related with the fragmentation of society, meaning that people are having more individualistic and pluralist lifestyles. In addition, those lifestyles are getting more and more resistant to *planning regulation* in time. Therefore, for sustainable development, it is required to adopt an approach to spatial planning that integrates mobility behaviour, lifestyles, social and spatial structures. **Fourthly, environmental protection** should be done by minimising emissions and reducing negative effects of transport activities with such policies as reducing noise, promoting use of non-renewable resources, and ensuring adequate capacity that can respond to spills and accidents.

Finally, for economic **viability**, people should internalise all external costs of transport including subsidies. However, people should also respect equity issues, promote suitable research and development considering the economic benefits of transportation. These benefits include increased employment that might result from restructuring transportation and from established partnerships both with developed and developing countries for the purpose of creating and implementing new approaches to sustainable transportation (OECD 1996, 36). Williams (2005, 8) reports a research by Maat and Stead who found that proximity to transport infrastructure does have some effects on employment.

2.2.6. Policies and Strategies of Sustainable Transport

There are many policies and strategies in order to support sustainable transport. For example, the OECD conference in Vancouver, Canada (1996) explored **three visions** of sustainable transportation: *a high-technology vision, a low-activity vision, and the automobile industry vision.* The **high-technology vision** focuses on the concept of the 'hypercar', which is an *"ultralight vehicle"* that is created from advanced composites. Therefore, it is 5-20 times more fuel efficient than present cars, and yet "*safer, sportier, probably cheaper, and more comfortable, durable, and beautiful*". Besides, the high-technology vision has also an imagination of *"cars powered by pollution-free engines, and built with materials that are cheap and recyclable without imposing any burden on the environment"* and an imagination of *"high-speed maglev trains powered by pollution-free electricity"* (Conference paper by Amory Lovins cited in OECD 1996, 37).

Presentation of the **low-activity vision** focuses on the common issue of 'automobile dependency'. In order to actualize the low activity vision, the changes are social rather than technological and are based on the fact that building cities with an assumption of automobile use and growth is *no longer sustainable*. Hence, the changes will involve giving higher priority to improving non-auto infrastructure than auto infrastructure, developing land-use patterns that will minimise the need for travel, and giving more *emphasis on community rather than individual values* and *on urban rather than suburban living conditions*. According to this vision, for achieving sustainable transportation, there will be required reductions in the use of motorised transport. This reduction can be obtained by making the automobile less desirable or less necessary than non-motorised transport (OECD 1996, 37-38).

The **automobile industry vision** supports the importance of private transportation in modern industrialised society, and stresses the capabilities of automobile manufacturers in absorbing new technologies. This vision claims that information technologies will make vehicles more efficient and replace some travel, because the working hours will fall, people will have more leisure time and will not prefer spending time in trains and buses (Conference paper by Achim Diekmann cited in OECD 1996, 38).

A synthesis of these visions of OECD (1996) and those topics mentioned in the previous sections can be combined under 5 main categories as the main strategies to attain sustainable transport:

1. **Promote cleaner fuels:** hybrid-electric propulsion system, biofuel, diesel, etc.
2. **Promote new / environmentally friendly technologies:** electric car, solar car, hypercar, etc.
3. **Promote tele-working, e-shopping, distant learning, etc.**: ICT-Information and Communication Technologies to substitute motorized trips
4. **Promote "green modes":** public transport (mass rapid transit, trams, trolleybuses, light rail transit, bus rapid transit), bicycle, walking
5. **Promote sustainable urban forms** (that are not auto-oriented and automobile dependent): compact form, corridor development, multi-centred cities

This classification of sustainable transport policies is done to develop a systematic way of observing and comparing their effectiveness in terms of solving major 'unsustainable' problems associated with transport. As stated before, Newman and Kenworthy (2000, 109) determined the problems of car dependency according to three dimensions; *economic, social and environmental* that is crucial for sustainable transport (See Table 2.1). A **table** is created in this study referring to these problems and those five policies expressed above to observe which policies are effective in solving the problems of car dependency such as *oil vulnerability, toxic emissions, urban sprawl, petrol dependency, loss of productive rural land, loss of community, external costs from accidents and pollution, etc.* Based on this table, the ***most effective sustainable transport policies*** are tried to be identified in order to form the basis of this study (See Table 2.2).

Table 2.2 Policies For Sustainable Transport and Their Effectiveness In Solving Transport Problems

P R O B L E M S (U n s u s t a i n a b l e transport trends)		***Promoting clean fuels***	***New technologies***	***Promoting ICT***	***Promoting green modes***	***Planning to reduce the need to travel***
ENVIRONMENTAL	Oil vulnerability	+	+	+	+	+
	Photochemical smog	+	+	+	+	+
	Toxic emissions such as lead and benzene	+	+	+	+	+
	High greenhouse gas contributions	+	+	+	+	+
	Traffic problems such as noise & severance			+	+	+
	Urban sprawl				~	+
ECONOMIC	External costs from accidents & pollution		+	+	+	+
	Congestion costs, despite endless road building			+	+	+
	High infrastructure costs in new sprawling suburbs				+ ~ (If rail system is applied)	+
	Loss of productive rural land				+ ~	+
	Loss of urban land to bitumen				+	+
	Petrol dependency		+	+	+	+
	Urban sprawl				~	+
SOCIAL	Loss of street life				+	+
	Loss of community				+	+
	Loss of public safety				+	+
	Isolation in remote suburbs			+	~	+
	Access problems for carless and those with disabilities			+	+	+
	Urban sprawl				~	+

Note: **~ :** indicates that the relevant policy can be effective if supported with urban planning.
+ : indicates that the relevant policy can be effective in solving the problem.

When **Table 2.2** is examined, it can be seen that '*planning to reduce the need to travel'* policy has the highest potential to solve the problems associated with unsustainable transport. In addition, '*promoting green modes'* policy also has the potential to solve a majority of the transport problems compared to the other policies. However, in green modes policy, if the transportation is based on a rail system, then the accessibility increases, the distances lengthen, and therefore this new rail system can in time contribute to urban sprawl ***if it is not supported by planning.*** Therefore, policy that emphasizes the importance of land-use planning and policy that emphasizes the importance of green modes in transport planning are identified to be the most effective policies, particularly in urban context, and they are decided to be the focus of the thesis. Hence, the use of land-use and public with non-motorized transport strategies to manage sustainable transport and the **integration** of land-use and transport are the **Focal points** in this study. Before reviewing these focus areas in further detail, however, it is important to present some general factors that may act as **barriers** in attaining sustainability and in successfully implementing the above policies. The last section of this chapter reviews studies addressing such barriers that may hinder the success of these policies.

2.2.7. Main Barriers for Achieving Sustainable Transportation

The basic sustainable transportation development problem can be said to be *"how a transportation system can meet basic movement needs;* and *consume resources less than the affordable resources capacity"* (Akinyemi and Zuidgeest 2000, 33). It is apparent that in order to solve these problems, the determination of movement needs and desires of the people are required. In addition to this, the desired level of transportation system performance and the capacity of resources that are consumed by transportation systems should be managed and also a suitable tool for supporting a transportation system's sustainably developing process are required (Akinyemi and Zuidgeest 2000, 33-34).

OECD (1996, 52) classifies two kinds of barriers. **First,** there are barriers related to methods and approaches. Barriers to the development of appropriate technology can be thought such as; high capital costs and lack of appropriate refuelling facilities.

Another barrier, which is frequently mentioned as discouraging a progress towards sustainable transportation, is the lack of targets and performance indicators. In addition, the lack of integrated transport planning (ITP) tools is considered as another strong barrier to the achievement of sustainable transportation. Only with an ITP approach, full-cost of all available choices can be accounted in order to secure the access that people need in their daily lives. It stresses the importance of giving equal treatment of both demand-side as well as supply-side alternatives. Other barriers are thought as political/institutional structures that favour continuation of present pricing systems.

> *"It was argued that increased prices for transportation can happen in a democratic society only if users experiencing higher costs also experience improved system performance"* (OECD 1996, 52).

Secondly, there are barriers related to individual and social behaviours. According to OECD (1996), there should be a strong public support for attitudes aiming to secure sustainable transportation. This view emphasizes the importance of use of *green modes* as a strategy of sustainable transport. However, people prefer automobile dependency and less use of green modes. In the Report, it is stated by Miller (1996) that there is a willingness for people to change their behaviours to be able to reduce the impacts of air pollution. People should drive less, substitute walking for short trips and ride sharing for longer ones, and should use public transport (Conference paper by Doug Miller cited in OECD 1996, 51). The question arises as;

> *"Why, with all this evident willingness to change, more is not done towards reducing transportation's impacts, both individually and collectively?"* (OECD 1996, 51)

In the OECD Conference in Vancouver, Canada (1996, 51), as a result of experiments in the Netherlands, it was said that the behaviour of individuals can be related to the phenomenon of *cognitive dissonance* whereby people reduce contradictions between their behaviour and the problems that are caused by their behaviour by ignoring the problems. It was claimed that when people are more

convinced to think about the problems caused by motorized traffic, their *problem awareness* become less. On the other hand, as OECD (1996, 51) emphasizes, there is a need for awareness about environmental problems and behavioural change for more use of green modes; although it is very difficult to free people from car dependency. In fact, according to OECD, there are stronger factors determining automobile dependency other than the *cognitive dissonance* that is related to behaviours. For instance, *lifestyle* is the first factor causing this dependency.

Newman and Kenworthy (2000, 15) state the **ten myths** about the inevitability of automobile dependency and the OECD (1996, 31-32) states twelve factors that are contributing to the private automobile use. When these classifications are combined and synthesized, the following factors are observed as explaining the car dependency:

Wealth is considered as an important factor. Automobile dependency is shown as an inevitable consequence of wealth by many authors. According to Newman and Kenworthy (2000, 15) as people get richer, they tend to buy cars and occupy larger amounts of private urban space; so alternative urban forms, public transport, and non-motorised modes will inevitably disappear. In OECD (1996, 31), it is also stated that GDP per capita among countries and personal or household incomes within countries affects automobile ownership and use positively. Petersen (2002, 6) gives as an example that in low-income regions where car ownership rates are low, dependency on public transport is generally high.

On the other hand, alhough many authors claim that car dependency is proportional with wealth, Newman and Kenworthy's studies (2000) show that some other factors, especially *urban density* and *urban form,* are in fact much stronger influences for car dependency. They give as an example that the car is used mostly in US and Australian cities whereas in European cities, which are wealthier, car is used 2.4 times less than US cities (Newman and Kenworthy 2000, 111). Using data from 46 international cities, Kenworthy and Laube (1999, 632 in Petersen 2002, 7) discovered that gross regional product per capita was usually higher in less auto-dependent cities; and Cervero (2001, 1651) stated that car use does not necessarily increase with increasing wealth, instead tends to fall in the wealthiest cities (See

Figure 2.3). Petersen (2002, 5) also supports this argument with that the conditions for mobility differ considerably between different regions with respect to income and spatial structures. Therefore, it can be said that while income is seen as a factor strongly influencing car ownership and usage, spatial structure and particularly urban density may be more important and stronger factors in shaping car dependency.

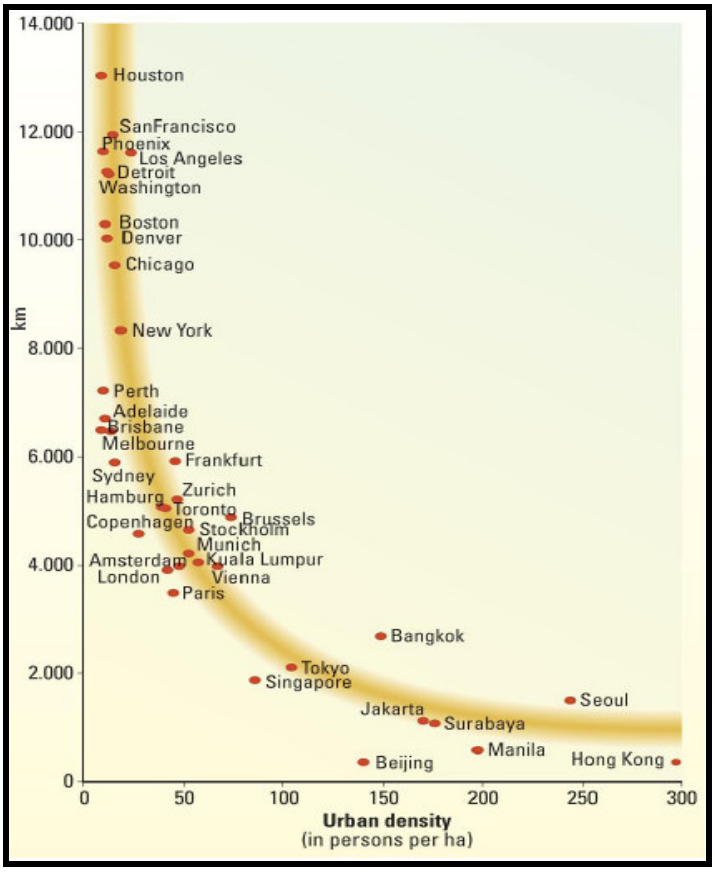


Figure 2.3 Annual Car Use Per Capita (1990) and Urban Population Density

(Source: Kenworthy & Laube *et. al*, 1999 cited in Petersen 2002, 7)

Urban density is considered as a major factor in car dependency. According to Newman and Kenworthy (2000, 113), to achieve a more sustainable urban form, planning the development of densities that can enable public transport, walking and cycling to be viable options is inevitable. Figure 2.3 indicates that lower urban density increases car dependency. This figure demonstrates that although the income

level of a city is high; if the urban density is high, then the car dependency can be expected to be low in that city. When the urban density becomes lower, more negative consequences from the transport sector such as more energy consumption and greenhouse gas emissions will be obtained. The graph in Figure 2.3 depends on the same database as Table 2.3. The general findings and main conclusions of both graph and the table are supported by the results of a worldwide survey carried out by the International Association of Public Transport (UITP) (Rat, 2001 cited in Petersen 2002, 6), although there are some differences. Table 3 tries to make a relation between urban density and the collected shares of *walking, cycling and public transport*; and it gives data on travel cost as a percentage of GDP, annual per-capita travel distances and related energy consumption (Petersen 2002, 7).

Table 2.3 Modal Split in Trips to Work in Asian Cities (Early 1990s)

City	Population (million)	Population density / km2	Private Vehicle (%)	Public Transit (%)	Foot / Bike / other (%)
Bangkok	6,4	14955	60,0	30,0	10,0
Kuala Lumpur	3,0	5693	57,6	25,5	16,9
Jakarta	8,2	17056	41,4	36,3	22,3
Tokyo	31,8	7099	29,4	48,9	21,7
Manila	9,3	19783	28,0	54,2	17,8
Singapore	2,7	8697	21,8	56,0	22,2
Hong Kong	5,5	28405	9,1	74,0	16,9

(Source: Sheeden 2001, Kenworthy and Laube *et. al.*1999, www.demographia.com cited in Petersen 2002, 7)

Residential density also affects automobile ownership inversely (OECD 1996, 31). High density of homes, which is achieved either by building small dwellings or by multi-storey buildings, generates sufficient concentrated transport demand that promotes good public transit supply. Therefore, car dependency can decrease (Petersen 2002, 10).

Climate is another factor and automobile dependence is inevitably caused by warm climates where people can enjoy low-density suburban lifestyles, whereas compact, transit-oriented cities are mostly seen in cold climates (Newman and Kenworthy 2000, 15). **Age** is also effective and automobile dependency is an inevitable feature of modern life. The city's age does affect its spatial and transportation traditions, and the old cities founded before the middle of the 19th century were built around walking distances. Afterwards, the transit systems spread the city out, and finally the car allowed lower densities. Hence, new cities that have developed predominantly after 1945 show more car dependency than old cities (Newman and Kenworthy 2000, 15-19).

Number, purpose, and mode of trips affect car dependency. Automobile ownership is now characterised as the single most important impact in increasing mobility and high mobility is associated with making more trips rather than making longer trips. This growth in trips is almost for non-work purposes (educational, recreational, social…etc. purposes) that cover now more than two thirds of *motorised trips* in most OECD countries. For these additional trips, people mostly prefer their **personal automobile** rather than public transport (OECD 1996, 31-32).

Land developers also create automobile dependency and there is little that planning can do to stop them (Newman and Kenworthy 2000, 15). Capitalism is based on the accumulation of wealth and cities seem to be built in cycles in which most construction takes place related to the level of capital accumulation (Harvey, 1973; Walker, 1978 in Newman and Kenworthy 2000, 22). Most suburbanisation follows economic booms and car dependency increases. In such a situation, the process of achieving less automobile dependent cities can be enabled only if there is a city-wide planning agency which is deliberately attempting to minimise sprawl (Newman and Kenworthy 2000, 22).

Transportation and land-use planning is a process in which automobile dependency can be an outcome too (Newman and Kenworthy 2000, 15). Land use and transportation modelling process, which emerged in the mid-1950s as a distinct area of study, contains most important technical procedures in transportation planning. The purpose of these studies was to plan for an expected growth in

population, jobsand traffic for a 20 years period, and with this planning method, to ensure an equilibrium between the supply of transportation facilities and demand for travel as it arises out of land use. For example, in most major cities, which built extensive freeways, it was found that this process spread out land use and generated more and more traffic. Besides, after the completion of freeways, there was again severe congestion (Newman and Kenworthy 2000, 23).

A review of these factors that create car dependency shows that spatial structure and land-use patterns are extremely important in determining travel behaviour and choice of modes, regardless of income and other factors. This strong interaction between land-use trends and automobile dependency and as a result difficulty for transport mode change towards *green modes* can be explained with a figure (See Figure 2.4). As seen in Figure 2.4, three factors can be identified that have resulted in a process in which land-use changes have increased the need to travel and discouraged more sustainable modes. At the same time, higher rates of travel and car ownership have led to less sustainable patterns of development (Stead and Banister 2001, 318).

Factor 1 can be called the ***increase in travel demand.*** With economic growth and increased urban population, the city areas tend to enlarge that leads to urban sprawl and longer trips. In addition, growing economic activities cause more frequent and longer trips of people and goods. This can be categorised as the issue of ***quantity*** (IGES 2006, 213).

Factor 2 can be called the ***increase in vehicle ownership and use, and lack of alternatives.*** Income growth and population rise stimulate the increase in vehicle ownership and use. There is an increasing travel demand, especially in sprawling areas, and so the rate of ownership and use of automobiles are expected to grow. Alternatives to car use are public transport and non-motorised transport modes (walking and cycling) (IGES 2006, 213-214). However, urban sprawl, increased distances, and usage of urban scope for roads and car parking make it increasingly difficult to travel with public transport or walking and cycling. When the usage of public transport and non-motorized modes decrease, it also becomes difficult to justify any investments to improve these modes. This cycle strengthens car dependency.

Finally, **factor 3** can be called ***high environmental impact due to vehicle use.*** Vehicles consume energy, and release air pollutants with greenhouse gases to an extent depending on the travel distances and traffic conditions. Another major factor that defines the total environmental burden is the energy efficiency and emission rate of each vehicle. While developed countries have been making progresses in the energy efficiency and emission control technologies of vehicles; in many developing countries, old and ill-maintained polluting vehicles are still seen in the traffic (IGES 2006, 214).

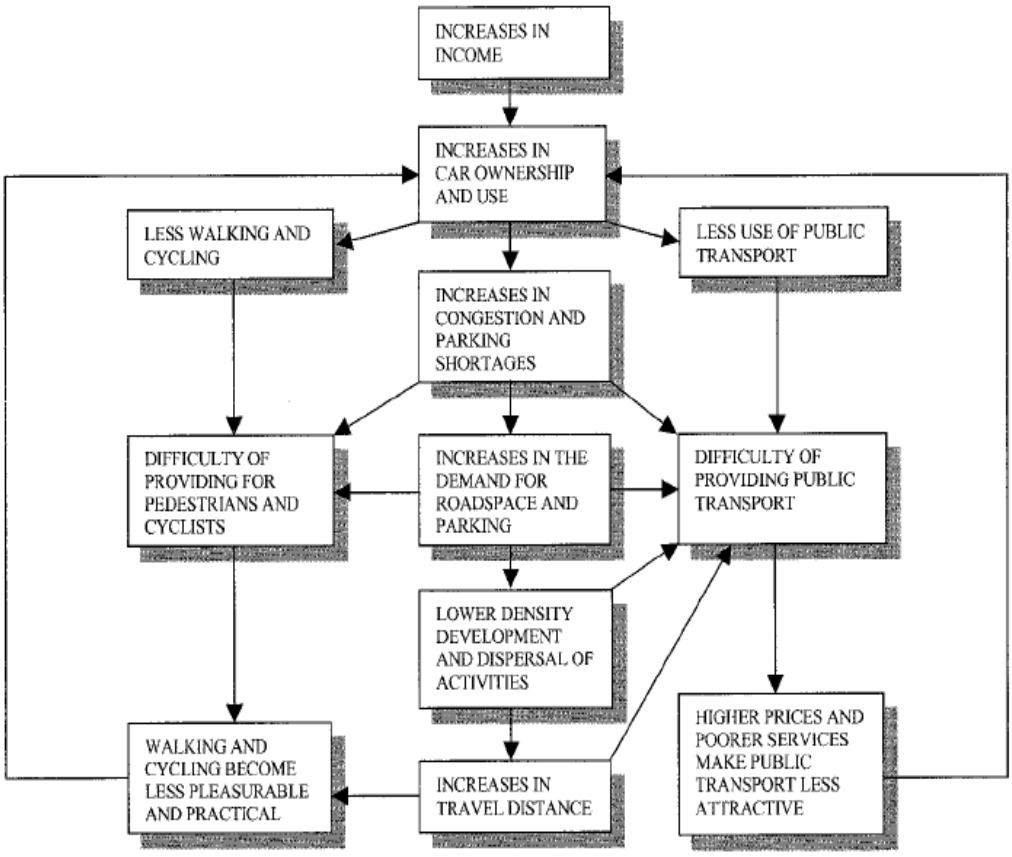


Figure 2.4 The Interaction of Driving Forces Behind Land-Use Trends
(Source: Royal Town Planning Institute 1991, Pharoah 1992 cited in Stead and Banister 2001, 319)

As a result, there are many barriers for achieving sustainable transport. While there

is a common consensus that among all of these factors ***wealth*** is an important one in inducing car ownership and car dependency (Newman and Kenworthy 2000, OECD 1996, Petersen 2002, IGES 2006), it is increasingly recognized that ***car ownership*** and ***car dependency*** alone and that factors such as ***urban density, urban form and urban layout*** are in fact much more effective in creating (or preventing) unsustainable car-dependent transport trends. According to Newman and Kenworthy (2000), one of the most important barriers for sustainable development seems to be predominantly with car-dependent lifestyles of people, which are created by urban forms. Therefore, land-use planning tools and strategies appear to be maybe the most important policy as a solution to problems that are hindering the success of sustainable transport policies. However, as it has been mentioned based on Table 2.2, for ensuring sustainable transportation, land-use planning tools (to reduce the need to travel) should be integrated with transport strategies (especially public transport) that promote green modes of transportation. This can be also supported with 'smart growth' strategies that is called by Cervero (2000, 1) as synonymous with sustainable development and as an advocate of transport and land-use integration.

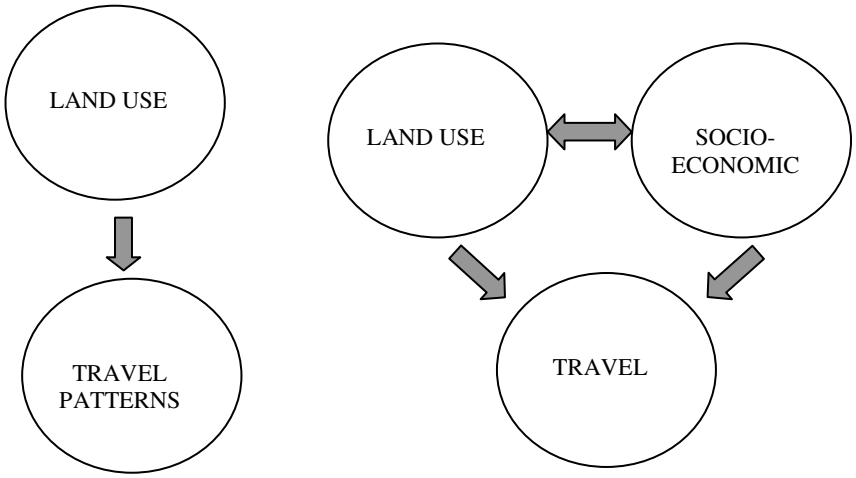
Building on the findings of this chapter, in this thesis, as a literature review, firstly, in **Chapter 3,** land-use planning policies and tools for achieving sustainable transport will be discussed. Then **Chapter 4** will be based on the environment friendly transport issue that is directly related with making transport sustainable. These two chapters help to highlight the current approaches to transport and urban planning with a significant focus on achieving sustainability in transport. Following these policies and approaches for sustainable transport, **Chapter 5** introduces another concept that is another recent development trend for urban areas: the city-region development where spatial development and transport trends, as well difficulty in integrating land-use and transport planning make it more difficult to attain sustainability in transport. The study aims to bring together these two important fields of research in the planning literature: sustainable transport and city-regions, with a view to analyse whether they can co-exist, whether their policies comply with, and complement each other, eventually whether it is possible to attain transport sustainability in city-regions.

CHAPTER 3

LAND-USE PLANNING POLICIES AND TOOLS FOR ACHIEVING SUSTAINABLE TRANSPORT

3.1. Interaction Between Land Use Patterns and Transport

Urban form is indicated as the generalized shape of an urban region and the character of its major components (Brunton, Brindle 1999 cited in Buxton and Jackson 2004, 10). It may be defined as the spatial configuration of constant elements within a metropolitan region. This includes the *spatial pattern of land uses* (land-use types, the degree of land-use mix) and *land use characteristics* (such as population density or the presence of local services and facilities) with the spatial design of transport (transport patterns) and communication infrastructure (infrastructure provision) (Anderson *et. al.*1996, 9; Buxton and Jackson 2004, 10; Stead, D. *et al.* 2000, 174). In other words, there is a simple 'cause and effect' relationship between land use and travel patterns (See Figure 3.1) and urban form is defined by **firstly,** the ***spatial distribution*** and ***relationship of land uses*** (concentrated, evenly spread or nucleated) or different urban functions such as housing, working, living and services (educational facilities, shops, social and cultural services, recreational facilities, etc.). **Secondly**, urban form is defined by the ***transport networks*** or the connections (radial, circumferential or grid) that are serving it (Petersen 2002, 3; Westerman 1998 cited in Curtis 2006, 160; Snellen *et al.* 2000, 54). These transport connections are represented by transportation systems for different modes, such as private motorized transport (car), private non-motorized transport (bicycle, walking) and public transport (train, bus, tram, metro) (Snellen *et al.* 2000, 54). Therefore, urban form is determined by both urban functions and connections.



(a) Traditional cause and effect relationship

(b) Alternative interdependent relationship

Figure 3.1 The Interaction Between Urban Form And Travel Patterns
(Source: Stead, D. *et al.* 2000, 174)

In general, six different urban forms can be identified (See Figure 3.1). These are "*(1) the radial concentric city, (2) the lobe city, (3) the linear poly-nuclear city, (4) the concentric poly-nuclear city, (5) the linear city and (6) the grid city"* (Snellen *et al.* 2000, 54).

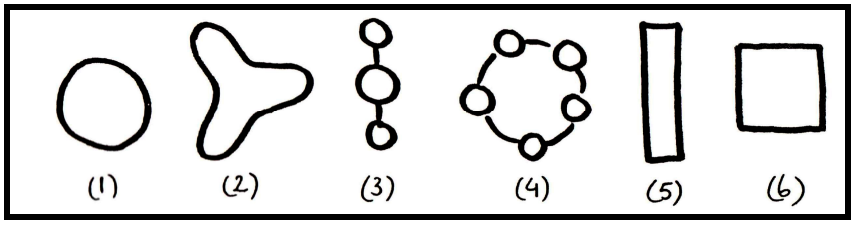


Figure 3.2 Urban Forms
(Source: Snellen *et al.* 2000, 55)

From another perspective, Bolt (1982 in Snellen *et al.* 2000, 55) identified five elementary networks, *"(1) the linear network, (2) the radial network, (3) the ring, (4) the grid, and (5) the shifted grid"* (See Figure 3.2). These network types used for a transportation mode will vary according to the characteristics of each mode. For

example, the linear network will be very useful for metro systems, whereas the grid network or shifted grid network can be very efficient for the cars.

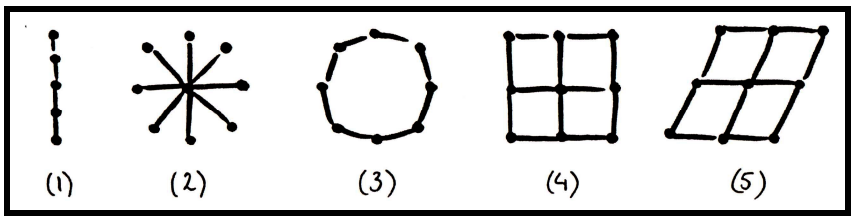


Figure 3.3 Network Types
(Source: Bolt 1982 cited in Snellen *et al.* 2000, 55)

Urban interaction refers to the *flows* of goods, people, and information among different locations in the city. Urban form has a deep influence on these *flows* within the city, but does not determine them completely (Anderson *et. al.*1996, 9). Besides, accessibility and travel demand is determined both by the proximity of land uses to *each other* and to the *transport network* (including its capacity, operating characteristics and costs) (Webber, 1964; Keyes, 1982; Kelly, 1994; Westerman, 1998 cited in Curtis 2006, 160). Therefore, urban form is primarily affected by transport policy and land-use policy (Anderson *et. al.*1996, 7). Urban forms with their *shapes, sizes, densities and uses* in cities, can promote environmental, social and economic benefits. Conversely, the physical form of cities can also lead to serious environmental, social, and economic problems (Buxton and Jackson 2004, 10). For example, the location of residences, workplaces, recreation areas, and transport infrastructure determines the ability and desire of human beings to choose alternatives to the automobile in meeting their transport needs (Anderson *et. al.*1996, 9). As a result, changes in land-uses and transport infrastructure impact on travel patterns.

Development of transport infrastructure and transport services changes accessibility patterns and also influences locational decisions of private households and businesses. These decisions form the structure of the city and its surrounding areas, and generate new traffic demand patterns. Petersen (2002, 20) gives an example of a

small settlement at a road junction where a circular road has been added (See Figure 3.4). In this example, the new circular road provides a new core of development with changing investment priorities and starting new trip relations. This generates more and more trips between the centre and the new suburban locations. Because of increased trip distances and urban traffic volumes that are following the geographical growth of the city, more road construction programs will be demanded (Petersen 2002, 20-21).

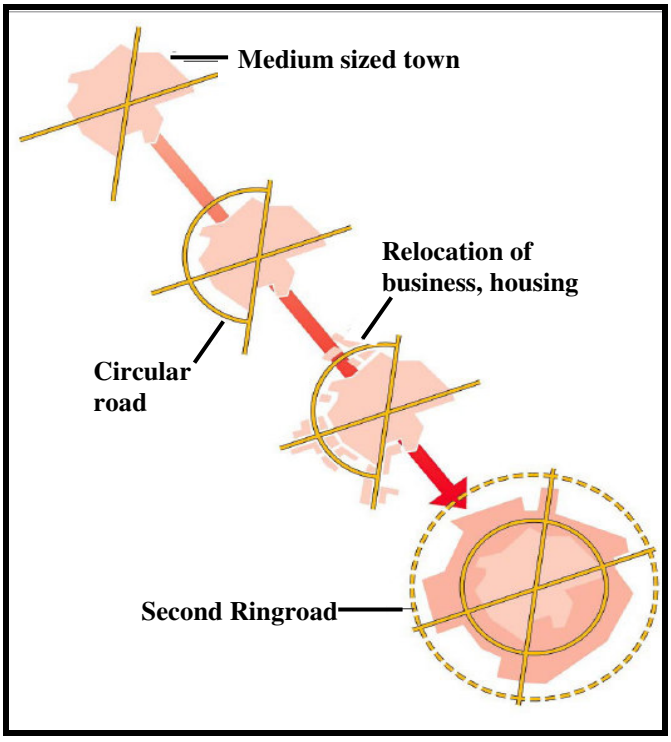


Figure 3.4 Circular Road and Urban Relocations
(Source: Wuppertal Institute VE-265e/96 cited in Petersen 2002, 21)

Petersen (2002, 21) gives some analyses in the US as example. These analyses have led to the argument that circular roads may attract investors that otherwise would choose locations in the countryside. While ***centripetal***[3] (circular) road investment

[3] **"Centripetal"** refers to tending to move toward a center: *centripetal force* (Free Dictionary by FARLEX: http://www.thefreedictionary.com, Last accessed date: April 29, 2007).

may even cause denser developments in some situations, the US type of ***centrifugal***[4] road network design supports sprawl (See Figure 3.5) (Petersen 2002, 21).

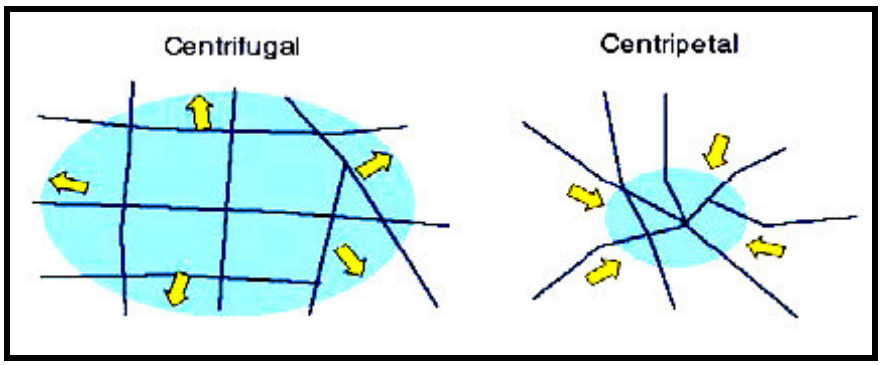


Figure 3.5 Spatial Effects of Various Road Network Designs
(Source: Rodrigue, 2002 cited in Petersen 2002, 21)

The interaction between transport infrastructure construction and urban development can be studied in many already highly motorised countries. It is stated that nowadays the pattern of settlements are shaped by transport services provided and the kind of infrastructure built. While dense road networks and high car ownership rates support sprawl development, rail networks support cluster development around train stations. As it is shown in Figure 3.6, if there are low car ownership conditions, and a bus-based public transport system, the development will preferably take place along the main arteries that are served well by buses. *"At longer distances from the centre, development may concentrate like* ***'pearls on a string'****"* (Petersen 2002, 21).

[4] **"Centrifugal"** refers to tending to move away from a center: *centrifugal force* (Free Dictionary by FARLEX: http://www.thefreedictionary.com, Last accessed date: April 29, 2007).

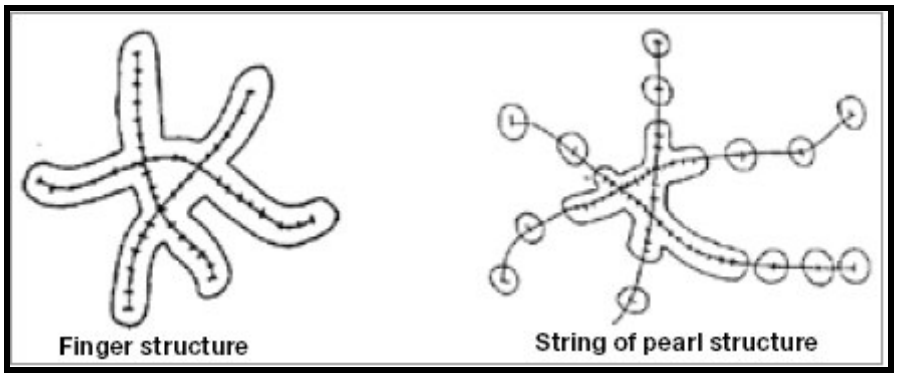


Figure 3.6 Land Development Along Transport Infrastructure
(Source: Petersen 2002, 21)

In conclusion, it is emphazised that the interaction between transport and land use has not been adequately reflected in classical transport planning models which, for example, does not consider market-driven choices of locations. It is also stated that the land use patterns that have been evolved from certain transport planning strategies, show important variables related to *income, population increase, economic growth, sectoral dynamics, and also land use planning schemes* (Petersen 2002, 22). Therefore, there should be more analyses that examine this interaction between land-use patterns and transport. Besides, it should be realized that the land-use planning decisions should be made together with transport policies based on those analyses.

3.1.1. Interaction between Land-Use Planning and Transport Policy

Transport is a major consumer of land and in urban areas; transport infrastructure can destroy natural habitats and affect the ecological balance adversely (OECD 1996, 27). Mobility, especially in the form of *motorised transport,* requires an increasing share of land, both within cities and in rural areas and it is stated that cities in highly motorised countries dedicate much of their urban area for roads. As an example, one of the characteristics of the US, Japanese and European cities are that the road share of urban area is ranging from % 15 to % 25. On the other hand, there are discussions on the international literature about whether more roads provide *sustainable*

improvements of the traffic situation or not.This is accepted as a highly questionable issue (Petersen 2002, 1).

Increasing road space may damage the quality of the urban environment, discourage people for walking and cycling, and force those households that can afford it to move away to cleaner and less noisy suburban or peripheral areas (Petersen 2002, 1). Then, there can be seen an unplanned and piecemeal growth which will induce the increasing demand for road capacity. For example, with the sprawl and mismatches in jobs and housing growth, many Californians have been forced to drive too long distances (Cervero 2003, 1). Therefore, the interaction between **transport** and **land use**, and the dynamics of related developments must be considered as a whole. Figure 3.7 demonstrates the *"vicious cycle"* of car traffic that leads to deteriorated living conditions, causes suburbanisation and transforms the rural areas into settlements. In these settlements, households are dependent on the private car for their daily mobility and increasing car use again follows the "*traffic spiral"*. When more roads are built to satisfy commuters that are using cars, more urban land is transformed into wasteland. In Europe, Japan and also North America, **awareness** has risen that the past urban planning paradigms should be changed, and the new sprawl development trend should be struggled (Petersen 2002, 1-3).

The terms **'mobility'** and **'transport'** are often equated, but, it is necessary to differentiate that mobility is referred as a basic demand, and transport is referred as a derived demand (Petersen 2002, 5-6). According to Akinyemi (1998b), in order to design a sustainable transportation system, mobility should be treated as *a supply variable*, rather than as *a demand variable* (Akinyemi 1998b in Akinyemi and Zuidgeest 2000, 38). This means that the focus of attention is generally the number of *kilometres driven* that often becomes the indicator of mobility. However, it is stressed that mobility should be measured in a broader sense relating to *"potential access",* rather than simply to *"kilometres of movement"* (Petersen 2002, 5). Mobility should be defined as *a qualitative term,* instead of being the actual trip making (kilometres per trip, number of trips made per day by a person, etc.), because mobility is considered as a symbol of the *ability or capacity* of a group of people to travel easily in an area by several transportation modes (Akinyemi and Zuidgeest 2000, 38).

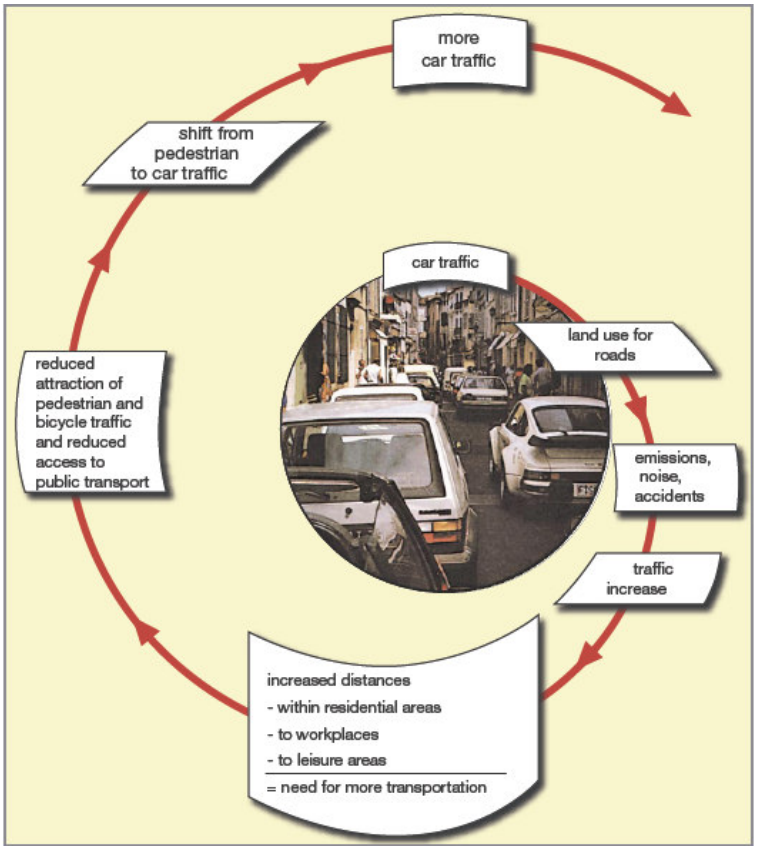


Figure 3.7 Traffic And Land Use Interaction (Traffic Spiral)
(Source: Wuppertal Institute VE-151e / 95 cited in Petersen 2002, 3)

Stead and Banister (2001, 315) state that **transport policy** clearly has a direct impact on mobility and can be used to influence the supply and demand for transport. However, they also stress that transport policy is not the only way to influence mobility. They note that the achievement of sustainable transport requires transport demand that should be reduced with combining complementary **transport policies** and **non-transport policies**. Land-use planning is one of the non-transport policies.

Figure 3.8 shows four main influences on mobility that are themselves mutually dependent:

(1) transport policy (such as road pricing and infrastructure construction);
(2) technological change (such as e-commerce, teleconferencing, route guidance systems, and signalling technology);

(3) social and economic trends (including the ageing of population, globalization trends, and decentralization); and

(4) non-transport policies (such as **land-use planning**, regional development policies, energy taxation and European enlargement) (Stead and Banister 2001, 315-316).

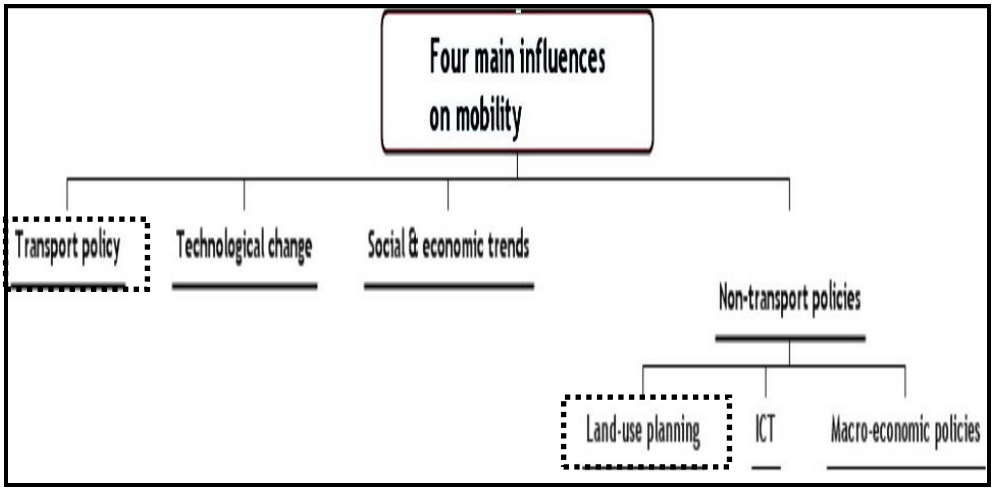


Figure 3.8 Four Main Influences on Mobility
(Source: Developed referring to explanations by Stead and Banister 2001, 315-317)

There are some linkages between transport policies, non-transport policies, social and economic trends, innovation and technology, and mobility. Moreover, for each of the four main influences on mobility that are defined above, it is possible to identify many strategies, some of which tend to increase mobility and some of which aim to reduce the need for high levels of mobility. For example, *a new vehicle design* referring to a new technology will affect the *transport policy,* causing a rise in the mobility and some *trade aggrements or EU enlargement* policies will act to support the mobility of people, goods and services. On the other hand, in some EU countries, at the national and local level, *energy taxation and* ***land-use planning*** policies are being used in order to reduce the need to travel (Stead and Banister 2001, 316-317).

In conclusion, any program that is designed to maintain sustainable transportation is considered to be successful only if it addresses the multiplicity of factors which

might be effective in the movement or mobility of people (OECD 1996, 31). This situation is because it is now accepted that there exists a strong relationship between the *land-use characteristics* of a city such as, *its shape, size, density, uses* and *its sustainability.* However, consensus is still lacking about the exact nature of this relationship (Willams, K. *et al.* 2000, 1). In order to understand the relationship between land-use structures and transport and in order to reach more sustainable urban transport, **land use planning**, as a non-transport policy, is required. As it has been concluded in Chapter 2, that land-use planning policy should be integrated with transport policies to achieve sustainable transportation.

In this thesis, among those four main influences on mobility, transport policy and land-use planning factors have been chosen to be highlighted (See Figure 3.8) as they appear to bring effective solutions for sustainable transport development. 'Land-use solutions' strategy refers to the changes in urban form and the influences of urban forms on travel patterns whereas 'the promotion of alternative transport modes' strategy refers to to policies and investments to improve green modes of transport (public transport, walking, cycling) and encourage their wage. A central question to this study is as follows:

> *"How can urban **land use planning** contribute to future responsible mobility with less emissions and energy consumption?"* (Petersen 2002, 3)

3.1.2. Land-use Planning Strategies for Sustainable Transport

Urban space has to serve a variety of human needs: housing, working, social interaction, leisure, mobility of persons and goods and also nature within their living areas. In order to create and maintain a livable urban environment, the requirements of these human needs have to be balanced against each other. *"**Land use planning** serves this process of balancing competing demands on limited urban space"* (Petersen 2002, 1). It is stated in the literature that space consumption by urban development has become a major concern, not only in western societies, but also throughout the world. The reason of this is said that *compact cities*, developed at

higher densities, and with a mixture of uses, affect *sustainability* (Porter 1997, Crane 1996, Lowe 1991 cited in de Roo and Miller, 2000, 1) and sustainability is seen by many as an essential requirement for human survival. In addition, the intensity of activities, particularly traffic and industry, are seen as major factors influencing sustainability. Therefore, land-use planning is regarded as a contributing element to sustainability and land-use planning decisions are known as having long-term effects on the physical environment (de Roo and Miller 2000, 1).

Agenda 21, which has been mentioned as a product of the Environmental Summit in Rio de Janeiro in June 1992 (See Chapter 2.1), discussed the ways of effective land-use planning systems. *"Agenda 21 stated land-use planning as a precondition for promoting sustainable human settlement development and defined the following steps to be managed:*

- *Providing adequate shelter for all*
- *Improving human settlement management*
- *Promoting sustainable land-use planning and management*
- *Promoting the integrated provision of environmental infrastructure*
- *Promoting sustainable energy and transport systems in human settlements*
- *Promoting human settlement planning and management in disaster-prone area*
- *Promoting sustainable construction industry activities"* (Selman, 1996, 109-110).

Transportation, on the other hand, especially in urban areas, requires a comprehensive approach and it is clear that it must not be considered in isolation from issues of *governance, land-use planning, economics,* and *equity* (OECD 1996, 39). Land-use planning is becoming increasingly recognized as an important *'non-transport' policy* that is one of the factors influencing mobility (Stead and Banister 2001, 317). Rice (1978 in Anderson *et al.* 1996) states that, transport policy deals with the provision of transport services on infrastructure that is almost owned and operated by the public sector. Hence, transport authorities have the power to design the configuration of infrastructure and set rules for the use of it by private and public

vehicles. On the other hand, land-use services such as residential areas, commercial space, and industrial areas are generally provided by the private sector, and the facilities or land covered within them are generally privately owned. From this perspective, it is seen that land-use authorities are challenging with a complex case in which there is market intervention to achieve desirable outcomes (Anderson *et al.* 1996, 7).

In recent years, it is stated that there has been much concern about overcoming the adverse environmental effects of transport by promoting more sustainable forms of urban development in which with design and layout, reducing travels can be promoted (See Figure 3.9). Nowadays, it is generally accepted that for urban areas, the most suitable transport strategies are **integrated strategies** that gather a range of policy measures and achieve synergy between them (May et al., 1999 cited in IGES 2006, 208).

As it has been mentioned, there are often synergies between land-use planning measures and transport policies, such as *fuel pricing and road charging* (See Chapter 3.1). For example, in European cities, land-use planning measures such as *physical restraint* and *road space reallocation* are said to be already used measures for allocating space to priority users and managing mobility (Stead and Banister 2001, 317). 'Institute for Global Environmental Strategies' (IGES 2006) has made a research for cities in the Asia-Pacific region. This research aims to propose some strategic policy options (SPOs) to develop systems for **environmentally sustainable transport** (EST), that is, effectively integrated policy instruments for the cities, *Bangkok (Thailand), Beijing and Taiyuan (China)*, based on good practices (IGES 2006, 208). Depending on this research of IGES with some of its policy instruments and Stead & Banister's article (2001), the land-use planning strategies are tried to be identified in the following figure (See Figure 3.9) and then these strategies are tried to be explained based on these authors' views.

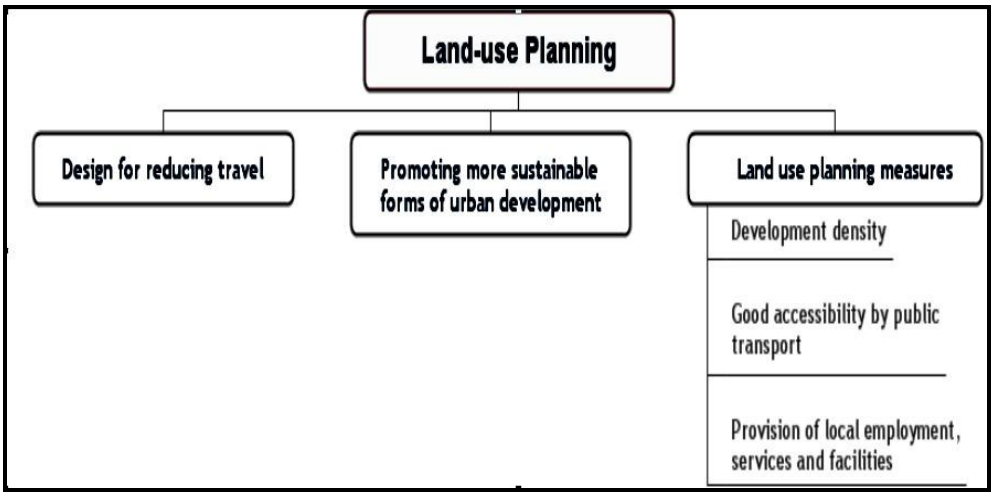


Figure 3.9 Land-Use Planning Strategies
(Source: Developed referring to explanations by Stead and Banister 2001, 317-319)

> *"The general rules of* ***land use planning for sustainable transport*** *– reduce the need to travel and the trip distances, support walking, cycling, public transport, restrict car use – have to be adapted to local circumstances"* (Petersen 2002, 19).

Design for reducing travel can be thought as Strategy 1. There are two kinds of changes necessary to reduce transport demand or to manage Strategy 1. The first change aims to avoid uncontrolled urban sprawl with changing land use patterns; so that people do not have to make long trips for daily activities such as work and shopping. The second change aims to alter the travel behaviours with introducing suitable technologies (telecommunications, information technology, etc.); so that the frequency of trips of people will be reduced. As this thesis makes an emphasis on the first change, this will be discussed in detail (IGES 2006, 219).

Table 3.1 Strategy 1 = Design For Reducing Travel

Change	Objective	Policy Options	Good Practice
Land use change for shorter length of trip	Avoiding urban sprawl	Creating regional systems of cities	Vancouver
		Promoting compact cities and smart growth[5]	Singapore, Curitiba

(Source: Developed referring to explanations by IGES 2006, 215)

For the first change and objective, two policy options are identified by IGES (2006, 219): **Creating regional systems of cities** and **promoting compact cities** and **smart growth**. Policy makers have seen urban form as a tool to reduce travel demand (Williams *et. al.* 2000, 107). With creating a **regional system of cities,** some urban functions can be transferred from large cities to self-sufficient sub-centres for preventing uncontrolled sprawl and reducing or diverting the transport need in a large city. Besides, with promoting **compact cities and smart growth,** which consists of land use planning policies that are concentrated on creating higher density and better accessibility; automobile dependency can be reduced in urban areas. The *compact cities and smart growth* approach are only applicable until the density reaches a certain point and, if the city is overcrowded, the decentralised concentrated urban forms such as *regional system of cities* would be more suitable (IGES 2006, 219).

Promoting more sustainable forms of urban development can be thought as Strategy 2. Firstly, in general, **land-use characteristics,** such as**,** *mixed-use development*, *settlement size*, and *provision of local facilities* have important roles to play in promoting more sustainable forms of urban development. However, Stead (2000 in Stead and Banister 2001, 318) claims that, over recent decades, the land-use characteristics of new developments haven't shown the properties of the ones that might promote more sustainable patterns of urban development. He states that population and activities have become much more dispersed and a large number of people and jobs have moved out of the urban core to the suburban, peripheral, and rural locations. In addition, it is also said that a wide range of different types of services and facilities have been centralized, where fewer, larger services and

facilities have replaced a large number of small-scale ones (Stead and Banister 2001, 318). In fact, according to Petersen (2002, 22), dispersed urban and regional development is both a result of investment priority for roads, and inadequate land use planning. For example, in Europe and Japan, it is said that the relatively strong planning regulations have prevented towns and regions from developing in the same disperse way as in the US, where zoning regulations were not effectively implemented.

Secondly, transport is a key issue in the 'sustainable urban form' debate. The discussions about the effects of urban form on travel patterns have provided the most dominant confidence for moving towards more compact urban forms (Williams *et al.* 2000, 107). However, there are still uncertainities about the **compact city form**, as opposed to other urban layouts, whether it is the most effective city form in terms of sustainable transport or not (Breheny, 1995; Rickaby 1987; Feitelson and Verhoef, 2001 cited in Williams 2005, 2). It is also not obvious whether the compact city form can achieve sustainable travel patterns at the 'regional' level or not; although in recent years, city-region developments have become widespread (Headicar, 2000). Therefore, two other city forms are today popular for promoting sustainable urban forms. These are **corridor developments** and **multi-centred cities** that are emphasized by many authors in different ways. This issue about 'sustainable urban forms' will be discussed in detailed in the following Section 3.2 (Williams *et al.* 2000; Anderson *et al.* 1996; Curtis 2006).

Land use planning measures can be thought as Strategy 3. These measures are crucial to manage mobility. These include policies such as to increase development density, to improve accessibility by public transport and to provide local employment, services, and facilities. According to these three main headings, the land-use characteristics that can affect travel patterns are classified by Stead, D. *et al.* (2000, 175) as following:

- Location (with respect to existing towns, cities, infrastructure)
- Structure of development (size and shape)
- Land use type (overall mix)

[5] For smart growth, see Chapter 4.3.

- Clustering/concentration of development
- Land-use mix (level and scale of mix)
- Density of development (population density & employment density)
- Layout of development (movement of networks, neighborhood type)

It is argued that high development density ensures less need to travel and therefore more sustainable development. In addition, if the use of public transport is managed to be increased, then the car dependency decreases. Lastly, it is also claimed that the supply of local services can be designed in short distances for people to reach easily and so the total distance traveled is decreased. This land-use planning measures strategy will be discussed in detail in Section 3.3.

In conclusion, actually, it can be said that in literature, the land-use planning policies lay emphasis on two issues: **the urban form** and **public transport accessibility** (See Section 2.2.6.; Section 3.1, Figure 3.8). The public transport, in general, emphasizes the importance of new rail systems (Light rail transit systems) and advanced/modern bus systems (BRT – Bus rapid transit systems). These policies can be considered as investments to improve public transport. On the other hand, the urban pattern issue is very important and there are many studies carried out on this issue. In literature, for providing sustainable urban development and sustainable transport, the 'ideal city form' discussions increase day by day. These two issues, assignment of the 'ideal urban form' and the improvement or management of public transport, are needed to reinforce land-use pattern. Curtis (2006, 159) states that in order to facilitate sustainable travel, there is a need to change both the operation of public transport and the urban structure and these changes should be mutually supportive. Therefore, as it has been emphasized by many authors and has been stated before in Section 2.2.6. 2.2.7., for achieving sustainable travel outcomes, there should be **land-use** (urban form or pattern) and **transport** (public transport) **integration** (Curtis 2006, Anderson *et. al.*1996, Cervero 2000, 2002, Petersen 2002, Hayashi & Tomita 2003). Stead and Banister (2001, 317) state that the need for the integration of land use and transport policy is now quite well established, especially in most European countries and this issue is one of the most popular sustainable city arguments.

In fact, since the 1980s, the analyses for an **efficient urban form** have been considered with supply of sustainable transport issue. This analysis ranges from discussing the essentials of different theoretical 'ideal' forms, to modelling simulations of 'ideal' forms. It is sometimes based on empirical data for a specific place, through to use of aggregated or disaggregated empirical data to discover the impact of urban design variables on travel behaviour and the relationship and strength of these variables compared with demographic and attitudinal variables. Curtis (2006) classifies all of these variables into two scales: macro-scale and micro-scale in her analysis of Perth, Western Australia. Curtis's research defines the **macro-scale,** as focusing on determining the ***shape of urban areas***, and the **micro-scale,** focusing on ***urban design factors*** such as density, transport network and function, land use mix and proximity (Curtis, 161).

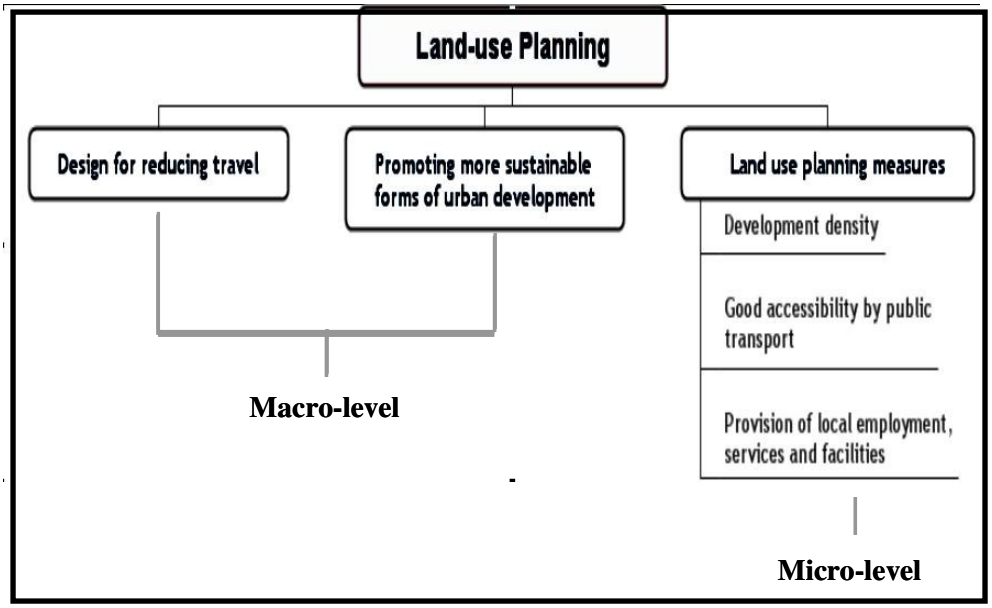


Figure 3.10 Land-Use Planning Policies at Micro and Macro Levels

Therefore, Figure 3.9, which has been developed referring to Stead and Banister (2001, 317), is reshaped with considering Curtis's classification, and as it can be seen in Figure 3.10, first two main land-use planning policies are classified as macro-level whereas the third policy, land-use planning measures, are classified as micro-level. It is important to emphasize that Figure 3.10 schematize the main

framework of the thesis and in this thesis, firstly, the ***urban form issue*** as a part of two main land-use strategies at the macro-level and then, the land-use planning measures at the micro-level will be discussed. The ***public transport issue***, which is stated as one of the micro-level measures in terms of accessibility in Figure 3.10 will be discussed in detail as a separate chapter, because one of the two main issues of the thesis is the need to attain a more sustainable urban transport system (See Chapter 2 on sustainability and Chapter 6 on methodology).

3.1.3. Trends in Urban Forms and Travel Patterns

There has always been an interest in the form of cities from past to present (Curtis 2006, 160) and there has been a debate about whether particular urban forms, in terms of their *shape, density, configuration,* and *so on,* can have an impact on the sustainability of cities (Williams 2005, 1; Williams *et al.* 2000; de Roo and Miller, 2000). It has also been discussed that the motives for promotion of different forms have changed over time and the search for a sustainable form is a relatively new issue (Jenks et al., 1996 in Curtis 2006, 160). Besides, trying to cope with urban growth has been one of the key challenges of the 20th Century urban and regional planning (Lapintie 2005, 1).

In addition, there has always been an urgent need to move towards the `sustainable city' for many environmentalists, professionals or politicians in recent years (Commission of the European Communities, 1990; OECD, 1990; Haughton and Hunter, 1994; Burgess *et al.*, 1997; Roseland, 1997, 1998; Satterthwaite, 1997a, 1997b cited in Haughton 1999, 1891). It is said that the term 'sustainable city' may have different meanings depending on the stage of development of a city. For example, while within the growing economy of a developing country, 'sustainability' means the ability to control spatially sprawling suburbanization; within a region of a developed country (like California) it may mean 'smart growth'. Moreover, within mature economies with stable populations, such as some regions of Europe, it means regeneration of cities by attracting the population back to revitalized city centres (Hayashi and Tomita 2003, 5). The characteristics of the sustainable city are shown in comparison with three other types of city; *the*

traditional walking city, the industrial city, and *the modern automobile city* by Newman and Kenworthy (2000, 119) (See Table 3.2).

Table 3.2 Characteristics of Four City Types

	Traditional pre-modern walking city	**Industrial transit city**	**Modern automobile city**	**Postmodern 'sustainable city'**
Economy (and Technology)	Small household industries (local and small regional economy)	Larger industries, concentrated in parts of cities (national and regional economy)	Large scale industries scattered through city (national and regional economy)	Information and services oriented (global economy); heavy industries to rural areas and small towns
Social organisation	Person-to-person, community-based	Bigger cities losing person-to- person contact but still community oriented in rail-based suburbs	Individualistic and isolated	Local community-based, but globally linked
Transport	Walking (and cycling later)	Streetcars and trains (also walking and cycling)	Cars (almost exclusively)	Walking and cycling (local), transit (across city), cars (supplementary), air (for global)
Urban form	Walking city: small, dense, mixed, organic	Transit city: medium-density suburbs, dense mixed centre, corridors with green wedges	Automobile city: high-rise CBD, low-density suburban sprawl zoned to further separate functions	Sustainable city: local urban villages (high density) linked across city by transit, medium and low-density areas around villages, no more sprawl
Environment *** Resources** *** Wastes** *** Nature orientation**	Low Low Close to rural areas (dependent)	Medium Medium Some connection through green wedges	High High Little nature orientation (independent)	Low-medium Low-medium Close to nature

(Source: Newman and Kenworthy 2000, 119)

3.1.3.1. Historical Background of Urban Forms: Emergence of Urban Sprawl as an Unsustainable Trend

Until the 19th century, the diameter of cities was at a distance that enables travelling on foot; the street patterns and roads were designed according to the needs of horsecars. During the industrialisation process, the rapid growth of the cities brought an urgent need for fast mass transport; streetcars and buses that served the arteries. However, this led to a kind of ***decentralised centralisation***. As main development took place within ***walking and cycling distances*** from public transport stops, people could reach their homes by walking from these stops (Petersen 2002, 13). Important examples of the historical urban patterns are shown as the checkerboard patterns designed by Hippodamus (~ 480 BC), and as the rectangular city designed by Simon Stevin (~ 1600) (Snellen *et al.* 2000, 54).

From the 1800s to the 1930s, *Howard, Le Corbusier, and Wright* who are early planners, proposed large-scale urban change as a solution to issues about health and the quality of life in industrial cities (Curtis 2006, 160). During the last years of the 19th Century, Ebenezer Howard introduced his proposed the *Garden City* as a solution to the negative effects of the industrial city (Lapintie 2005, 1). Moreover, during the nineteenth century, in many cities significant expansions of urban boundaries and the development of suburbs began to occur. These expansions were mainly due to contagious growth and the rail transport which supports more dispersed development along its corridors (see Lewis, 1991; Muller, 1986; Warner, 1978 cited in Anderson *et. al.* 12). However, Anderson *et. al.* (1996, 12) explain that rapid acceleration of urban sprawl is generally associated with the widespread adoption of automobile and truck transport, especially in the 1950s and 1960s. Therefore, it can be said that sprawl began with rail to a limited extent, and continued extensively with car usage.

During the 1950s and 1960s, the automobile, which is a private and highly flexible mode of transport, allowed for the development of residential areas without considering their accessibility to workplaces and public transport infrastructure. The shift from rail to truck transport gave rise to the accelerated development of businesses in the suburbs (Anderson *et. al.* 1996, *12*). High availability of private

cars after the 1950s and 1960s encouraged the **sprawl** of low-density settlements. Besides, the urban zones around CBDs became less attractive with disappearing public security[6] (Petersen 2002, 14). Therefore, at that period, planners were busy with the uncontrolled spread of cities and their transition from **monocentric** city forms to **dispersed and polynuclear** cities (Curtis 2006, 160). The central issue was, in order to make efficient use of land, to identify city forms (Gottmann, 1957; Lynch, 1961; Friedmann & Miller, 1965 cited in Curtis 2006, 160). There were also interests on designing a city that did not feel 'uncontrolled' (Lynch, 1961; March, 1969 cited in Curtis 2006, 160).

In addition, **since the 1960s,** there has been increasing concern about the environmental consequences of human activities (Anderson *et. al.* 1996, 8). The interest in urban form as a way of solving transport problems was first noted in the UK where the problems caused by urban sprawl were reacted with the idea that was *"the future shape of cities needed to deal effectively with transport problems"* (Buchanan 1963, 186 cited in Curtis 2006, 160).

During the 1970s, the 'oil shock' provided a new idea to examine the relationships between energy, land use and planning (Curtis 2006, 160). In the beginning of 1970s, the concern about securing the supply of energy gave rise to thinking about wasteful practices in areas such as transport and industrial processes (Anderson *et. al.* 1996, 8).

Since the late 1980s, Curtis (2006, 161) explains that there has been a focus on the search for how to reach the ***sustainable city*** and transport's contribution to the sustainable city.

On the other hand, as suburbanization has still been causing many urban problems, it will be useful to look through the suburbanization process of different countries in detail. OECD (1995) states that as **suburbanisation of residents,** which is called as **first waves,** is a general idea that has been experienced by almost all cities in the world. Although the first waves of this suburbanisation were seen many decades ago (partly based on public transport), rapid decentralization has become a property of

[6] In highly motorised regions, this development is still continuing. In developing countries, the process is on the rise (Petersen 2002, 14).

urban growth in most western countries especially after the Second World War and this kind of growth of suburbanisation since the **early 1960s** has been identified as unique (Nijkamp *et. al.* 1997, 694; de Roo and Miller 2000, 4). This decentralization has taken the form of ***massive suburbanization*** in Canada, the United States, Japan and Australia, creating in its extreme forms 'the 100 mile city', along major transport routes. However, in Europe, urbanization has tended to spread from urban nuclei. In each case, open rural land is converted to urban uses (de Roo and Miller 2000, 4).

In fact, the private car has brought low-density living for the large groups of upper and lower middle-class families (Nijkamp *et. al.* 1997, 694). Especially in the US, those who could afford started to settle in the suburbs. Although in recent years remarkable efforts have been made to revitalise American cities, the distribution of wealthy citizens is still in concentric development form in which the middle and upper classes are concentrated in a suburb-ring around the traditional city (Petersen 2002, 14).

Nijkamp *et. al.* (1997, 694) state that suburbanisation of living was a result of several changes in society, such as *"income increase, smaller households, more leisure time, and changing housing preferences"*. Suburbanisation has also been seen as the dominant and successful mechanism for reducing congestion with shifting road and highway demand to less congested routes and away from core areas (Gordon and Richardson 1997, 5). On the other hand, suburbanisation is usually associated with some negative socio-economic and environmental impacts, such as longer working and shopping trips, more energy consumption, pollution, accidents, and problems of public transport provision in low-density areas (Arbury, J. 2005, 15; Masser *et al*., 1992 cited in Nijkamp *et. al.* 1997, 694). It can also be said that lower density development has increased dependency on the automobile for transportation, and reduced the effectiveness of public transportation (de Roo and Miller 2000, 5). In other words, *"**sprawl** is the most expensive form of residential development in terms of economic costs, environmental costs, natural resource consumption, and many types of personal costs"* (Real Estate Research Corporation, 1974, 2–7 cited in Cervero 2001, 1653).

The suburbanisation of living was followed by **a second wave** of **suburbanisation**

of employment in the **1970s** and **1980s**; hence jobs as well as dwellings tended to disperse further from urban centres into a broader metropolitan area. This dispersion process can be referred as extended suburbanisation or counter-urbanisation (Breheny, 1996 cited in Nijkamp *et. al.* 1997, 694-695). Besides, it is also said that a phase of re-urbanisation started which caused a strong revitalisation trend in inner-city areas and affected the wealthy residents that can afford to pay the increased rents in city centres. This can also be called as **a gentrification** process (Nijkamp *et. al.* 1997, 695).

These trends and views on suburbanisation and urban sprawl brought some changes in human settlement patterns during the **late twentieth century.** Urban planning has changed throughout the twentieth century and has led to a great variety of urban forms which often disregard their impact on the environment. In this period, two city types can be seen; **compact city** and **diffused (decentralised) city.** They are both the outcomes of two simultaneous spatial trends. Firstly; the concentration of an increasing share of the population and economic activities into urban areas (urban intensification); and secondly, the dispersion of population and economic activities within urban areas (implying low-density urban development) (Nijkamp *et. al.* 1997, 695; Arbury, J. 2005, 15-16; Anderson *et. al.* 1996, 10-12; Masnavi 2000, 64; Buxton 2002, 54-57).

The first of these trends simply reflects a shift to an urban economy, in which most people are employed in activities that are more spatially clustered. This trend has accelerated especially during the past two centuries and it continues at a rapid rate in the developing world, whereas it shows reduction in developed countries (Beale, 1977; Vining and Kontuly, 1978 in Anderson *et. al.* 1996, 10-12). **'Compact city'** is the result of this trend, in which high density housing is provided and jobs are mainly concentrated in the central city. In recent years, the compact city has become a leading principle in Dutch physical planning, and has been adopted in Europe as a guideline for urban planning[7] (Breheny, 1996 cited in Nijkamp *et. al.* 1997, 695).

[7] This 'urban intensification trend' issue will be discussed in detail in the 'compact city' section (Section 3.2.1).

The second trend, which is commonly referred as '**urban sprawl'** (suburban sprawl), shows a significant transformation of urban form and is mainly characterised by;

- *"an outward expansion of the metropolitan boundary that separates urban from rural land uses;*
- *a general decline in intensity of all forms of land uses, as measured by population and employment densities;*
- *transport networks that provided high connectivity among points, even in peripheral parts of the city; and*
- *the segregation of residential from other land uses, with the greater part of residences locating in peripheral suburbs"* (Anderson *et. al.* 1996, 12)
- rapid low-density growth consuming large amount of land;
- dominance of the private car in defining movement patterns, built form and spatial relationships;
- poor provision of public transport and lack of provision for or interest in walking or cycling
- mass, suburban, single-family housing;
- retail provision in standardized malls oriented to car use;
- increasing decentralization of workplaces to business parks and edge suburban centres that are accessible only by car (Quinn 2006, 312).

Large cities such as **London** and **Paris,** and smaller ones such as Milan and Brussels, seem to adopt this development pattern (Nijkamp *et. al.* 1997, 695).

The **main problems** of sprawl development are:

- *"High average trip distances for commuters,*
- *high dependency on private passenger cars,*
- *noise pollution, traffic accidents*
- *high level of transport related air pollution*
- *congestion on main arteries,*
- *high transport energy consumption,*
- *poor market shares of transit due to economically unfavourable settlement*

structures,

- *dangerous conditions for bicyclists and pedestrians,*
- *long trip lengths for pedestrians due to multiple barriers"* (Petersen 2002, 16).

Finally, as Falk (2006, 340) says, it is necessary to make an emphasis on the importance of giving attention to the suburbs if it is required to make real progress towards creating more sustainable towns and cities.

3.1.3.2. Alternative Urban Forms

Urban forms shape the future environmental sustainability of cities. Before seeing best forms ensuring sustainable development in the following section, some of the alternative forms, the 'shape' or 'structures' of cities are presented here. The following models are adapted mainly from Newton (2000, 46-50), Pressman (1985), Minnery (1992), Banister (1992), Loder and Bayly (1993), Buxton and Jackson (2004, 10) and Petersen (2002, 22) (See Figure 3.11).

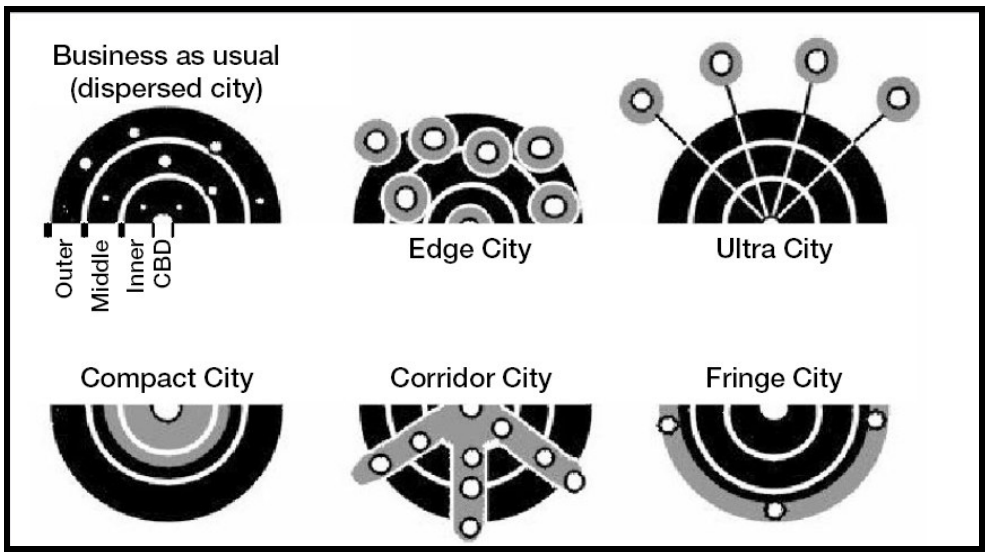


Figure 3.11 Structural Options For Urban Growth
(Source: Newton 1999 cited in Petersen 2002, 22; CSIRO 2006)

Dispersed city ("business as usual"): This type is simply an extension of current development practices. It refers to the low density development of detached housing and separated single uses in car dependent suburbs, with retail and commercial development concentrated in vehicle oriented regional nodes linked by freeways or major arterial roads.

Compact city: This type refers to the increased population and density of an inner group of suburbs, with associated investment in public transport.

Edge city: This type refers to increased population, housing densities and employment at selected nodes within the city, especially around important highway junctions and increased investment in orbital freeways links the edge cities or the nodes. This is also considered as a consequence of **a leap-frog** type of growth**.**

Corridor city: This type is a focus of growth along linear corridors spreading from the central business district (CBD), supported by upgraded public transport infrastructure.

Fringe city: This type refers to the additional growth predominantly on the fringe of the city, the outskirts.

Ultra city: This type refers to the growth in regional centres within 100 kilometres of the CBD. High-speed trains link the regional centres to the city heart. Housing and employment is located in existing small towns, regional towns, or newly constructed towns outside and separated from the metropolitan area.

In addition to these urban form models, there are **satellite cities** which are self-supporting cities that get benefit from their proximity to the mega-cities, but that are far enough away to discourage daily commuting. The basic idea and aim of satellite cities, is to restrict the spatial disperse of the major city, to avoid urban sprawl and hence to maintain the functioning of the metropolitan areas. While the creation of satellite cities, which are mostly seen in fast-growing Asian countries like China, is based on public planning and investments; the creation of edge cities, which are common in US, is market-driven (Petersen 2002, 22).

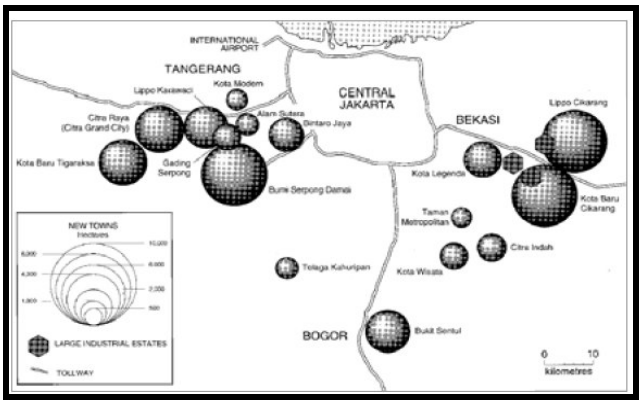


Figure 3.12 Satellite Cities In Jakarta
(Source: Dick & Rimmer, 1998 cited in Petersen 2002, 22)

As an example, at the end of the 19th century, European cities had established development corridors based on rail in early phases of urban growth and along this type of **rail infrastructure**; the stations formed nuclei of dense development and started a **'de-centralised centralisation'.** Nowadays, in developing countries, as **bus transport** is dominating and the private automobile is being accessible to a large amount of population, the corridors have been becoming more like bands rather than pearl chains. However, the advantages of the **corridor** or **pearl chain type** of structure are still continuing with higher public transport shares (Petersen 2002, 22).

As a result, examples of urban form models can be increased, but in terms of sustainability arguments, three main models of urban spatial development are identified: *Compact, corridor and multi-centered* urban form models. These are discussed in more detail in the following section.

3.2. Urban Form Models for Sustainable Transport (Macro-Scale Urban Planning Approaches)

It is known that for a long time, researchers and planning authorities have been trying to find out the impacts of urban form on a number of elements of sustainability, such as *social equity, accessibility, ecology, economic performance, pollution, and health*. In fact, the main concept that has attracted the most attention

both academically and in practice is the impact of city form on transport and mobility. The research about this concept has concentrated on the **'best' urban forms** to facilitate sustainable transport solutions, generally defined as "***reducing trip lengths and times***, ***reducing reliance on the car***, ***enabling efficient public transport***, ***encouraging walking and cycling*** and ***reducing transport-related emissions, pollution and accidents"*** (Williams 2005, 1).

Williams (2005, 1) explains that the outcome of much of this research promotes **compact** urban layouts with a mix of uses in close proximity. The compact city is thought to be the most sustainable urban form with many researchers like de Roo and Miller (2000, 5), Jenks, Burton & Williams (1996), because compact form reduces travel demand. The travel demand is reduced because people can work near their homes and make use of local services and facilities. Besides, compact form can provide population densities high enough to encourage public transport services and to support cycling and walking. Compact developments can also be defined as concentrations of high density developments around public transport nodes, or in local neighbourhoods within a city (Williams 2005, 1-2).

In Europe, Asia, USA and Australia, compact urban form models have become common in planning strategies. However, 'compact city' solution is not the only urban form model defined in the sustainability debate (Williams 2005, 1-2). There are two other solutions as sustainable urban forms. These are the **corridor** development and **multi-centred (multinucleated / polycentric)** development (Anderson *et al.* 1996, Williams *et al.* 2000, Williams 2005, 1). These different models of urban growth result in various transportation systems and mobility patterns. They are shown in two different ways in different articles (See Figures 3.13, 3.14).

The best known of these is the **concentric city.** The Focal point of this form is the central business district (CBD) and land uses are segregated into concentric zones around the CBD. CBD is the location where maximum employment density, maximum number of trip ends and maximum rent are seen (Anderson *et. al.* 1996, 10). This model of **concentric zone development** is rather simplified and in reality, there are *ring segments* with specific land uses, as well as segmentation of the

population according to socio-economic parameters. As it can be seen in Figure 3.13, high-income groups settled in the up-wind side of the city while low income people settled in the down-wind side and they suffered from industrial activities (Petersen 2002, 13).

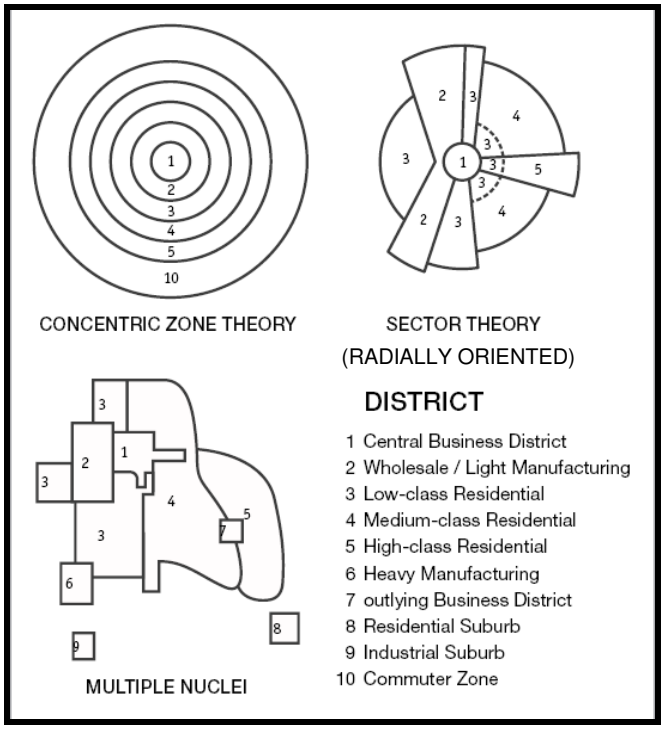


Figure 3.13 Urban Growth Patterns
(Sources: The University of North Carolina at Charlotte Website, www.uncc.edu/~hscampbe/landuse/b-models/B-3mods.html cited in Petersen 2002, 13)

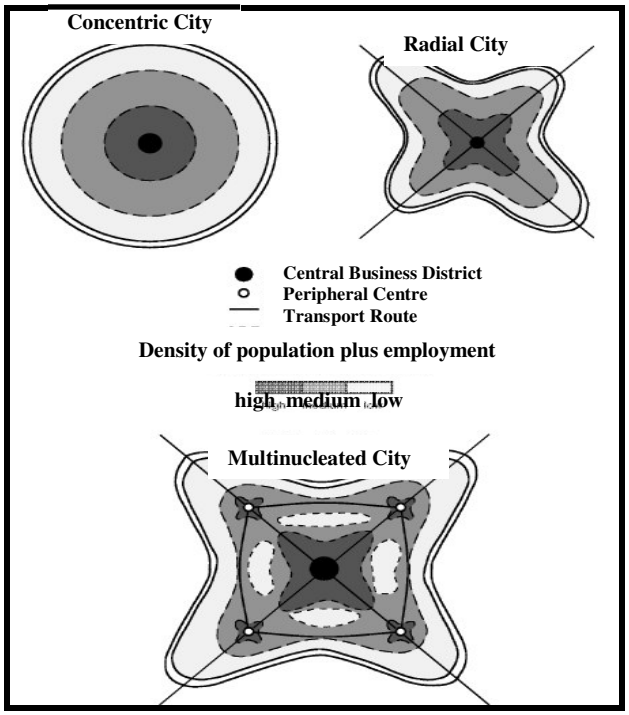


Figure 3.14 Urban Growth Patterns
(Source: Anderson *et. al.* 1996, 11)

"The differences in urban development structures have consequences for the demand and supply of transport services" (Petersen 2002, 13). The **concentric form** assumes a very dense transport network which consists of a smaller number of major routes that extend out from the CBD (Anderson *et. al.* 1996, 10). The **radially oriented city** will show articulated arteries that lead to the heart of the city and allow supply of high-volume rail and bus system (Petersen 2002, 13). This means, in the radial city, there are sectors of intense land uses that extend out from the CBD along *major lines of transport*[8] (Anderson *et. al.* 1996, 10). Due to the sectoral changes in land uses, this city form is also called as sectoral development type. The sectoral development type provides chances for short distances between housing and other functions (Petersen 2002, 13). A general characteristic of the radial form is that trips between points in *different sectors* must be made by way of the CBD. Therefore, it can be said that in radial cities, there is a relatively *low level of connectivity* among locations in the city (Anderson *et. al.* 1996, 10).

[8] A special case where there is only one transport line with the CBD located at its centre is called the **linear city** (Anderson *et. al.* 1996, 10).

A third urban form that has received increasing attention in recent years is called the **multinucleated city** in which the CBD has lost its dominance to a number of other foci. In this form, there is a more complex and hierarchical system of transport infrastructure in which not all routes are oriented toward the CBD. Therefore there is *a higher level of connectivity* in the city. In such a city, spatial interactions may flow in all directions and the simple relationship between land-use type and centrality disappears (Anderson *et. al.* 1996, 10). However, the multiplenuclei type may cause more problematic conditions for efficient public transport supply, and the distances often may be too long for preferring nonmotorised trips. Hence, the private passenger cars will attain high market shares (Petersen 2002, 13).

3.2.1. Compact City

In the past twenty years, the main focus has been on the impacts of different urban forms on travel behaviour and transport provision, resource efficiency, social equity, accessibility and economic viability. The outcome from this debate, particularly in Europe, the USA Australia and Japan has been a strong advocacy of the 'compact city' model (Jenks *et al*., 1996; Williams *et al.*, 2000 cited in Williams 2002; Burgess 2000, 10). This concept has emerged as a response to the widespread belief that there is a need to find more sustainable models for the towns and cities of the developed world and the compact city is the solution that is beneficial for *environmental, social, and economic* sustainability (Williams 2000, 30; de Roo and Miller 2000, 1; Burton 2000, 1969). One important result of the search for sustainable urban development has been the revival of interest in compact city theories and policies. It has been adopted as a strategy for reducing low-density urban developments and preserving the countryside (Burgess 2000, 9). For example, in the late 1970s, especially in Europe, the loss of countryside to suburban development has given rise to compact city development policies in order to make cities *self-contained* (de Roo and Miller 2000, 4).

There are many definitions of compact city. Essentially the compact city is a high-density, mixed-use city, with clear (i.e. non-sprawling) boundaries (Jenks *et al*., 1996; Williams *et al.*, 2000 in Williams 2002). It is possible to offer a combination

of the definition of contemporary compact city approaches as increasing built area and residential population densities and intensifying urban economic, social, and cultural activities with mixing functions instead of separating them. It can also be said that the compact city is about managing urban size, form and structure with adopting environmental, social, and global sustainability benefits that can be obtained from the concentration of urban functions (Burgess 2000, 9-10; de Roo 2000, 33).

The process of achieving urban compactness is usually termed as **'intensification', 'consolidation'** or **'densification'** (Burton 2000, 1969). According to Buxton & Jackson (2004, 10); Buxton (2000, 56); Newton (2000, 46) and Petersen (2002, 22), the compact city, that is also referred as *conventional consolidation*, is the intensification of population and activity through higher density housing especially in the inner and middle ring suburbs with associated investment in public transport. Promoting consolidation aims to reduce private vehicle use and transport energy consumption, and to ensure better utilisation of existing facilites and a range of social and environmental benefits.

As an example, there is considerable research that was done by Australian Urban and Regional Development Review, to indicate that density and land use mix are both related to modal choice and that, as these increase, the levels of public transport use and walking increase, while car usage decreases. In that research, it has been concluded that concentration around a strong central city (compactness), increased density, restricted urbanization of the countryside, supported public transport-oriented development, and localised employment and services. Hence, compactness can contribute to transport energy savings and, over a period of about 20 years, significantly increase the sustainability of cities (Armstrong *et.al.* 1995 cited in Buxton 2000, 56; de Roo 2000, 32).

Conventional urban consolidation can occur through intensification of housing in the existing urban area, or on the urban fringe, or through both (Buxton 2000, 56). Intensification can occur in planned ways through governments or market. Intensification of built form can be obtained with redevelopment of suitable existing buildings or undeveloped urban form, intensification of activity can be obtained with

raising use of existing buildings or sites (Jenks 2000, 243; Buxton 2000, 56).

In summary, these three processes; 'intensification', 'consolidation' or 'densification' encourage the re-use of brownfield land, more intensive use of urban buildings, and transformation of existing development and an increase in the density of population in urban areas (Burton 2000, 1969). They are also commonly understood as processes that enable constructing new buildings at higher densities in cities, developing vacant land in urban areas and support high-density redevelopment (Williams 2002, 2).

3.2.1.1. Advantages of Compact Cities

For sustainable urban futures, the compact city form with its process of urban intensification is chosen as it can provide benefits in terms of resource efficiency, reduced travel demand, and livable environments. Many countries, especially in Europe, are referred as following policies of urban consolidation as a way of achieving these goals (Jenks *et. al*. 2000, 17). **'Compact City Model'** has been supported for its many advantages (Williams 2002).

First, compact cities are claimed to be efficient for **more sustainable modes of transport** because the population densities are high enough to support public transport and to make it feasible to operate (Williams 2002, 1). It is generally accepted that public transport works better in compact cities as there is a tendency for a larger population to live within easy access of a stopping-point (Goodchild, 1994; ECOTEC, 1993 cited in Burton 2000, 1973; de Roo & Miller 2000, 6). As compact cities have high density and mixed land uses, the theory is that people can live near to their work place and leisure facilities (Williams 2002, 1) or in other words, households are in closer proximity to facilities (Burton 2000, 1972). Hence, the demand for travel is reduced and the need to travel by car and fuel emissions is decreased (Burton 2000, 1969; Buxton & Jackson 2004, 11; Masnavi 2000, 65; Williams 2002, 1; de Roo & Miller 2000, 6). As a result, there is a support for public transport and walking and cycling (Williams 2002, 1; Burton 2000, 1969).

The compact city is indicated as **a 'pedestrian-friendly city'** or **a 'walking city'**, and a more equitable alternative to car-led urban sprawl (Burton 2000, 1973). According to Burton (2000), Newman and Kenworthy have provided perhaps the most well-known evidence of this property of compact cities. At the end of the 1980s, they provided evidence of the fact that there is a clear relationship between low-density areas and petrol consumption. Their work has proposed that higher-density cities are associated with a high usage of public transport because they discovered that public transport declines as density drops and takes a value at around 20–30 people per hectare (Newman and Kenworthy 1992 cited in Burton 2000, 1973-1974).

Second, compact cities are perceived as **a sustainable use of land**. By reducing sprawl, land in the countryside is preserved (conservation of countryside) and land in towns can be recycled for development (Williams 2002, 1; Burton 2000, 1969; Buxton & Jackson 2004, 11). In addition, a possible advantage of the compact city is that it may be easier to access open countrysides out of the city boundaries (Burton 2000, 1972). Stretton (1994) gives an example that going out is often easier in Europe with shorter distances and better public transport (Stretton 1994 in Burton 2000, 1972).

Third, in social terms, compactness and mixed uses are associated with **diversity**, **social cohesion** and **cultural development** (Williams 2002, 1). Some also argue that it is an equitable form because it offers good accessibility to city facilities and services for all parts of the society (Williams 2002, 1; Burton 2000, 1969; Buxton & Jackson 2004, 11; Masnavi 2000, 65). It ensures a range of several intensified social activities and a high quality of life for the whole community (Buxton & Jackson 2004, 11; de Roo & Miller 2000, 6). Compact form increases social interaction with presenting more opportunities for social contact in the neighbourhood's streets and public spaces as it provides more frequent use of these places and walking trips (Masnavi 2000, 65).

Burton (2000, 1970) states that while it may be the an uncertain statement that the compact city is **a socially equitable city**, it is accepted that the compact city has the potential to reduce the separation between home and work and so to reduce the time and money spent on commuting (Freeman, 1984; Elkin *et al*., 1991; Hawke and Howe, 1991; Beer, 1994; Laws, 1994 cited in Burton 2000, 1973). Such an impact

would promote social equity because the disadvantaged people, especially those who do not have a car, may suffer from unequal accessibility problems in a decentralised city (Burton 2000, 1973). There are many discussions on existing suburban land-use patterns which are inequitable and racially segregated. It is argued by many that measures to increase compactness would improve equity (Gordon and Richardson 1997, 10).

Fourth, compact cities are argued to be **economically viable** because infrastructure, such as roads and street lighting, can be provided cost-effectively per capita; meaning that lower infrastructure costs can be reached (Williams 2002, 1; Buxton & Jackson 2004, 11). This more efficient utility and infrastructure provision with the revitalisation and regeneration of inner urban areas improves public health, through reducing pollution, particularly that caused by emissions from vehicles (Burton 2000, 1699; Masnavi 2000, 65; de Roo & Miller 2000, 6).

3.2.1.2. Impacts of Intensification

Williams (2000) made a research to determine the impacts of intensification over a ten-year period in three London boroughs to assess whether compact city policies are meeting their objectives. The case study areas were Harrow, Camden, and Bromley in London (Williams 2000, 30). The research findings are combined with studies and findings of other authors.

(i) The environmental consequences of urban intensification:

From a spatial point of view, compactness might be seen as a contribution to multi-functionality of a city; however, **from an environmental point of view,** it might lead to some conflicts as it can have both environmentally sensitive and environmentally harmful functions (de Roo 2000, 33). It is said that compact urban development has shown some spatial and environmental policy dilemmas, because it can restrict some spatial and economic developments in urban areas and it can affect the environmental quality of these areas in a negative way (Bartelds and de Roo 1995, VROM 1993b cited in de Roo 2000, 33).

First, it is searched *whether urban intensification reduces the need to travel or not*. The result was that it is extremely difficult to change existing travel patterns and behaviours with overcoming car culture and educating people about the strategic impacts of car use. On the other hand, as intensification rejects trip-generating developments in peripheral locations, and concentrates new development in existing centres, it can be said that the infrastructure is suitable for other trip-reducing policies to be effective. **Secondly,** it is searched *whether urban intensification represents the most suitable use of land or not*. The research showed that intensification policies that strongly restrict peripheral development forced the development towards brownfield sites and made derelict lands viable. **Thirdly,** *the wider environmental impacts of urban intensification are searched*. Three key environmental impacts were identified (Williams 2000, 35-36).

First impact was "***loss of greenery"*** issue and the argument is that increasing development and densities in urban areas limits space for greenery (Breheny 1992 cited in Williams 2000, 36 and cited in Burton 2000, 1972). However, the losses of greenery can be prevented if developers and planners give attention to landscaping and planting (Williams 2000, 36). As another example, Burton (2000) states that European cities are compact ones whereas Australian cities are more dispersed. Stretton (1994) expresses that Europeans have to leave town to reach some recreational areas whereas Australian cities have green areas in their towns (Stretton 1994, 133 cited in Burton 2000, 1972-1973).

Second impact was about the claim that intensification could have "***an upgrading effect on the built environment and contribute to urban regeneration"*** (Rogers 1995 in Williams 2000, 37). On the contrary, Evans (1990) and Hubbard (1994) found that the effects of intensification were dependent on location, type and quality of development. For example, in the residential suburbs, infill developments were often seen as having a harmful effect on the environment due to their poor quality (Evans 1990 and Hubbard 1994 cited in Williams 2000, 37). Third impact was about the claim that intensification would lead to "***increased environmental wear and tear".*** It was seen that mixed and crowded streets can cause problems (Williams 2000, 37).

As a result, Williams (2000, 37) concludes that urban intensification policies with environmental aims have had several successes, especially enabling a sustainable use of land. On the other hand, their inability to reduce travel demand by using energy-rich modes of transport is also indicated. Finally, Williams stresses that the rapid growth in car ownership and tendency of life patterns to disperse are common trends which are difficult to influence through land-use planning policies alone. Therefore, it can be resulted that there should be other instruments that will encourage land-use planning tools.

(ii) The consequences for quality of life of urban intensification:

Firstly, it was searched *whether providing homes in urban areas leads to a better quality of life or not.* In the case studies, it was resulted that while determining the quality of life, the people's cognition or feelings and the location of intensification (suburbs or center) was important. For instance, if people give attention to vibrancy and liveliness, then they will perceive intensification as a positive policy. On the other hand, if people give attention to silence of residential neighbourhoods, then they will perceive intensification as a negative policy (Williams 2000, 38-39).

Secondly, it was searched *whether urban intensification improves a city's vibrancy and culture, and lead to a sense of community, local identity and safety or not*. In 'The Death and Life of Great American Cities', published in 1961, **Jane Jacobs** argued that the presence of *"eyes on the street"* deters people from making public wrongs and supports personal safety (Burton 2000, 1975). The development of housing in non-residential areas (with social facilities, etc.) and ensuring compactness may reduce fear of crime (Goodchild, 1994 cited in Burton 2000, 1975). However, it is said that the public perceptions are often the opposite of this, as high-density urban form has often been associated with high crime levels and cities have generally been associated with violence and danger (Williams 2000, 39-40; Burton 2000, 1975).

Thirdly, it was searched *whether urban intensification improves accessibility to services and facilities or not.* As 'equity' issue is a part of intensification policies,

accessibility to services and facilites are supplied to all urban residents, both in physical terms (proximity) and as opportunity. However, surveys of residents showed that intensification did not seem to contribute to improving accessibility to more specialised jobs or retail, cultural or leisure facilities (Williams 2000, 40).

Lastly, *the wider quality of life impacts of urban intensification were searched*. First impact was the issue of whether "***intensification leads to reductions in private space"*** or not. There was a conflict about this issue (Stretton 1996; Evans 1988, 1999 cited in Williams 2000, 40)**.** The research's findings supported this trend and, as Burton (2000, 1974) also stated, the new houses were smaller than the average size of the existing stock. The second impact was that in intensified areas, as a result of the reduced need to travel and increased usage of non-car modes of transport, the "***impacts of traffic such as air pollution, noise and generally poor environment for cyclists and pedestrians would be improved".*** However, Williams (2000) says that in the case studies, no evidence of this benefit was found out and findings supported Engwicht's (1992) argument that because of high traffic volumes and dangerous traffic, a compact city may lead to a worse environment for walking and cycling (Burton 2000, 1974; Williams 2000, 40-41). The final impact was the relationship between mixed-use, higher density developments and ***negative neighbour effects.*** Findings supported this (Williams 2000, 40-41).

(iii) The economic consequences of urban intensification:

Firstly, it was searched *whether urban intensification contributes to vital and viable local economies or not* and it was found that increasing densities, and encouraging mixed-use developments generate new local services and improve economic viability. **Secondly,** it was searched *whether intensification improves access to employment or not* and it was found that access to certain types of employment improved by intensification (Williams 2000, 42-44).

In conclusion, intensification made some contributions to sustainability in some certain aspects. In the research, policies had been effective in transforming derelict land, and orienting development to less desirable brownfield sites. Nevertheless, it was also discussed that with only achieving more intensive development; the

planning system cannot be accepted as promoting a sustainable use of land. Although intensification can provide urban forms in which sustainability objectives can be facilitated, the resulting urban forms cannot be said to be sustainable spontaneously. Williams (2000) and Church (1995) refers intensification policies as being ***"necessary but not sufficient"*** (Church 1995 cited in Williams 2000, 44- 45). Therefore, it can be said that intensification policies are not enough alone and they should be supported with other policies.

3.2.1.3. Conclusions

Compact cities provide many facilities such as better access to public transport and shopping facilities and improve the image of an area with well-designed buildings. On the other hand, there are also problems caused by intensification such as traffic congestion, air pollution, noise, and loss of green space. In total, it is accepted that intensification can a way of achieving more sustainable urban forms, but only in some certain circumstances. Therefore, for success, alternatives should be explored and there should be discussions between *several stakeholders* to make acceptable decisions with realizing and responding to *local differences* (Jenks 2000, 244-250). For this, de Roo (2000, 40) states that there is a need for *strategic planning* for spatial and environmental policy on the local level. This means that the local environmental quality should be protected through local planning and development that may deal with dilemmas of the compact city.

Therefore, the decision makers should have an awareness of the importance of decisions that can affect spatial development. With the lack of control over development, it will be very difficult to assess whether the benefits of compact city have been achieved (Williams 2002, 4-5). In 1990, the Commission of the European Communities stated that, *"**Effective management** of our urban environment requires a strategy based on an overview of the urban system, with **integrated decision-making** in key areas* (CEC 1990, 24 cited in Williams 2002, 5)*"*.

It seems that there is a still interest on the compact city model, but as a universal response to unsustainable cities it can only be seen as *a small part* of the solution.

Recently, other alternative urban form models were also introduced as being effective in attaining sustainability. These are the **corridor development model** and the **polycentric city model** (Williams 2002, 5-6).

3.2.2. Corridor Development (Radial City)

In the end of the 1950s and during the 1960s, the idea of **corridor-development,** both planned and unplanned, was actively studied and discussed among spatial planners, designers and scientists. However, many of these scholars also met a difficulty of visualising the dynamics of the corridor development. Generally, three spatial designers or researchers; George R. **Collins** (architecural historian), C.F.J. **Whebell** (geographer) and C. **Doxiadis** (architect/urban designer), were distinguished in the discussions on corridor development during the 1960's. In this section, in order to understand the current discussions on ***corridor-development,*** the definitions and schematic representation of both corridor and linear development will be explained as linear cities are shown as being reference to corridor development (Sap 2007, 3).

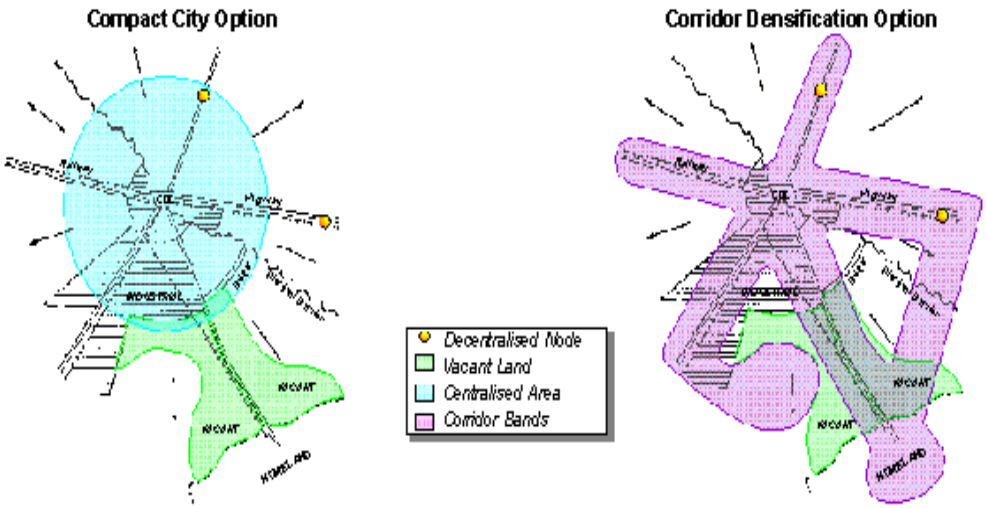


Figure 3.15 Corridor Development
(Source: Official Website of South African Department of Transport (Cape Town): http://www.transport.gov.za/projects/msa/msareport/msarpt_fig82.gif, Last accessed date: January 15, 2008)

3.2.2.1. Defining Corridor City

Corridors are referred as urban development along lines and flows, which can be material like roads, water or rail as well as flows of data, power, etc., in the landscape. **Corridor development** is a form of urbanisation that has formed through the whole history of urbanization for many reasons such as production, socio-economic, etc. *"The concept of the corridor was introduced in the middle of the 1960s both as an evolutionary development of the landscape (Whebell) and as planned urban development axis (Friedman e.a.). The last decade corridors have been mainly researched with a focus on economy and transportation, although in the Netherlands, in the middle of the 1990s, another attempt was made to introduce the concept as urbanisation concept"* (Sap 2002, 1).

According to Sap (2003), corridor development occurs as a spatial expression of the postmodern organisation of production (postfordtist industrial production and knowledge economy). Regarding this, in urban networks that have always existed, the infrastructural lines between the nodes in these networks become urbanized. Companies prefer to settle along these lines and new housing developments also emerge there, often as expansion of existing centres. Reasons are *low land costs, connectability, employment, space and the proximity to green space and urban centres* (Sap 2003, 3). According to Newton (2000), corridor city development is a focus of growth along linear corridors emanating from the central business district (CBD) that are supported by upgraded public transport infrastructure and are separated by rural green belts (Newton 2000, 46; Buxton and Jackson 2004, 10).

In order to understand the corridor and linear development more, the explanations and definitions of some researchers will be discussed and figured.

Firstly, the discussions on 'corridor development' in the **Netherlands** can be examined. In the Netherlands, at the end of the 1990s, 'planned corridor-development'concept became one of the leading concepts in spatial planning. In 1999, in the Dutch preliminary document of the 'Fifth National Report on Spatial

Planning (2001)', called as 'Startnota' [9], 'planned corridor development' was proposed as a future concept for spatial planning in the Netherlands and corridor-development was seen as inevitable.

At the beginning, the corridor concept entered the Ducth spatial planning discussion as transport-corridor, on which infrastructure and related commercial activities are clustered. In the report, the definition concentrates on *"bundles of road, rail and where possible water and pipe infrastructures connected by so-called multimodal change and transshipment locations"* (VROM 1999, 42, authors translation cited in Sap 2007, 2).

In the Startnota, the corridor was defined as *"an urban development axis, constructed along infrastructure, composed of (existing) urban centres in combination with building zones in suburban densities between those centres, intended for companies, services, and dwellers. Corridors are intended to meet the urgent need for settlement-space of households and companies; thereby form a realizable integration-framework for the bundling of deconcentrating urban space-use"* (VROM 1999, 41, authors translation cited in Sap 2007, 2). Sap (2007) explains that the concept of 'bundled deconcentration' of urban development was presented to meet the population growth and to concentrate suburbanisation in some certain nodes along main infrastructures (Sap 2007, 2).

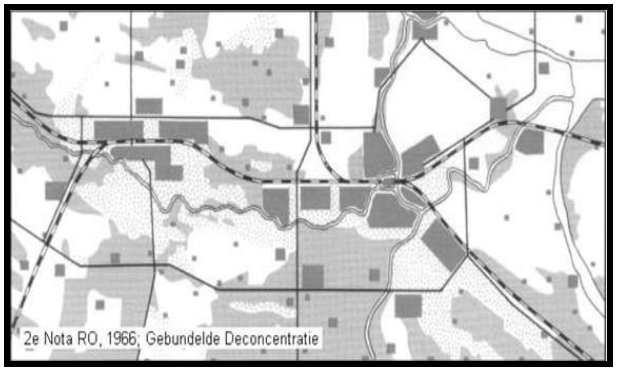


Figure 3.16 Bundled Deconcentration
(Source: Dutch Second National Report on Spatial Planning 1966 cited in Sap 2007, 2)

[9] 'Startnota' means 'Starting Memorandum on Spatial Planning' in long terms.

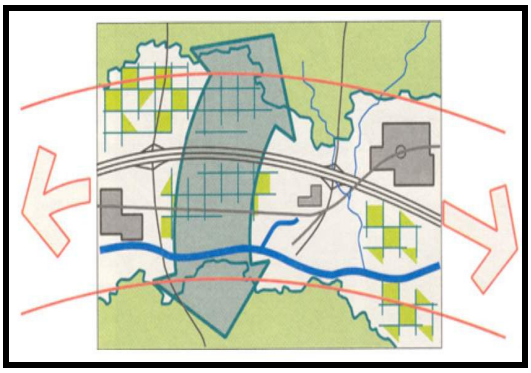


Figure 3.17 Principles For The Organization of Corridors
(Source: Startnota, 1999 cited in Sap 2007, 3)

Although the 'planned corridor' was adopted as a reaction to unplanned corridor-development and urban sprawl, the concept did not gain popular support and was rejected by spatial planners and urban designers. By the time the Fifth Report was finished in **2002,** the concept of planned corridor development was removed from the document. This was due to the *'lack of a clear definition'* and the '*unability to develop an adequate visualization'* of the concept. The corridor growth was replaced by the compact city concept. The strong image of the compact city was surrounded by a green countryside and settlements should expand within these boundaries. As the government changed, the Fifth Report was never actualized (Sap 2007, 1-3).

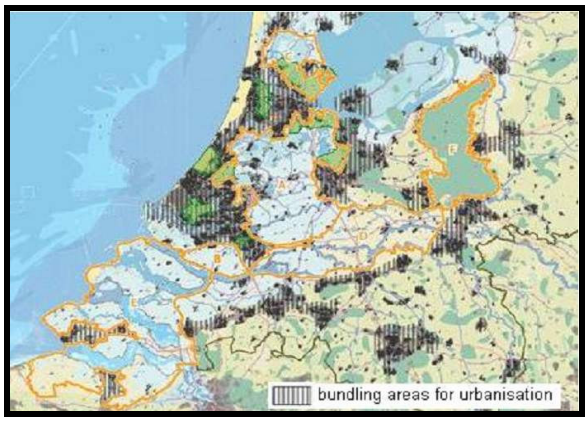


Figure 3.18 Bundling Areas For Urbanisation (Fragment)
(Source: Vijfde Nota, 2001 cited in Sap 2007, 3)

Secondly, George R. Collins's (architecural historian) discussed the 'corridor development' from another perpective. Collins wrote about linear planning in the late 1950s and the 1960s, due to the rising popularity of the linear cities at that time. In his articles, Collins expresses that linear growth has been *"the natural pattern of growth of our great urban regions"* (Collins 1968 in Sap 2007, 4). Collins is afraid of *unplanned* and *uncontrolled* linear growth of cities, but he expects that planners could control this development. His rejection of the unplanned growth and expectations of the planned corridor looks like the Dutch short-lived but positive attitude towards the corridor in 1990s (Sap, 4).

In Collins definition, 'linear city' and the 'corridor' concepts seem to be *interchangeable*. His definition starts with 'a linear city' and ends with 'the linear corridor': *"A* linear *city is one that is formed - and grows - along a line. This line is usually its artery of transport for people, for goods, and for services: roads, rails, pipes, and wires. A city of this sort can grow freely - infinitely - in increments…" . "...Since the extensions of the growing city are narrow in width, all its points are in close confrontation with natural landscape, and the countryside in turn partakes of the advantages of modern city life, brought to it by the* linear *corridor"* (Collins 1968, 2 cited in Sap 2007, 4).

Collins emphasises that while the existence of linear settlements in history was based on the topographical or ecological circumstances; actual 'linear plan' is *"very much a modern idea"*due to transportation revolution and changes in planning (Collins 1968, 3 in Sap, 4), In his article, Collins defines a great variety of linear concepts and designs (the single-axis plans, production-line plans…) and tries to combine two types of presenting linear plans; the scheme (like the schemes of Miljutin, or Le Corbusier) and the blueprint (like the blueprint-plans of Malcolmson) (Sap 2007, 4).

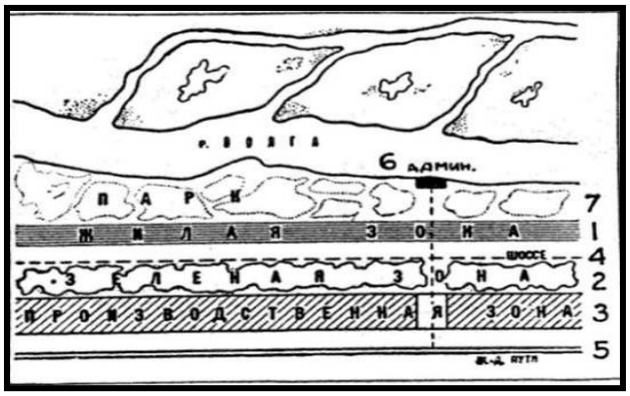


Figure 3.19 Tractorstoi, Stalingrad
(Source: N. Miljutin, 1930 cited in Sap 2007, 5)

Collins balances these two types and argues that *"linear planning is 'regional planning' and not 'city building'; it is the system or process that prevails"* (Collins 1960, 345 cited in Sap 2007, 5) [10].

Thirdly, in 1969, the geoprapher **C.F. Whebell** published a study on 'corridor development' in the Annals of the Association of American Geograpers. In his article Whebell defines the corridor *as "a linear system of urban places together with the linking surface transport media"* and as *"a linear pattern of major towns joined by highly developed bundles of transport routes"*. Similar to Collins who expressed that linear planning has been the natural pattern of growth of urban regions, Whebell also defines the corridor as *"very persistent historically…"* (Whebell 1969, 1-5 cited in Sap 2007, 5). In his study, Whebell mainly concentrates on *geographical assets* and *economic forces,* which form the corridor development, rather than *actual planning aspects*. Whebell refers the corridor development as a development that is both based on economic development and a requirement for economic development (Sap 2007, 5).

Although **Collins** stresses that linear planning should be seen as a process; he mainly shows several *'finished'* linear plans. On the other hand, **Whebell** obviously contains the dimension of time in his theory besides space and defines corridor development

[10] For more detailed information on Collins's descriptions, see:
- Collins, G. R., 1959a, "Linear Planning Throughout the World", *Journal of the Society of Architectural Historians*, vol.18; no.3. (October), pp.74-93.
- Collins, G. R., 1960, "Cities on the Line," *Architectural Review*, vol. 128, November, pp.341-345.

as an evolutionary process. In addition, while Collins considers efficiency and expanditure as the key characteristics for linear planning, Whebell draws attention to the relation between trade and location for the development and structure of urban systems (Whebell 1969, 1-2 cited in Sap 2007, 6).

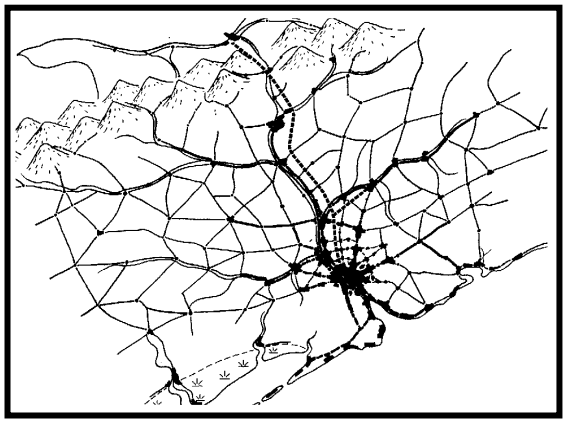


Figure 3.20 Corridor Development, Stage Five; Metropolitanism
(Source: C.F.J. Whebell, 1969 cited in Sap 2007, 7)

Whebell (1969 cited in Sap 2007) deducts that the spatial development and the movement between settlements will follow the most convenient routes and that knowledge and trade will spread along these routes. According to this concusion, Whebell describes a 'space of flows' by taking into consideration the postmodernisation of production in which production has become more and more spatially flexible (Castells, 1996, Harvey, 2000 cited in Sap 2007, 7). Sap states that the urban networks and development of dominant nodes in this network can already be seen in Whebell's diagrams for evolutionary corridor development (Sap 2007, 7)[11].

The postmodernisation of space is an important issue in the corridor development history. Since the late 1960's, new ideas on spatial planning have emerged, because

[11] For more detailed information on Whebell's descriptions, see: Whebell, C.F., 1969, "Corridors: a theory of urban systems," *Annals of the Association of American Geographers*, vol.59; no.1. (March), pp.1-26.

there has been a cultural shift from *modernism* to *postmodernism* and an economic/ technological shift from *fordism* towards *post-fordism* in organization of production terms. Spatial and urban organisations are closely related with organisation of production (and consumption) (Sap 2003, 1-3).

Postfordism describes the changes in industrial production from large scale, which is referred as mass production, towards a more flexible and small scale production. Hence, larger companies have collapsed into more or less autonomous specialized companies that work together in a global network. In addition, post industrialism describes the strong growth of the commercial service sector and the emergence of *a knowlegde economy* since the 1960's (Sap 2003, 3).

The fluency of flexism is the consequence of *cheaper and faster transportation* and telecommunication systems, the globalization of the market and the rise of flexibility and specialization in production. Castells mentions about a space of flows of capital and goods beside the traditional space of places (Sap 2003, 3).

The postmodernisation of production results in an increasing importance of productive flows and networks and the assembly line of the industrial economy is replaced by the network in the informational economy. This network is flexible and requires no physical centre (Negri and Hardt 2000, 295 cited in Sap 2003, 4). Because of developing information and communication technologies, there has been a change in forms of communication and the importance of proximity has started to disappear. Then the position in networks, whether it is close to a harbour…etc. or not, have become important for settlements to develop and *"cities of control"* have emerged (Sassen, 1991; Hardt&Negri, 2001 cited in Sap 2007, 4-7).

Deleuze (1994) describes the city as connecting the roads and causing flows along different places along horizontal lines with its entrances and exits. Deleuze also mentions that while the cities are now becoming less and less apparent; the network becomes the urban (Deleuze 1994, 432 cited in Sap 2003, 4). With the development of networks and the development of corridors, the importance of spaces between the urban nodes gains power. Hence, a development *from points to lines* is seen. Therefore, as Sap (2003) states, the cities are no longer nodes in a network but the cities are merging with their hinterland and transform into an urban field with *"nodal*

and linear concentrations" (Sap 2003, 5-6).

Thirdly, the architect and urban designer, **C. Doxiadis's,** point of view can be discussed. While Collins, as an architectural historian, focusses on morphology, Whebell, as geographer, concentrates on spatial transformations and development with changing economy. Then Doxiadis, as an architect/urban designer, can make a synthesis of these two perspectives. Doxiadis emphasizes that there has been a transformation and increasing complexity of the cities, which were based on pedestrian speed and distance in the past, due to the introduction of new modes of transportation (Doxiadis, 1963 cited in Sap 2007, 7).

Doxiades distinguishes and illustrates three main forces shaping the new dynamic and complex urban system:

- *"**Centripetal forces** of existing settlements* (See Figure 3.5),
- ***Linear forces** of modern transportation systems,*
- ***Aesthetic forces** of attractive locations"* (Doxiadis 1963, 311 cited in Sap 2007, 8) (See Figure 3.21).

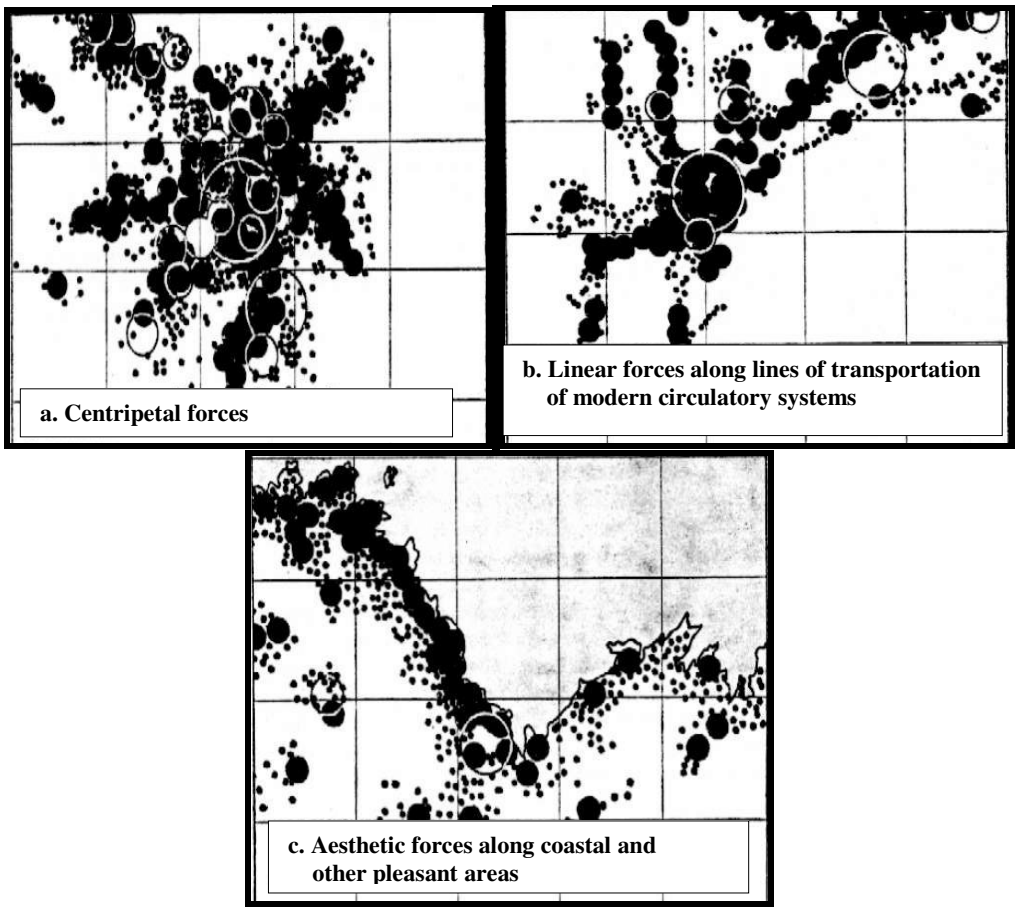


Figure 3.21 The Forces Shaping The Urban System
(Source: Doxiadis 1963, 311 cited in Sap 2007, 9)

In these three figures, linear urban systems can be clearly distinguished. **Figure a** shows linear urbanisation along (rail) roads. These roads between new and historic urban settlements have become important and provided radial growth of cities (region). **Figure b** shows that linear or transportation forces can occur also on a larger scale than the city (region); at a national or supranational scale. **Figure c** shows that the aesthetic forces, like a scenic coastline, can affect the form of development both on the city (region) scale and on the larger scales (Sap 2007, 8)[12].
In conclusion, it can be understood from the studies of Collins, Whebell and Doxiadis, there are many similarities between the **corridor** and the **linear** city. Sap

[12] For more detailed information on Doxiades' descriptions, see:
- Doxiadis, C.A., 1963, *Architecture in transition*, Hutchinson, London.
- Doxiadis, C.A., 1967, "On linear cities," *Town Planning Review*, vol.38; no.1, pp. 35-42

(2007) states that formation of urban networks, linear decentralisation, (supra) regional development, the process of combining the characteristics of 'the city' (mobility, services…) and 'the countyside' (recreation, sceneric beauty…) are the evidences of this similarity. As described by Collins, the linear city concept can be regarded as urban/spatial expression of modernism (fordist) production that is inspired by mass production and the development of the train, highway and the assembly line (Sap 2007, 12).

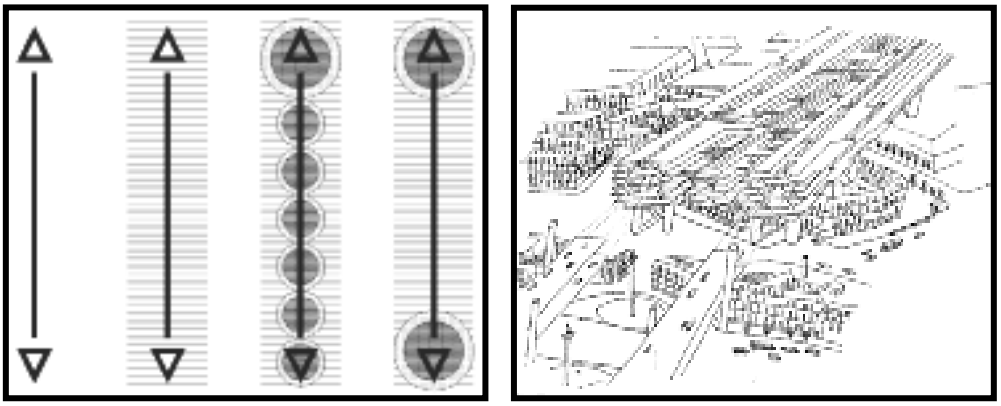


Figure 3.22 History of Linear Development: <u>Modern</u> - Linear Cities & <u>Postmodern</u> – Corridor
(Source: Sap 2002, 2)

As described by Whebell and Doxiadis, the **corridor concept**, can be regarded as an evolutionary and long-term concept for urban or regional development that also considers technological and locational assets and changes. Hence, the corridor is shown as a part of a historical urban pattern and regarded as spatial expression of postmodern flexible production. As a result of the increase in mobility and flexibility, a *"multidirectional spatial orientation"* has been observed. For example, as one of the modernist paradigms Le Corbusier's tree structure form (See Figure 3.23) is said to have been replaced by the postmodern paradigm of the net in which every location is potentially connected with each other (Sap 2007, 12-13).

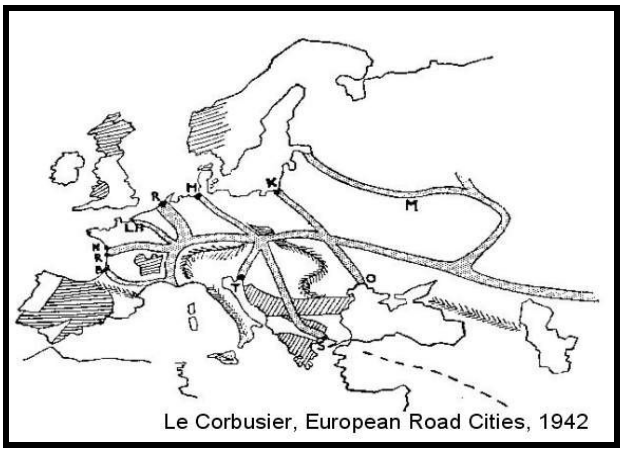


Figure 3.23 European Road Cities
(Source: Le Corbusier, 1942 cited in Sap 2007, 13)

Herwin Sap (2002, 1) states that the corridor development considers economic, social and ecological features and indicates an urbanisation process that is located between the nodes of *"multipolar urban networks"*. These multi-polar network cities are said to develop with supports of new technological developments especially in transport sector, and the associated flexibilisation of labour, production and mobilization. This type of urbanism has been expressed as an important trend in the post-fordist urban paradigm. It is also emphasized that together with the improvement of the **network city, corridor development** has been seen along infrastructures between the cultural, business and production nodes in the network.

3.2.2.1. Case Examples: *Frankfurt Rhein Main Region*

The Frankfurt Rhein Main Region is one of Europe's economic core regions that can be referred as showing a postmodern urban landscape which possesses both postfordist production industry and postindustrial service/knowledge economy. *"The region functions as an urban network; in which not just the main commercial cultural nodes are important, but also the space of flows gains importance"*. Besides, the linkages between the main nodes are very important. Those main nodes accommodate many of the commuters that work in the urban nodes of the region and include many of the postfordist and postindustrial production units. Therefore, the

main spatial strategy for the region focuses on the development of the *major urban nodes* and on the growth of smaller towns and cities that are planned strictly and controlled (Sap 2003, 1).

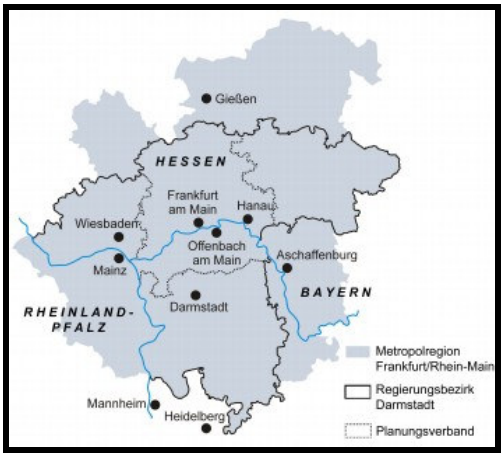


Figure 3.24 Rhein Main Region
(Source: Official Website of Kompetenznetze Deutschland the Federal Ministry of Economics and Technology Initiative: http://www.kompetenznetze.de/navi/de/Innovationsregionen/frankfurt-rhein-main.html, Last accessed date: January 15, 2007)

Sap (2002), has chosen The Frankfurt Rhein Main Region as the case study in his research (Corridor development, the corridor as a design question). This region was selected as a case study for several reasons. When the figures, which show the build and unbuild surfaces of the region clearly, are observed, it can be seen that as time passes there has been a concentration of build surface in **a linear zone** along the east-west orientated infrastructures. Besides this, the Frankfurt Rhein Main Region was selected as a case study because the region has;

- intensive aggregation of infrastructure: river, rail, road,
- integration in a larger multipolar urban network,
- history of service economy and trade/transport,
- transition of traditional industrial production into a more flexible organisation of production,
- tradition of urban and regional planning (Sap 2002, 1).

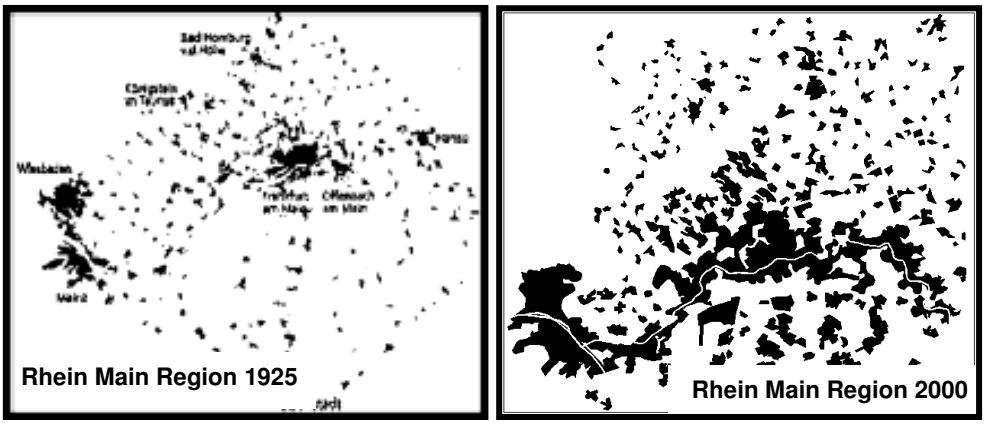


Figure 3.25 Rhein Main Region In Year 1925 And Year 2000
(Source: Sap 2002, 1)

The Rhein Main Region is not obviously defined in spatial terms and it is divided in three governmental units. Hence, planning for the Rhein Main Region often depends on the voluntary participation of these three planning units. This makes regional planning difficult and has caused a lack of vision. Regional plans, which have been made, have focused either on radial or linear models. For instance, one of the two recent spatial plans has been based on decentral-concentration concept whereas the other is a plan to combine the green spaces and settlements of the region with a network of ecological corridors (Sap 2002, 4).

The region has still a requirement for houses, workspace and recreational green-space. It is important to state that there is a densification of the historic cities of the region and the places between these historic cities develop their farmland and expand. While expanding, those cities form axes along the regions, road and public transport network. Although, the concentration is mainly east-west orientated between Aschaffenburg and Mainz, several north-west orientated axes can be distinguished (Sap 2002, 4).

In summary, the main features of the **Frankfurt Rhein Main Region** are the following:

- concentration of build surfaces in a linear zone along the east-west

orientated infrastructures

- planning for the region depends on three planning units
- current leading concept is 'decentral concentration' and network of green nodes and corridors
- corridor development by densification and transformation of farmland by competing towns (Sap 2002, 4).

3.2.2.2. Case Examples: *M4 Corridor in the UK*

Another case, studied by Sap (2002) is the **M4 Corridor** from London to Bristol in the UK as another case study. In this 'unplanned' corridor, accumulation of indirectly related functions created the corridor. In fact, the development of the corridor started as a movement from London to the west with the search of companies for more space and workforce. Then, this tendency of growth started to boom when military R&D centres started to develop commercial spin-off companies. Moreover, the car/airplane industry, which has turned a more post-fordist organisation of production, and the attractiveness of the good quality of living in the corridor has also contributed to the corridor's development.

In summary, what is specific for the M4 Corridor is that spatial and economic development partly started with the construction of the M4 motorway and the fast intercity train (Sap 2002, 1). It is also stated that Western London and its M4 Corridor towards Bristol show the cummulative effects of innovation, infrastructure and economic development Sap, 7).

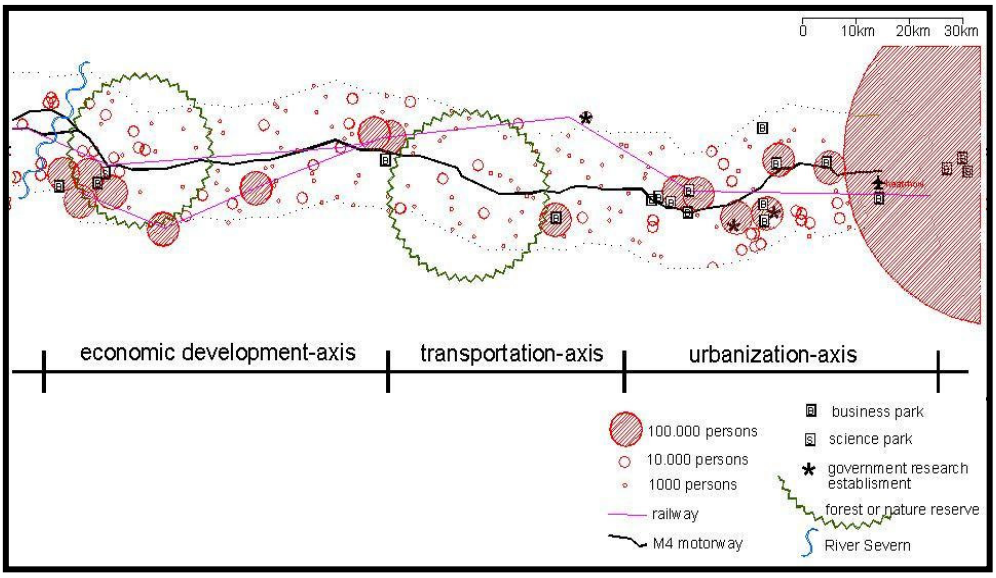


Figure 3.26 M4 Corridor In The UK
(Source: Sap 2002, 4)

3.2.3. Multi-centred[13] City (Traditional Neighbourhood, Transit Oriented, or Urban Village Development)

During the past decade, it has become popular to emphasize the polycentric nature of the many newly perceived urban and regional forms. These forms can be termed as 'post-industrial cities' by Hall (1997), 'polynucleated metropolitan regions' by Dieleman and Faludi (1998), 'polycentric urban regions' by Kloosterman and Musterd (2001), 'global city-regions' by Scott (2001) or 'mega-city regions' by Hall (2004). This attitude towards new urban and regional formations has resulted in a number of challenging new areas of discussions such as the ones on 'agglomeration economies' (e.g. Anas *et al.*, 1998; Phelps and Ozawa, 2003) and 'strategic planning' (e.g. Albrechts, 1998; Turok and Bailey 2004) (Lambregts 2006, 115).

When the history is questioned, the factors that have affected the creation of the polycentric nature of the urban forms can be realized. As it was discussed before (See Section 3.1.3.1), the beginning of *the information age* coming with a big economic change, was once considered both as inevitably leading to dispersed cities

[13] The terms **multinucleated, multi-centred, polynucleated and polycentric** are used interchangeably in the literature (Anderson *et. al* 1996, 31).

and also making them more car dependent (Webber 1963, 1964, 1968 in Newman and Kenworthy 2000, 114). Moreover, theories have recognised that information technology had the ability to reform cities with reducing the need for *face-to-face* interchange in some activities. However, there is still a continuing need for quality and human interaction which is crucial for economic and cultural processes (Castells 1989, Castells and Hall 1994 cited in Newman and Kenworthy 2000, 114).

After several years, it has been seen that, although the information technologies present many facilities; as it was in the past, human creativity can be developed when people gather face-to-face. Regarding this perspective, Newman and Kenworthy (2000) states that some have argued that *"local milieus"* will emerge (Willoughby 1994 in Newman and Kenworthy 2000, 114), or that local culture will be strengthened by globalised information that makes national borders less relevant (Sassen 1994, Ohmae 1990, Naisbett 1994 in Newman and Kenworthy 2000, 114). Some have claimed that *"the importance of face-to-face contact will ensure centres emerge as* ***critical nodes*** *of information oriented production"* (Winger 1997 Newman and Kenworthy 2000, 114).

According to Newman and Kenworthy's research (1999), all the cities in their sample are re-urbanising and there has been a significant shift towards increasing the amount of urban activity per hectare. They state that in US cities, this trend is seen as concentrating the activity in outer suburbs through 'edge cities' and so the inner areas continue to decline. Therefore, rather than dispersing urban activity, the information-based technologies focuses the activity in some nodes. In summary, the reasons for this are:

- professionals require **face-to-face interactions** for creative project development work;
- community, especially young people, always needs face-to-face contact;
- de-industrialisation of inner cities generally makes them even more attractive for human-based work locations; and
- as travelling time is being exceeded in fringe locations, busy professonals locates close to work (Newman and Kenworthy 2000, 115).

In summary, the information age seems to be favouring a multi-nodal city where the *sustainable transport modes* are increasingly important as sustainable modes can create more human-based centres that are critical for the new urban economy. The challange is to enable the emergence of such **sub-centres** not only in wealthy regions but throughout the all city (Newman and Kenworthy 2000, 115). Studies by Schofer and by Roberts in 1975, by Keyes and Peterson in 1977, by Van Til in 1979 and by the Municipality of Metropolitan Toronto in 1979 promote multi-nodal city. They argue that the '**least energy consumptive'** urban form was **'polycentric'** form which is an urban area including small, compact sub-centres arranged in transport corridors (Curtis 2006, 160-161)[14].

3.2.3.1. Defining Multi-Centred City

Newton (2000, 46) calls the multi-centred city as the **edge city** or **multi-node** city. He emphasizes the rises in population, housing densities, and employment at selected nodes within the city and the increased investments in orbital freeways linking the edge cities. Buxton and Jackson (2004, 10) call it as the multi-node city and according to them, it is the intensified development of mixed use, higher density areas within 400 metres of a public transport location, with increased street connectivity, in both the existing metropolitan area, and in new development areas on the urban fringe. They also define multi-node city as a kind of *traditional neighbourhood, transit oriented, or urban village development*[15]. The several characteristics of the terms *urban villages* (Newman and Kenworthy 1992 in Buxton 2000, 59), *transit-supportive (transit-oriented) development* (Calthorpe and Associates 1992 cited in Buxton 2000, 59; Cervero 2003, 70), and *traditional neighbourhood development (designs)* (Duany 1992 cited in Buxton 2000, 59; Cervero 2003, 72) can be grouped under the heading of New Urbanism (Buxton 2000, 59).

[14] Both the multi-centred city and the corridor city are formed through the new information age – the postmodernisation period –. Because of this, both forms are defined firstly by describing their creation through the postmodern period.
[15] These New Urbanism issues, transit villages, transit-oriented development, and traditional neighbourhood design are explained in detail in Chapter 4.

The **New Urbanism** emphasizes the need for well integrated buildings with streets, and need for diversity in household types and sizes. Kaufman and Morris (1995) argue that New Urbanism tries to help the elderly, the young, mothers, and the poor, with ensuring better access to services. Moving the poor to outer suburbs and the construction of gated communities in the suburbs are contrary to New Urbanism principles (Kaufman and Morris 1995 cited in Buxton 2000, 60).

According to Buxton (2000, 59), multi-centred development is an alternative to compact, corridor and dispersed development patterns and he states that the alternative model to dispersed and compact city models is an approach that proposes the redevelopment and transforming of areas, which are close to public transport locations, into centres with three characteristics. First, they must contain *mixed uses and higher residential densities* that combine significant local employment, retail, and service functions. Second, their design elements include *interconnected street systems* that encourage walking, protection of historic values, and energy efficient buildings, etc. Third, the centres must be close to public transport systems for promoting to reduce motor vehicle use. As a whole, this model looks for self-containment in centres and integration between land use and public transport use. It contrasts with both the dispersal model, as its separated land uses are linked by road transport, and the compact city model, in which intensification occurs in existing or new suburbs, in an incremental manner.

As an example to multi-centred model, the city of **Espoo,** that is on the southern coast of Finland and is a part of the Helsinki Metropolitan Area, can be shown. The city of Espoo, which is now a city of 200 000 inhabitants, is a specific city and has ***a network of centres***. This means, it does not have one centre but five concentrations of housing and services that are connected by roads and highways. Hence, the city has been called a model of the whole country, *"the truth about Finland"* (Lapintie 2005, 3). In Figure 3.27, the city of Espoo can be seen. In the figure, the colours indicate central services (brown), industry and services (dark grey), and housing (light grey). Blocks of flats are concentrated in the centres, while the rest is mainly detached housing, with rather low density. The eastern municipal border with Helsinki is on the right (Lapintie 2005, 4).

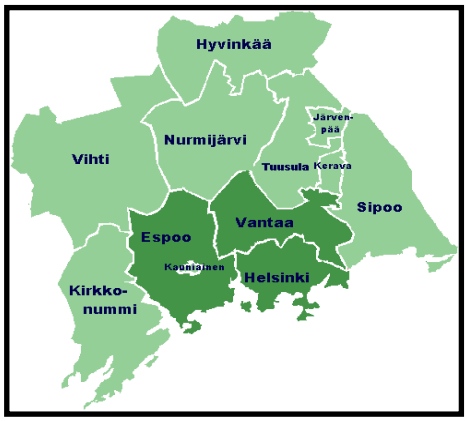


Figure 3.27 Map of the Helsinki Metropolitan Area (Light Green) and the Capital Region (Dark Green)
(Source: Wikipedia, the Free Encyclopedia on Internet: http://en.wikipedia.org/wiki/Helsinki_Metropolitan_Area, Last accessed date: January 11, 2007

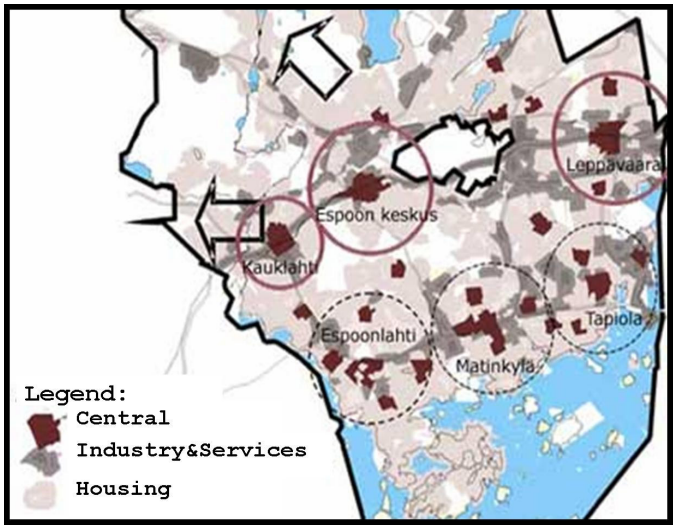


Figure 3.28 The Multi-Centered Model In Espoo
(Source: The preparation material on the municipal plan from 2003 cited in Lapintie 2005, 4)

3.2.4. Concluding Remarks

Although there is a large number of studies, there is a lack of consensus about what constitutes an 'ideal' urban form and this is partly a result of the lack of definition of particular urban forms being measured (Ewing, 1997; Frey, 1999 cited in Curtis

2006, 162). Many of the early studies focus on the compact city as a monocentric model, but some researchers use the term 'compact' very rarely. Those researchers apply compactness to an urban form that is formed by a city with several/many centers each of which is compact and is settling within a more dispersed city. They refer that type of urban form with using the term 'decentralized concentration' and some other researchers also refer to this form as a meaning a 'polycentric city'.

Nevertheless, there is also a lack of consensus on the definition of polycentricity (Moore & Thorsnes, 1994; Kloosterman & Musterd, 2001 cited in Curtis 2006, 162). Polycentricity can indicate one metropolitan region or it can cover a much larger urban system that links several complementary metropolitan regions like the Randstad in the Netherlands or the Kansua region in Japan (Batten, 1995 cited in Curtis 2006, 162). It can contain either a number of sub-centers with the maintenance of a dominant centre, or multi-centers with no single dominant core (Curtis 2006, 162).

One of the problems is *transferability*. A large amount of the analyses are based on US cities, then European cities and a few Australian cities. It is said that Australian cities are similar to US cities in terms of their low density and dispersed cities, however they are are more like European cities with their stronger CBDs (Buxton, 2000; Mees, 2000 cited in Curtis 2006, 162).

It is clear that while there is an agreement that urban form has an impact on travel behaviour, when this impact is researched, it is said that the research gives no clear result and so there is no consensus for the ideal urban form (Sorenson, 2001; Williams et al., 2000; Hickman & Banister, 2002 cited in Curtis 2006, 162). However, it can be said that there are varieties of urban forms which are **more sustainable** than typical development patterns of recent years (Williams et al., 2000). "*The **most widely agreed** solution for sustainable transport outcomes in cities appears to be one of multiple nodes of concentrated activity".* That solution requires a transition from a **'Uniplex City',** which has one central core of activities surrounded by suburbs, to a **'Multiplex City',** which has several centres connected both physically and by telecommunications (Van Til, 1979; Kumar, 1990; Newman and Kenworthy, 1992, 1996; Van der Valk & Faludi, 1992; Frey, 1999; Healey,

2000; Newton, 2000; Srinivasan, 2002 cited in Curtis 2006, 163).

Until now, macro-scale urban planning approaches and regarding this, three urban form models as a way of achieving sustainable transport have been mentioned. In the following chapter, micro-scale urban design approaches will be discussed.

3.3. Land-Use Planning Measures For Sustainable Transport (Micro-Scale Urban Design Approaches)

A number of land-use planning measures ranging from strategic to local in scale can help to create more sustainable urban areas in terms of transport, by making alternatives to the car more viable and attractive options (See Figure 3.29). At the strategic level, ***the location*** of new development (distance to existing towns, cities and / or other infrastructure) may affect travel demand. Besides, ***the size*** *and* ***shape of new development*** and the type and mix of land use may affect travel patterns. At the local level, to what extent the ***land uses are mixed***, and to what extent the development is clustered or concentrated into nodes, are considered to affect travel demand (Stead, D. *et al.* 2000, 175). At the neighbourhood level, land use parameters include ***density*** (in terms of addresses per hectare) and ***multiple configuration of functions***, with easy access to all daily destinations by foot; locations for shopping, services, leisure locations, parks, etc. Most activities are made within the residential area as short trips. This should focus attention of transport planners on the local level (Petersen 2002, 9).

Location: ***The proximity of households to the urban centre*** is likely to influence travel distances because many jobs and services are located in urban areas. Distance between home and urban centre is an important determinant of total travel distance. Besides, of course the factors such as accessibility to local facilities and car ownership are also effective. As an example, commuting distance in Birmingham first increases with increasing distance between home and the urban centre. While, car ownership has the greatest influence on transport energy consumption, it is followed by the distance between home and the urban centre, then accessibility to local facilities from home, income per capita, and various other socio-economic

factors (Stead, D. *et al.* 2000, 175-176).

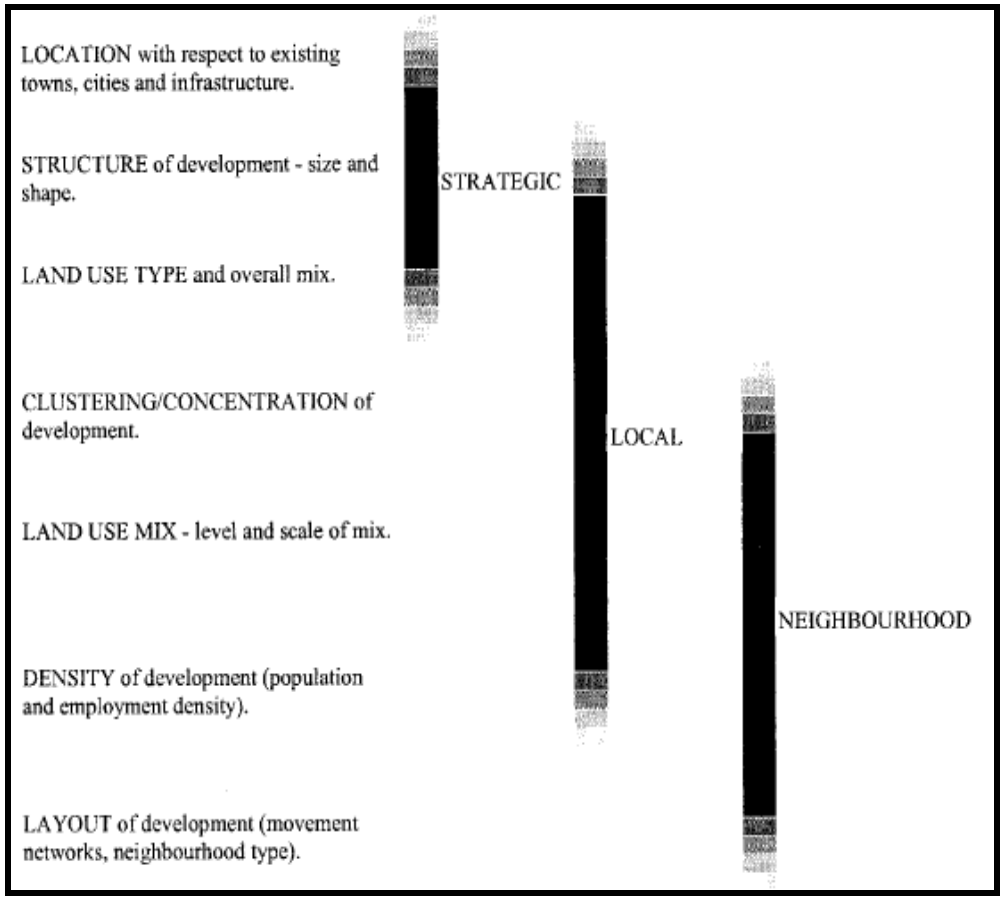


Figure 3.29 Land Use Characteristics That May Affect Travel Patterns
(Source: Stead, D. *et al.* 2000, 175)

Structure of Development: ***Settlement size*** is a key factor influencing the range of jobs and services that can be supported. It may also influence the range of public transport services that can be provided locally (Williams and Banister, 1999 cited in Stead, D. *et al.* 2000, 176). However, the relationship between settlement size and travel patterns is not so simple. For instance, in small settlements that cannot promote a large range of services and facilities, local residents may be forced to travel longer distances in order to access the services and facilities they need. In addition, very large and centralised settlements may generate longer travel distances with rising seperation between homes and the urban centre. Besides, high density of

homes, either achieved by small dwellings or by multi-storey buildings, generates a concentrated transport demand that is enough to supply good public transit (Petersen 2002, 10; Stead, D. *et al.* 2000, 176).

Land-use Type: It is claimed that ***mixing of land uses*** may affect the physical separation of activities and so it may influence travel demand. However, some evidence suggests that that influence on travel demands is not as strong as the effect imposed by density. Besides, there is a consensus that attempts for changing the metropolitan structure of land use seem to have small impacts on commuting patterns, although they enable *more balanced* jobs and housing patterns (Stead, D. *et al.* 2000, 177). On the other hand, Banister (1992) and Blowers (1993) suggest that when more *balanced communities* with a good range of facilities, services, and job opportunities are provided, car dependency and long distance travels are minimized (Banister 1992 and Blowers 1993 in Titheridge *et al.* 2000, 149). For exmple, British, French, and Scandinavian post-war new towns adopted the principles of *balanced, self-contained growth* as means of conserving natural landscapes and correcting social inequalities (Cervero 2000, 8). In addition, in recent years, UK governments have claimed that mixed land uses can promote **sustainable transport** by reducing the need for travel by car. Especially for light food shopping trips, mixed land uses support walking and cycling, and discourages car use (Van & Senior 2000, 139,148).

Cervero (2000) emphasizes that the best efficient and sustainable outcomes which have been ensured by balanced growth is seen in Stockholm, Sweden. Stockholm planners have created **jobs-housing balance** along rail-served axial corridors and this has resulted in directional-flow balances. Stockholm's transit modal share is almost twice that is seen in larger rail-served European metropolises such as Berlin. Maybe the most effective issue is that Stockholm is one of the few places where automobility seems to be regressing. Between 1980 and 1990, it was the only city in which per capita decline in car use was seen among 37 registered global cities in a sample (Cervero 2000, 8-9).

Clustering/concentration of development (Level/Scale of Land-use mix): ***The provision of local employment, facilities, and services*** may clearly reduce travel

distances by increasing the proportion of short journeys and encouraging more locally based activities, which can be reached easily by non-motorised modes (Stead and Banister 2001, 319; Stead, D. *et al.* 2000, 177). Although the effect of increasing journey frequency is not as strong as the effect of reducing trip length, the provision of local facilities is associated with increased journey frequency (Stead, D. *et al.* 2000, 177). Planning Policy Guidance 13: Transport (PPG13) also claims that, *"By providing a wide range of facilities at the local neighbourhood level, the need for people to use cars to meet their day-to-day needs will be reduced"* (Van & Senior 2000, 140). Evidence from Winter and Farthing (1997) research shows that the provision of local facilities in new residential developments reduces average trip distances (Stead and Banister 2001, 319). They state many recommendations for *promoting more sustainable travel patterns* through the provision of local facilities, which covers

- clustering of facilities to maximize accessibility;
- ensuring the most convenient location for facilities to minimize average travel distance;
- giving priority to the design of good qualified footpaths and cycleways, providing direct access to facilities;
- providing high-quality environments in centres considering pedestrian comfort and limiting car usage (Stead and Banister 2001, 319-320).

Density of Development: *Population density* may be linked to travel patterns for several reasons. **First**, *higher population densities* broaden the range of opportunities for the development of local personal contacts and activities that can be maintained without *"resorting to*[16]*"* motorized travel. **Second**, higher densities broaden the range of services that can be encouraged in the local area and reduce the need to travel long distances. **Third,** higher density patterns of development can reduce average distances between homes, services, employment and other facilities. **Fourth**, high densities may be more suitable for public transport operation and use while it can be less convenient for car ownership and use (Stead, D. *et al.* 2000, 178). In summary, *higher density development* may also promote some other measures that are part of a strategy for concentrating development in transport corridors and nodes

(*increasing the accessibility to public transport and reducing the availability of parking…etc.*). The main idea is that when less land is allocated for development, there will be less need to travel and hence there will be more potential to use energy more efficiently. Conversely, low-density development and areas with large roads increase trip lengths and lead to a higher share of automobile trips (Stead and Banister 2001, 318; Petersen 2002, 3).

Layout of Development: "*Good pedestrian and bicycle facilities, connections through blocks for non-motorised traffic, parking schemes and short distance access transit (below 300 metres)"* are important measures to support selecting sustainable transport modes. Among these factors, *distance to public transport stops* strongly influences the mode choice (Wegener/Fürst, 1999 cited in Petersen 2002, 10). In other words, providing good accessibility to public transport modes refers to increase the share of public transportation. This land-use planning measure also aims to promote high usage levels non-motorised transport that are also environmentally sound (IGES 2006, 220). Therefore, with a good supply of walking and cycling networks, this measure aims to reduce dependency on the car, promote more sustainable alternative travel patterns, and reduce the amount of parking for development, which will result in high usage levels of public transport (Stead and Banister 2001, 319). However, some other measures should also be considered. For instance, the traffic load on local streets determines the quality of living in the residential area and a traffic calming policy increases the share of walking and cycling (Petersen 2002, 10).

It is also accepted that *proximity to main transport networks* may affect travel patterns, and travel distance, by increasing travel speeds and extending the distance that can be covered in a fixed time. Headicar and Curtis (1994) explain that proximity to a motorway or a main road is associated with longer travel distances and a higher level of car journeys. They also state that proximity to a railway station is associated with longer commuting distance but fewer car journeys (Headicar and Curtis 1994 cited in Stead, D. *et al.* 2000, 178).

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[16] 'Resort to' means 'to do or use (something) not because you prefer it but because there is no other choice available' (Cambridge Dictionary of American English Online: http://dictionary.cambridge.org, Last accessed date: March 20, 2007).

In summary, the land-use planning measures identified above are complementary and help to strengthen each other with creating synergies (See Figure 3.30). *Higher population densities* may support more supply of local facilities as the number of residents living in close distances increase. Besides, higher population density also provides a larger potential market for public transport and thus it can be said that it is *complementary* with public transport provision (Barton *et al*., 1995 cited in Stead and Banister 2001, 320). In addition, *lower provision of residential parking* allows more homes to be accommodated per unit area and hence it can be said that it is *complementary* with increases in development density (Stead and Banister 2001, 320).

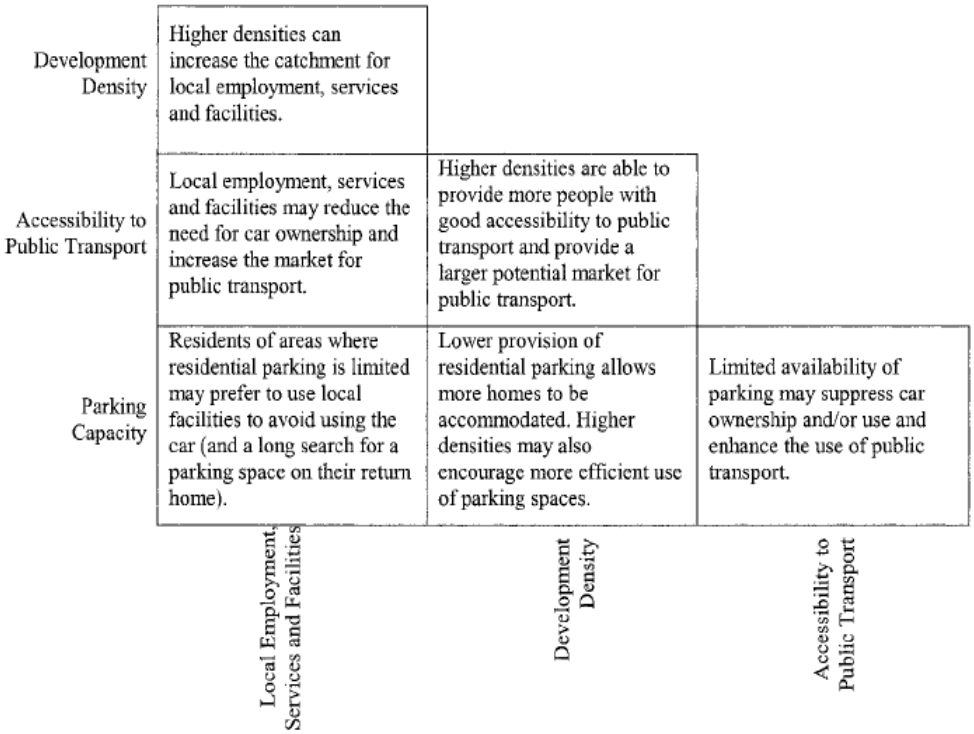


Figure 3.30 Synergies Between Land-Use Measures
(Source: Stead and Banister 2001, 321)

As Stead and Banister (2001, 320) remarks, land use planning policies can influence transport supply and parking as well as the distribution of land uses, and so can influence travel demand and/or modal choice. Moreover, combinations of several

land-use measures may have important effects on travel by *creating synergies* between measures. Then, the effects of non-land-use measures may complement land-use policies. For example, the land-use planning policies also have the potential to address the *social inequalities* of mobility. Finally, as it is concluded before (See Sections 2.2.6, 2.2.7, and 3.1.2) it is important to make a relation between land-use policies and transport policies.

3.4. Macro and Micro Scale Case Studies' Results

Curtis (2006) states that **at a macro-level**, studies from North America (Kumar, 1990; Filion, 2001), Europe (Rickaby, 1991; Cooper et al., 2001; Lloyd-Jones et al., 2001; Dieleman et al., 2002), and Australia (Brotchie, 1992; Newman & Kenworthy, 1996; Newton, 2000) advocate a **'polycentric' urban form**. It is claimed that it could result in a reduction in trip distance by car, reduced absorption of smog or more efficient fuel use. Other studies offered a **'compact' urban form** (Freidmann et al., 1992 cited in Crane & Crepeau, 1998; Loder and Bayley et al., 1993; Masnari, 2000; Simmonds & Coombe, 2000) that might reduce trips and travel distance. However, not all scholars supported the 'compact' city and those who objected to it were considered as advocates of a **'dispersed' city**. In fact, they were rather against a monocentric compact city form, and instead of it, they chose decentralised concentration (Curtis 2006, 161).

Many other studies focus **on the micro-level** instead of the macro-level and examine specific design parameters of the city that are considered as important in influencing travel (Curtis 2006, 161). For example, Williams, Burton and Jenks (2000) uses the term 'second wave' for referring the variables other than "urban form" that determines car use. Their research analyzes various elements of urban form including *density, compactness, concentration, dispersal, mixed uses, housing type*, etc. In addition, earlier works, such as Newman and Kenworthy (1989), examine the acceptability of conclusions, statistical methods used, and the possibility of the impact of variables other than urban form, such as fuel price (Buxton and Jackson 2004, 11).

Issues of **urban density** findings show that as densities increase, vehicle kilometres travelled reduce or car trips reduce, although this is not an *"unanimous view"* (Newman & Kenworthy, 1999; Burton, 2000; Guiliano & Narayan, 2005 in Curtis 2006, 161). On the other hand, Kirwan (1992), and Pucher (1990) have proposed that other variables such as income, car ownership, or fuel price are more important than density in determining private vehicle use (Buxton and Jackson 2004, 11). *"There is evidence that income positively correlates with Hanson's (1982) trip frequency, Cervero's (1996) commuting distances, and Naess's (1993) overall transport energy consumption. Pricing measures, car parking availability and availability of high quality public transport also affect car use (Buxton and Jackson 2004, 11)"*.

In addition, **distance from the CBD** was a factor and as the distance between the residential areas and the concentrations of employment and facilities at the CBD increases, traveling distances will become longer and non-motorised journeys will have a lower share (Banister, 1991; Naess, 2002, 2005; Naess & Jensen, 2002 cited in Curtis 2006, 161). **Provision of local facilities or mixed-use development** may reduce both trip distances, trip generation rates and share of automobiles, although this is not *"an unanimous view"* (Cervero, 1991; Cervero & Kockelman, 1997 and Farthing et al., 1996, cited in Van & Senior, 2000; Van & Senior, 2000 in Curtis 2006, 161). Because, some claim that mixed-use is more important than density in reducing trip distance (Verroen et al., 1995 cited in Handy, 1996 cited in Curtis 2006, 161).

3.4.1. Macro-Scale Case Studies

There have been a number of case studies that tried to find out the impacts of various **urban forms** on transport energy use and its environmental implications in particular cities. Four studies that are described by Anderson *et al.* (1996, 23-26) will be discussed (See Table 3.4).

Table 3.4 Case Studies

Authors	City	Indicator variables	Data	Conclusions
Newman & Kenworthy (1988)	Perth, Australia	1. Fuel use per capita	1. Household travel diaries 2. Driving cycle data	1. Road expansion to reduce congestion increases energy use
Prevedouros & Schofer (1991)	Chicago, USA	1. Trips 2. Mode split 3. Average distance 4. Fuel use	1. Mail survey	1. Peripheral suburb residents take longer trips, use more fuel, have lower transit share 2. Trip generation depends on household characteristics rather than just location
May & Scheuernstuhl (1991)	Denver, USA	1. Travel demand characteristics 2. Emissions of 4 pollutants under 2 land-use scenarios	1. Household survey 2. Census data	Transport/land-use policies to promote transit will not reduce emissions because of 1. increased congestion 2. longer average trip length
Barton (1992)	Bristol, UK	1. Transit ridership Under LRT scenario	1. Travel survey	1. Introduction of LRT has little energy and environmental benefit without complementary land-use restrictions

(Source: Anderson *et. al.* 1996, 24)

The first study is by **Newman and Kenworthy** (1988) which examined the relation between road congestion and fuel consumption with a study in the Perth metropolitan area. Their main aim was to test whether increasing the overall road capacity can actually promote energy conservation by reducing congestion. However, they concluded that some locational factors have a greater impact on energy consumption rather than congestion and that a policy of increasing road capacity would lead to more fuel consumption. In conclusion, they argued that providing a more compact urban land-use planning can be used as an energy-conservation strategy.

The second study is by **Prevedouros and Schofer** (1991) who examined variations in travel behaviour and energy consumption in the Chicago metropolitan area between the people living in older suburbs that are close to the CBD and those in

newer suburbs in the urban periphery. They found that residents of newer suburbs made longer trips and consumed more energy. This was as a result of their findings about trip generations. Their analysis showed that demographic and employment characteristics that cause variations in household characteristics were more important than any `pure' locational effects.

The third study is by **May and Scheuernstuhl** (1991) who used a transport demand forecasting model for the Denver, Colorado metropolitan area to assess the outcomes of different transport system scenarios (in terms of carbon monoxide emissions… etc.). However, as the selected metropolitan area is overwhelmingly car-oriented, the increase in transit represents only a small amount of trips.

The fourth study is by **Barton** (1992) which is a more specific land-use planning initiative that examined Bristol, UK. Bristol has had rapid increases in traffic congestion that is a result of suburbanisation and increasing rate of car ownership. In order to provide a rapid transit option that will be relatively unaffected by automobile traffic, a light rail transit (LRT) has been suggested. However, a much larger shift to transit is required to have an important impact on energy use and emissions. Barton (1992) argues strongly that public-transit infrastructure projects will not achieve environmental results such as CO_2 reduction themselves. Barton (1992) emphasizes that transport projects must be accompanied by **an integrated approach** to land-use and transport planning that limits the use of cars and orients development to transit nodes (Anderson *et. al.* 1996, 23-26).

In summary, urban form can have impacts on the environment and energy consumption. Fuel use in automobiles is an increasing concern because in many cities the emissions associated with vehicles are rising. There is a broad consensus in the literature on a number of principal links between urban form and environmental quality. Alternative strategies for environmentally sensitive urban development include carefully planned multinucleated forms, focusing on *"transit orientation, mixed land use, and conservation of relatively large open spaces within the metropolitan boundary…"* (Anderson *et. al.* 1996, 18-19).

During the 1970s, with the first petroleum crisis, the consequences of several studies

were published on estimating the effectiveness of land use planning for energy conservation. Those studies adopted a similar approach that proposed two or more hypothetical urban forms or hypothetical patterns of growth for existing cities. Those studies also cover the discussions about what type of urban form is most efficient. In general, while the early conventional wisdom was that the most compact centralised form is the most energy-efficient; later research advocated a compact multinucleated form. This was because a compact multinucleated form was considered to be as efficient as, or more efficient than, a centralised form. It is important to state that multinucleated form is strengthened with compact form, because it was thought that while a well-designed multinucleated form accommodated energy-efficient behaviour, a centralised form enforced it. Within a multinucleated form, it is still possible for individuals to commute long distances if they do not prefer to live close to their workplaces. However, compactness will minimize the length of work trips (Anderson *et al.* 1996, 14-17).

3.4.2. Micro-Scale Case Studies

There have been many recent studies that provide more direct evidences about the effects of micro-scale land use measures with focusing on some specific indicators that can be observed in existing cities. In order to give examples to those **micro-level studies**, the **four comparison studies** discussed by Anderson *et. al.*'s (1996) can be reviewed (See Table 3.5). The factors that affect environmental indicators such as air quality measures are complex and there is a lack of adequate environmental data. All of the studies discussed in that study focus on ***energy consumption*** (Anderson *et. al.* 1996, 20).

Table 3.5 Comparison Studies

Authors	Indicator variables	Comparison	Conclusions
Newman & Kenworthy (1990)	Per capita gasoline consumption	32 major cities from 4 continents	1. Urban density is a major determinant of energy consumption
Webster & Bly (1987)	Public transit ridership	100 cities in 16 countries	1. Car ownership key factor in transit use 2. Centralised employment promotes transit 3. Small cities less transit-accessible 4. Radial forms more transit-accessible
Mogridge (1985)	Transport energy by distance from CBD	Paris and London	1. Car ownership more important than urban form 2. Policy emphasis should be on fuel efficiency
Banister (1992)	Per capita transport energy use	4 size categories of British towns and 6 small British towns	1. Mid-sized towns more energy-efficient than London 2. Diversity of services and labour-force containment Reduce energy use

(Source: Anderson *et. al.* 1996, 21)

The first study is **Kenworthy and Newman's** study (1990) which searched *annual per capita gasoline consumption* for an international sample of 32 large cities: *"13 in Europe, 10 in the US, 5 in Australia, 3 in Asia and 1 (Toronto) in Canada"*. They found out that **urban population density** is the unique most important factor, and suggested `reurbanisation' policies for reducing transport energy demand and solving many environmental problems. Although the advocates of compact development frequently give reference to their study results, there are also some criticisms about them. Gomez-Ibanez (1991) found their method of analysis as too simple to provide evidence for a causal link between density and car dependency. Moreover, even though there are cities that have similar densities but different clustering schemes; Kenworthy and Newman's results contribute a little to discussions about the variations between **compact centralised** and **compact multinucleated forms.** However, it is significant to state that among all studies that link ***energy consumption with urban form***; the most common and the most frequently used study as a reference is the study of Kenworthy and Newman (1990) (Anderson *et. al.* 1996, 20-22).

The second study is by **Webster and Bly** (1987) which examined *factors affecting public transit use* for a sample of 100 cities in 16 countries. They found out that there is an ongoing decline in transit use as a result of huge rise in car ownership levels in most cities and factors that promote car travel. They also concluded that the **suburbanisation of employment** makes it more difficult for transit mode to serve the commuters effectively. Toronto is given as an example where healthy employment growth in the CBD has kept transit mode's share relatively high. They also found that the form of suburbanisation is also effective. Particularly the cities like Paris and Stockholm, which show a radial pattern of growth in suburban communities and are located like *"beads on a string"* along rail transit lines, have the capability of maintaining a better transit share (Anderson *et. al.* 1996, 22).

The third study is by **Mogridge** (1985) that has a different view on the importance of urban form that shapes the **distance from the CBD** and examined *transport energy use*. According to the comparison of data for London and Paris, he resulted that car ownership rates are more important in answering why in Paris per capita transport energy consumption is higher than the density measures. He discovered that energy consumption increases with more peripheral residential locations, but with about the same rate of car ownership. Thus, he argued that policies to promote fuel efficiency will be more effective than land-use policies; because he claimed that car ownership rather than urban form affects energy consumption. However, he disregards the possibility that car ownership may itself be affected by urban form and although he considered all relevant indicators referring to distance from the CBD, he ignored to identify the radial or multinucleated structures in the two cities (Anderson *et. al.* 1996, 22-23).

The fourth study is by **Banister** (1992) that examined estimates of *weekly transport energy consumption* for **different sizes** of British cities. London was relatively inefficient and this contradicts with the common view that those cities served by rail transit are relatively efficient. This was due to its high density and the fact that London had more travel per person and a longer average trip length. Banister also compared six small urban places in South Oxfordshire with populations varying from 100 to 10 000. He discovered that the largest town, despite having the largest number of trips per person, also had the lowest per capita energy consumption. He

also found out that towns became more energy-efficient when they became more diversified in terms of services and reached a higher level of journey-to-work inclusion. With diversification, more residents will be employed locally. For example, a large metropolitan area might be similarly more efficient if it is made up of relatively **self-sufficient sub-units** (Anderson *et. al.* 1996, 23).

Finally, a last important result that can be extracted from macro and micro scale studies is that the major investments in public transit infrastructure will not be enough, unless **macro land use** and **micro neighbourhood designs** are complementary or compatible with these investments (Kennedy *et al.* 2005, 407).

3.5. Concluding Remarks

This chapter provided a review of the vast literature on land-use planning approaches, particularly urban form / development model discussions, in achieving sustainable transport. These land-use planning approaches are formed through variables that are classified into two scales: *macro-scale* and *micro-scale*. Macro-scale land-use planning policies concentrate on the variables determining the *shape of urban areas*, while micro-scale land-use planning measures concentrate on *urban design factors* such as density, transport network and function, land use mix and proximity.

It was seen in this chapter that many macro and micro approaches for planning sustainable urban areas and sustainable transport, included an effective public transport service as an integrated part of the strategy. It can be remembered that in Chapter 2, when various policies and strategies were reviewed as those that can solve contemporary transport problems and make transport more sustainable; two policies, namely land-use policies and policies to improve public transport and non-motorized modes were identified as the most effective ones, being able to help to tackle with the majority of transport problems (See Table 2.2). While this chapter focused on the first of these policies that is the land-use policies, the following chapter provides a review of the second policy, which is improvement and encouragement of public transport and non-motorized modes.

CHAPTER 4

IMPROVING ALTERNATIVES TO THE AUTOMOBILE: POLICIES FOR PUBLIC TRANSPORT AND NON-MOTORISED TRANSPORT AS A TOOL IN ACHIEVING SUSTAINABLE URBAN DEVELOPMENT AND TRANSPORT

For **sustainable urban development** and **more sustainable transport systems** that are less damaging to the environment and able to effectively serve social and economic development, either major development areas should be well–served by public transport or public transport provision should be considered as a part of the development (Petersen 2002, 29). Moreover, the essence of sustainable transportation is to reduce car dependency without compromising urban mobility and accessibility. Hence, it is a necessity for sustainable transportation systems to cover an extensive and well-integrated public transit system that has the capability to provide adequate capacity and competitive levels of service which can accommodate and attract a large proportion of travelers (Kennedy *et al.* 2005, 406). In addition to development of a well-operating public transport system, non-motorized transport modes, walking and cycling, should also be promoted with several planning and design strategies.

4.1. Revival of Public Transport Investments

Within the perspective of 'demand management' approach (See Section 2.2.3), reducing the demand for car usage and orienting this demand to public transportation and pedestrian transport is a primary objective. Regarding this approach, there has been a significant revival in public transport investments since the 1970s, and particularly in rail systems. In fact, within the context of the petroleum crisis, which was experienced at the beginning of the 1970s, in order to present an effective

alternative to the private car, especially in Western European and in North American cities, metro investments were started for the first time after the railway investments that had been made in the beginning of the century (Black, 1993 and Kain, 1988 cited in Tekeli *et. al.* 2006, 29). However, the metro technology required very high investment and operation costs and attracted low amounts of passengers in Western European and North American cities, where car usage remains extremely high. The 1980s and 1990s witnessed the application of light rail technology, as a lower cost investment compared to metros (Tekeli *et. al.* 2006, 29).

Babalık-Sutcliffe (2002, 415) states that, *"Since the 1970s, there has been a significant increase in urban rail systems. A total of 139* ***new urban rail systems****,* ***metros*** *and* ***light rail transit (LRT) systems*** *have been built worldwide in the past three decades. These systems were, in general, planned as instruments to solve transport, land-use, and environmental problems associated with the extensive use of the car"*. However, there has been a debate on the success of these systems especially about their patronage and their cost (Pickrell 1990, 1992; Mackett 1998, Richmond 1998 cited in Babalık-Sutcliffe 2002, 415). It has been claimed that not only there was an overestimation of the patronage of the urban rail investments, but also their other benefits like a rise in public transport usage and a decline in traffic congestion and air pollution were being overestimated (Gomez-Ibanez 1985; Hass-Klau and Crumpton 1998; Mackett and Edwards 1998; Richmond 1998 cited in Babalık-Sutcliffe 2002, 415-416). Car usage didn't decrease, efficiency and service level didn't increase, and there were no significant changes in urban form, as had been expected (Tekeli *et. al.* 2006, 29).

There are many studies that searched for the factors behind urban rail systems' failure in achieving the expected outcomes. Those studies showed that in order to transfer the private car journeys to public transport, the rail systems were not sufficient alone (See Table 2.2). It was realized that the railway investments had to be presented with some other policies that deters car dependency and favours public transport. Among those policies, on the transportation agenda, one of the most important dicussions has been that for reducing car usage, the car-dependant urban forms should be changed by comprehensive land use planning policies and interventions.

In fact, the basic principle of the approaches that define the **sustainable urban forms** in terms of **transport** is that if the several urban facilities (shopping, recreation, jobs, housing, etc.) in cities are planned with ensuring a high accessibility to public transport and other green modes (walking, cycling), the dominance of private cars can be reduced (Tekeli *et. al.* 2006, 29). Hence, the land-use planning approaches that have been discussed in Chapter 3 are very significant to change urban form but not enough alone to support sustainable development and transport. These policies should be integrated with transport planning policies (See Sections 2.2.6, 2.2.7, and 3.1.2). Besides, since the public transport issue is a very important for sustainable transport and sustainable land-use planning, it will be discussed in detail.

There is generally a political support for urban rail systems and investment in them. The Environment, Transport and Regional Affairs Committee (2000) of the House of Commons in England expressed that if the Government believes that it is serious to prevent car users from using their cars, and then it is necessary to put alternative forms of public transport in the first place. It is proved that people will not prefer public transport if it is not reliable, frequent, efficient, safe and clean with affordable fares. It is important for planners and politicians to realize the motives that make these systems successful and the barriers that hinder their success (Babalık-Sutcliffe 2002, 416). Firstly, several public transport modes and other green modes will be defined and secondly how the integration can be ensured between transport and land-use planning policies will be discussed.

4.2. Identification of 'Green Modes'

Green modes are indicated as public transport modes and non-motorized transport (NMT) modes (walking, cycling). In general, five objectives can be identified as those in contemporary transport planning for a more sustainable system: (1) improving public transport; that is, providing alternatives to automobiles; (2) improving non-motorised transport (NMT: walking and cycling); (3) reducing the use of automobiles (helping to reduce car traffic); (4) achieving a high patronage on public transport and NMT modes by encouraging their use, and (5) having a positive

impact on land-use and urban growth patterns by helping create more intense developments and preventing sprawl (IGES 2006, 220; Babalık-Sutcliffe 2002, 421).

In order to improve public transport, mainly, four types of modes are identified by policies: "*promoting rail-based mass rapid transit (R-MRT) through innovative mechanisms to address high initial costs; promoting Bus Rapid Transit (BRT); improving bus routes and services, and using community vehicles"* (See Table 4.1). Those options differ from each other in terms of **indicators**, such as *carrying capacities, operational speed, infrastructure and financial requirements, flexibility to transport demand, and environmental effects* (IGES 2006, 220).

Firstly, rail-based mass rapid transit **(R-MRT)** has the highest capacity among the other policies. R-MRT's environmental impact is the least, but it is the most costly and least flexible one. Hence, the funding mechanism of the system is one of the most important issues in introducing R-MRTs in developing cities (IGES 2006, 220). R-MRT includes a wide range of urban public transport modes: **metros, suburban railways,** and **light rail transit** (World Bank 2002 in IGES 2006, 221). Besides, R-MRT usually has a superior operating capacity and performance compared with unsegregated road-based public transport, such as **buses, taxis**, etc**.** (IGES 2006, 221).

Table 4.1 Increasing The Share of Public Transportation

Change	Objective	Policy	Good Practice
Modal Shift	Improving public transport (providing alternatives to automobiles)	Promoting rail-based mass rapid transit (R-MRT) through innovative mechanisms to address high initial costs	Beijing, Curitiba, Bangkok
		Promoting Bus Rapid Transit (BRT)	Curitiba, Bogota, Quito
		Improving bus routes and services	
		Using community vehicles	Bangkok, Kathmandu
	Improving NMT	Promoting special lanes for pedestrians and cyclists	Beijing
		Creating car-free zones	Bangkok

(Source: IGES 2006, 215)

There may be a need to fill the existing 'gap' between the medium-capacity, low-performance surface transit and the high-capacity, high-performance rapid transit. This may be ensured with an investment in an intermediate class of modes, especially semi-rapid transit. Semi-rapid transit modes include **light rail transit (LRT)** and **bus rapid transit (BRT)**[17]. Semi-rapid transit is a logical upgrade from surface transit and it requires relatively modest investments. Semi-rapid transit would aims to attract travellers and helps intensifying urban density. As it can be a model for rapid transit (subway/ metro…etc.) in the core city outside the CBD, it can also be a *"stand-alone system"* in the suburbs of large or small urban regions (Kennedy *et al.* 2005, 407).

Secondly, **BRT** and **conventional buses** are positioned between R-MRT and community vehicles in terms of the indicators mentioned above (IGES 2006, 220). Bus Rapid Transit (BRT) is a rapid bus system that operates on segregated bus lanes and with providing the segregated busways, BRT stresses the priority for and rapid movement of buses (IEA, 2002 cited in IGES 2006, 220). In order to maintain major development areas to be well-served by public transport, the urban authorities, which are responsible for transport planning and for traffic management, should design some corridors dedicated to public transport, especially segregated bus lanes (Petersen 2002, 29).

BRT can also be named as 'High-Capacity Bus Systems', 'High-Quality Bus Systems', 'Metro-Bus' 'Express Bus Systems', 'Busway Systems', and 'Surface Metro' Systems (Wright, 2002 cited in IGES 2006, 221). BRT has a capacity and operational speed that is very close to Light Rail Transit (IGES 2006, 220).

Recently, BRT has created much interest with its advantages like having short implementation periods, a high ability to develop (requiring less transfers), and requiring lower investments than LRT with comparable ridership levels (Vuchic, 2002 cited in Kennedy *et al.* 2005, 407). *"However, LRT has shown historically to have a strong image and identity, a sense of permanence, a high vehicle performance due to electric traction and an ability to upgrade into rapid transit.*

[17] In Kennedy *et al.* (2005, 407), it is suggested to see Vuchic (1981) for a classification of modes.

*Overall, investment in semi-rapid transit systems could be a key part in developing **sustainable urban transportation systems"*** (Kennedy et al. 2005, 407).

It is stated that the well-planned BRTs have high capacities to carry passengers and can provide comfortable, rapid, and low-cost public transport alternatives. BRTs started in **Curitiba (Brazil)** and are becoming widespread in the region including Bogota (Columbia) and Quito (Ecuador) as it has been proved to be a very cost-effective alternative. In **North America**, a number of cities have started to develop BRT systems, including Ottawa (Canada) and Los Angeles (US). In **Europe**, BRTs are becoming increasingly popular in cities in the United Kingdom, including Leeds and London. Cities in **Asia** are starting to introduce BRT, such as the systems in Nagoya (Japan), Taipei (China), Jakarta (Indonesia) and Seoul (Korea) (IGES 2006, 222).

Thirdly, **community vehicles** are referred as a transport system that was started by private operators to satisfy the commuting needs of the public with services such as school buses and factory buses. Community vehicles can provide a flexible public transportation service where mass transport fails to cope with the increasing public transport demand (IGES 2006, 220).

Fourthly, **NMTs,** especially **walking,** are the oldest ways of transport but now they are under the threat of the spread of motorisation. For improving NMTs, one policy should focus on infrastructure and another policy should rise the awareness about NMTs (IGES 2006, 220). For example, **promoting special lanes for pedestrians and cyclists** is a policy that aims to encourage walking and cycling by providing segregated lanes to ensure having safe trips by those modes (IGES 2006, 220). Planning authorities and developers should provide secure conditions for pedestrians and cyclists, and put special emphasis on safe routes especially to schools for children (Petersen 2002, 29). Besides, **creating car-free zones** is another policy that aims to limit the use of motor vehicles in specific zones. One way of this policy can be a car-free day which will not only discourage the use of private vehicles during a certain period but also to raise the awareness about the effect of transportation behaviour on the environment. This can also refer to the objective of reducing the use of automobiles (IGES 2006, 220).

Finally, as it has been emphasized before, all of these transport policies can be succesfull if they are integrated with land-use planning policies. 'Smart growth' is the trend that indicates this integration. It is a general term for land use practices which aim to create more accessible land use patterns and to reduce the amount of travel needed to reach goods and services (Litman 2003a cited in IGES 2006, 219). This is discussed below.

4.3. Transport and Land Use Integration

Approaches for linking land use and transportation cover a holistic view of development and one of these approaches is called **'smart growth'**. It is said to be shorthand for **'transport and land-use integration'** and its central belief is that transportation and land use must be closely coordinated and integrated. From a transportation perspective, smart growth assimilates a planning approach that better coordinates land use and transportation; ensures pedestrian and bike safety with mobility; provides and enhances public transportation services, and improves the connectivity of road networks. Besides, that kind of planning adopts a multi-modal approach in transportation with supportive land use development patterns for creating a variety of transportation options (Hayashi & Tomita 2003, 7; Cervero 2000, 1; Official Website of FHWA: http://www.fhwa.dot.gov/, Last accessed date: March 12, 2007).

Smart growth is synonymous with **sustainable development** and it is an antidote to **sprawl**; in other words, it is a tool for tackling the problem of urban sprawl. By their nature, smart growth strategies are *spatial* and they concentrate on *where growth should best occur and in what physical form* (Cervero 2000, 1-3; Cervero 2003, 69). According to a scheme, smart growth has four common strategies:

Firstly, they include **urban planning** by predicting and creating a vision of the future. This policy refers to regulatory strategies, including *growth management and linkage programmes, etc*. (Cervero 2000, 3; Hayashi & Tomita 2003, 7).

Secondly, smart growth balances the two competing aims of urban design – **form**

versus function. In designing and building places, for functionality, attention is given to *sustainability* and *resourcefulness*; whereas form is defined through the *livability* and *aestheticism* of neighborhoods and communities. This policy is a land use planning strategy, including *compact cities, transit-oriented development, and traditional neighbourhood designs* (Cervero 2000, 3; Hayashi & Tomita 2003, 7).

Thirdly, under smart growth, **infrastructure investments** are cleverly used for shaping and triggering development. This can refer to, for example, extending a rail line to a desired corridor of growth. This policy includes *targeted infrastructure and sliding-scale impact fees and market-based strategies*…etc (Cervero 2000, 3; Hayashi & Tomita 2003, 7).

Lastly, areas that are growing intelligently always have an institutional landscape that should deal with spillovers and cross-boundary problems. This often means some form of **governance** with instruments like regional master planning, environmental mandates, or zoning overrides…etc. This policy also includes *institutional reforms and sub-state planning* (Cervero 2000, 3; Hayashi & Tomita 2003, 7).

These four strategies that are emphasized by Cervero (2000, 3) and Hayashi and Tomita (2003, 7) can be resembled to the ***'four pillars of sustainable urban transportation'*** that are claimed by Kennedy *et al.* (2005, 393). It is argued that the process of achieving more sustainable transportation requires appropriate establishment of **four pillars** in order to ensure the integration of land-use and transport planning:

1. effective governance of land use and transportation;
2. attention to neighbourhood design;
3. strategic infrastructure investments;
4. and fair, efficient, stable funding

Among these sustainable transport pillars, the **first pillar** is a matter of '**governance'** for ensuring smart growth. When the urban planner or transportation officer realizes the need for sustainable transportation and willing to do something

about it, this may not be possible due to the common problem that is the division in power and responsibilities between transportation authorities and land-use planners. Therefore, the establishment of **effective bodies** for integrated land-use transportation planning is needed (Kennedy *et al.* 2005, 395).

The **second pillar** is the encouragement of investments through local design with micro level measures. This pillar indicates that **'micro neighbourhood design'** (of street layouts, pedestrian connections to transit… etc.) should know and consider the planning attitudes for 'macro urban form' (zoning, regional design concepts, etc.). If neighbourhoods don't supply attractive access to major transit facilities, then ridership will be insufficient. Hence, investments in the major systems will be financially unsustainable. Therefore, the discussion returns back to the first pillar. It can be possible only through the establishment of effective **regional governance** of land use and transportation that will make the essential connections between micro neighbourhoods design and macro urban form (Kennedy *et al.* 2005, 395, 409).

The **third pillar** refers to strategic '**investments'** in major infrastructure. Again with suitable **governance** and **funding mechanisms**, cities can invest in infrastructure that supports sustainable transportation. There is also potential to make more effective use of existing infrastructure such as the success that has been achieved through car sharing lanes, intelligent transportation systems (BRTs, LRTs), etc. (Kennedy *et al.* 2005, 395, 405-406).

The **last pillar** is the development of efficient, '**long-term financing mechanisms'** for transportation systems. These mechanisms are essential for the well being of cities either for investment in new infrastructure or for the long-term operation and maintenance of existing systems (Kennedy *et al.* 2005, 401).

Smart growth, integrating transport and land-use planning, is particularly important for countries like **Australia** where land is abundant and the countries like **USA** where dispersed patterns of growth is seen (Cervero 2000, 1-2). Nevertheless, this approach is as a valid instrument in other parts of the world too, where coordination and integration of transport and land-use planning is vital to enhance the benefits of planning and transport investments.

Besides, recent research suggests that smart growth provides some economic returns. For example, an analysis in the **San Francisco Bay Area** found that areas with good labour accessibility and high employment densities were economically the most productive (Cervero, 2001a cited in Cervero 2003, 69). The high accessibility can be obtained with a good management in both transport and land-use planning.

As a result, integrated land-use transportation planning concentrates especially on the growth in the center of a city to prevent urban sprawl; and defends the policies that are based on *compact, transit-oriented, walkable, bicycle-friendly land use, including mixed-use development with a range of housing choices;* and smart growth is a way of ensuring this (Wikipedia, The Free Encyclopedia on Internet: http://en.wikipedia.org/wiki/Smart_Growth, Last accessed date: April 2, 2007). Implementing these policies depends on the governance issue; because even if a city achieves the requirements for sustainable urban transportation, it still has to adapt its governance structure to the growth of the region (Kennedy *et al.* 2005, 410). In general, **Curitiba** is widely viewed as one of the world's most sustainable, well-managed metropolises and it is one of the most accessible. It is significant to state that its success is a product of some forty years of carefully integrating urbanization and transportation improvements with its emphasis on planning for people rather than cars (Cervero 2000, 13).

In the following sections, ways of integrated land-use transportation planning, the effective governance of it and the barriers for it will be discussed in detail.

4.3.1. New Urbanism: Transit-Oriented Development (TOD), Traditional Neighbourhood Design and Transit Villages

*"The **New Urbanism** is an American urban design movement that arose in the early 1980s. Its goal is to reform all aspects of real estate development and urban planning, from urban retrofits to suburban infill. New urbanist neighborhoods are designed to contain a diverse range of housing and jobs, and to be "walkable". The New Urbanism also is known as, **traditional neighborhood design**, neotraditional design, **transit-oriented development,** and the New Pedestrianism"* (Wikipedia, The

Free Encyclopedia on Internet: http://en.wikipedia.org/wiki/New_Urbanism, Last accessed date: April 2, 2007).

The transit-oriented development (TOD) concept was developed in the USA by Peter Calthorpe in the late 1980s and early 1990s in order to promote sustainable development. The Transit-Oriented Development concept covers the urban design principles of compact urban form, walkable neighbourhoods, and public transport orientation for supporting more sustainable behaviour. Calthorpe's transit oriented development proposal emerged in the 1980s and it was arisen from his earlier **'pedestrian pocket'** concept. The original 'pedestrian pocket' concept was identified as a walkable, mixed-use neighbourhood with medium to high-density housing to strengthen transit provision, protect open space, and provide a more compact urban form (Quinn 2006, 311).

The transit oriented development concept that builds on the **pedestrian pocket** has a more viable design, includes an outer secondary area around the dense core where a wider range of residential densities including low-density, single family homes were accommodated and where some land is allocated for some larger scale built forms such as light industrial uses, major leisure facilities, etc. (Quinn 2006, 311).

The main guiding principles of TOD are as follows:

Primary principles:

1. *"Interconnected Streets –the Grid*
2. *Compact Development –Higher Densities*
3. *Mixed Land Uses –Local Trips*
4. *Pedestrian Friendliness –Sidewalks, Crosswalks & Trails*
5. *Natural Open Space –Ecology*
6. *Public Realm –Civic Identity*
7. *Commercial Centre –Neighbourhood Good & Services*
8. *Transit Station/Stop –Convenient Access by all Modes"* (IBI Group 2004, 5)

Secondary principles:

9. "Smaller City Blocks
10. Mixed-Use Building Types
11.Architectural Variety
12.Narrow & Calmed Streets
13.Street Facing Buildings
14.Relaxed Parking Standards
15.Bicycle Friendly Streets/Bicycle Parking
16.Market Acceptance" (IBI Group 2004, 5)

Interconnected streets refer to traditional grid street and block patterns that function well for all modes of travel by connecting streets and sidewalks. The objectives are to encourage walking rather than driving; spreading local trips over more streets; creating better legibility regarding way finding; encouraging *infill development*[18]; creating neighborhoods with more human scale and character –*sense of place* (IBI Group 2004, 6). In general, TODs encourage infill and redevelopment along transit corridors within existing neighbourhoods (Quinn 2006, 312) (See Figure 4.1).

TODs are more compact than their suburbs for both providing a base of transit riders and allowing less auto-dependency (IBI Group 2004, 7). In transit-oriented developments, it is important to organize growth on a regional level to be compact and supportive of public transport. In TODs, commercial development, housing, jobs, parks, and other uses are placed within a walking distance of transit stops (Quinn 2006, 312). In addition, TOD transit stations are seen as a center of community life beyond their basic function (IBI Group 2004, 11) (See Figure 4.2).

[18] *"**Infill development** means the use of land within a built-up area for further construction, especially as part of a community redevelopment or growth management program or as part of smart growth. **Suburban infill** means the development of land in existing suburban areas that was left vacant during the development of the suburb, as a strategy of New Urbanism and Smart Growth"*(Wikipedia, the Free Encyclopedia on Internet: http://en.wikipedia.org/wiki/Smart_Growth, Last accessed date: April 2, 2007).

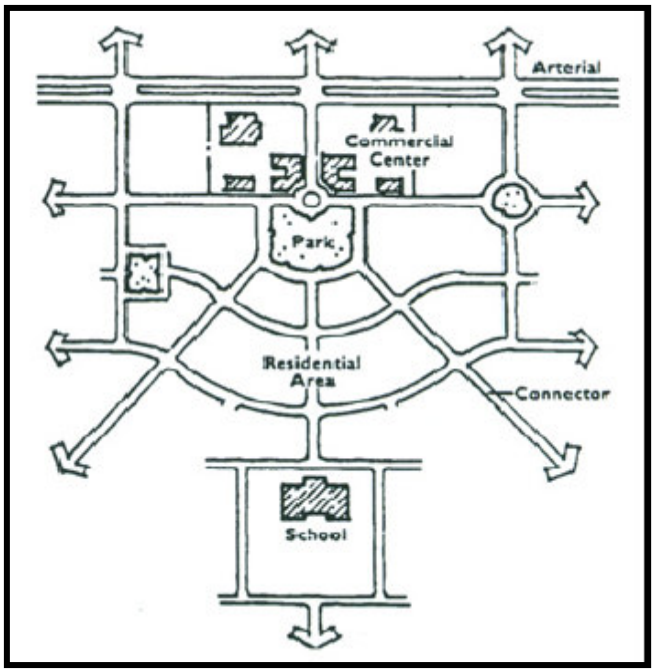


Figure 4.1 Interconnected Streets In TOD
(Source: IBI Group 2004, 6)

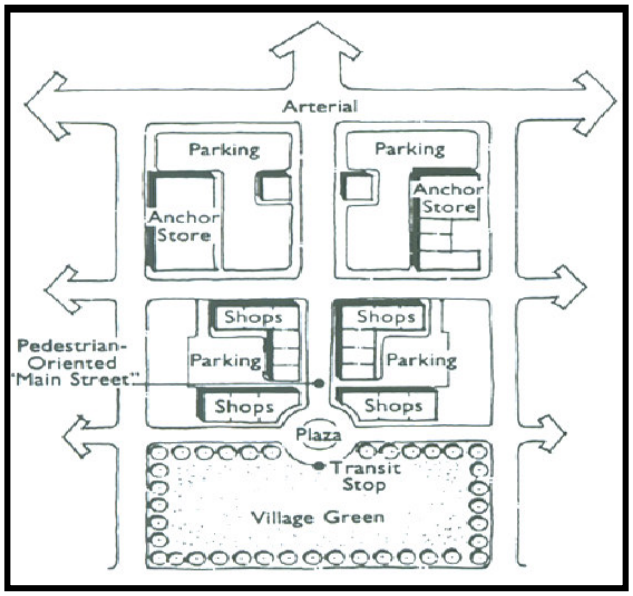


Figure 4.2 Compact Development Around The Transit Stops
(Source: IBI Group 2004, 7)

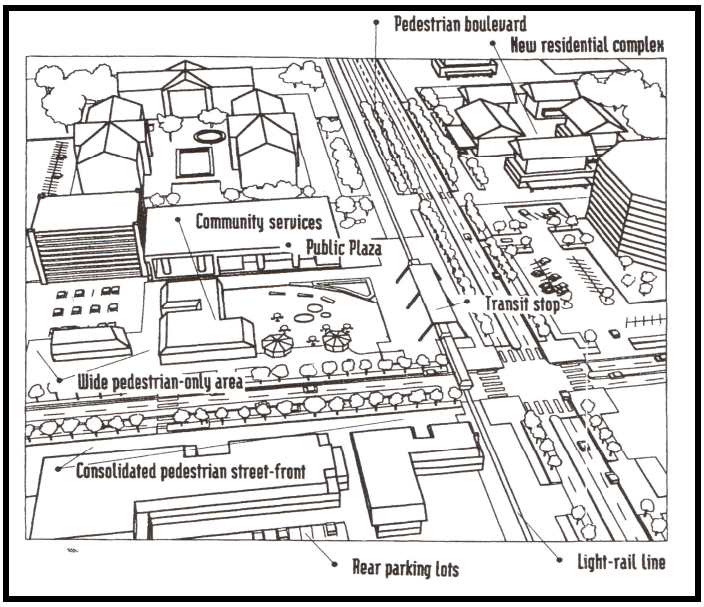


Figure 4.3 Transit-Oriented Neighbourhood Design
(Source: Bernick and Cervero 1997, 97)

In TODs, a mix of diverse and complementary high-activity uses rather than segregated uses, allows residents and workers to walk to their works or to shops within the village, instead of forcing them to drive elsewhere. Mixed land uses in TODs include a variety of retail (food, convenience), professional services, housing, employment, education, and recreation/ leisure, etc. (Quinn 2006, 312; IBI Group 2004, 8).

TOD creates pedestrian-friendly street networks that directly connect local destinations and such pedestrian-scale environments make walking a more attractive and preferable option than cars. Moreover, compact nature of TODs means that there will be less private open space for each household or workplace while there will be more focus on a variety of public open space types. TODs also make public spaces as the focus of building orientation and neighbourhood activity. TODs preserve sensitive habitat, and high-quality open space (Quinn 2006, 312; IBI Group 2004, 9-10).

Hirano (2002) states that California has built and is planning to lay more track-miles of rail transit than any other state in the country. Adherents of **smart-growth** would

like to capitalize upon these investments by orienting growth to rail stops, as it is also happening at an accelerated rate in *Los Angeles, San Diego, and San Jose.* As an example, most impressive fact is that a retail/ entertainment complex, which had a cost of $615 million and an area of 1.2 million square foot, was built directly above the Hollywood-Highland subway station in Los Angeles. It was interesting that after the complex opened in November 2001, boardings and alightings at the station more than doubled within a week, from 9,300 to 18,600 (Hirano, 2002 cited in Cervero 2003, 70).

IBI Group (2004, 3) classifies TOD into two features: LRT TODs and BRT TODs. LRT TODs encourages compact, mixed-use and pedestrian friendly neighbourhoods, which include housing, workplaces, shops, schools, parks and entertainment and other facilities, are centered on transit stations. Individual TODs are typically designed in circular or nodal arrangements and their edges are defined by a 5 to 10 minute walk, or 400 to 800 metres, from the central transit stop. TOD promotes the increased use of transit by generating and attracting ridership (IBI Group 2004, 3).

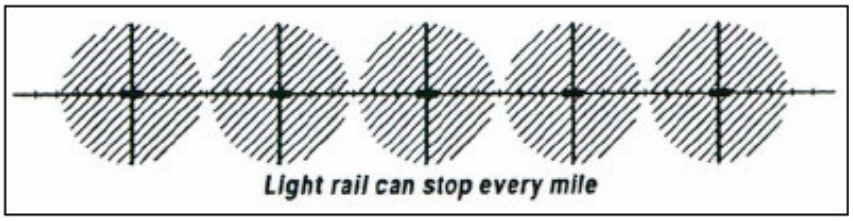


Figure 4.4 Light Rail-Based Transit-Oriented Development
(Source: IBI Group 2004, 3)

BRT TODs can be a part of Transit Supportive Design (TSD). TSD, like TOD, involves compact, mixed-use neighbourhoods located around BRT or conventional bus transit stops. Bus-based transit has less influence compared to rail-based transit in terms of attracting riders or developer interest. Hence, areas of compact, mixed-use development are smaller (200metres of transit stops). Given the closer spacing of transit stops (500 to 800metres) relative to rail-based transit, compact, mixed-use growth tends to 'blend together'between stops –resulting in linear arrangements of

this growth along transit corridors (IBI Group 2004, 4).

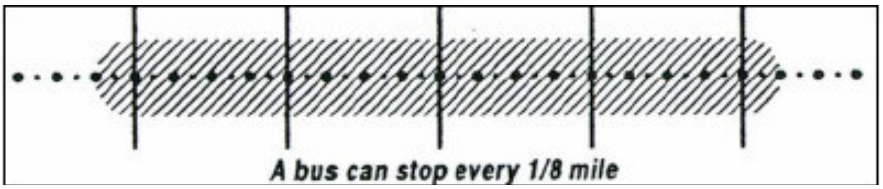


Figure 4.5 Bus-Based Transit-Oriented Development
(Source: IBI Group 2004, 4)

As another approach, **traditional neighbourhood designs (TND)** have become familiar in much of California under the heading of New Urbanism. The idea is to return American suburban designs to an earlier era when smaller units on smaller plots, mixed land uses, internal pathways, and semi-grid street patterns, which stimulated neighbours to socialize and interact more often. U.S. studies point out that traditional neighbourhoods shorten motorized trips, therefore they reduce kilometres travelled by vehicles (Ewing *et al.*, 1994; Cervero and Radisch, 1996 cited in Cervero 2003, 72).

Another well-known planning approach is the **transit villages,** as compact, mixed-use, walkable communities, centered around the transit station. A transit village invites residents, workers, visitors, and shoppers to drive their cars less and ride mass transit more, by its design. The transit village extends about a quarter mile from a transit station which is equal to a distance that can be taken in about 5 minutes by foot. The center of the transit village is the transit station itself and the public spaces surrounding it. The transit station connects village residents and workers to the rest of the region, provides convenient and ready access to downtown and major activity centers like a sports stadium. The public spaces or open spaces surrounding it fulfill the important function of being a community gathering spot and a site for special events (Bernick and Cervero 1997, 5; Official Website of Transit Villages: http://www.transitvillages.org/transitvillages.html, Last accessed date: April 12, 2007).

According to Bernick and Cervero (1997, 7), for long term success of transit villages, each of the following elements is necessary: *Enhanced mobility and environment, pedestrian friendliness, alternative suburban living and working environment, revitalization of neighbourhood, public safety and public celebration.*

As a result, transit villages join two separate, but related revolutions taking place in America, **New Urbanism** and **new rail systems**. It is indicated that transit villages create something much greater than the sum of the two. New Urbanism by itself is said to create a conventional suburban development and most of the residents are said to continue to drive to destinations outside the community for jobs and other trips. This is stated as a result of the fact that both ends of the trips taken by railway systems are not walkable. However, the association of New Urbanism and new railways into transit villages is said to create places that are both better to live with a higher quality lifestyle (Official Website of Transit Villages: http://www.transitvillages.org/transitvillages.html, Last accessed date: April 12, 2007).

4.3.2. Effective Governance of Land-use and Transportation

The city is a very complex system in which changes in one part can affect others in unexpected ways (Bourne, 1982 cited in Kennedy *et al.* 2005, 396). As discussed by Miller *et al.* (1998), understanding these complex interactions within cities can only be obtained through a comprehensive, integrated approach to transportation and land-use planning. However, according to Miller *et al.* (1998), unfortunately, for several reasons, land-use and transportation are often not dealt with in an adequately coordinated way by municipal or higher level governments and agencies (Miller *et al.* 1998 cited in Kennedy *et al.* 2005, 396). For example, the Dutch system of urban governance has been a widely recommended system (Hall, 1994, 1998; OECD, 2002 cited in Kennedy *et al.* 2005, 397). Dutch success is said to be based on its highly regulated hierarchical structure that is established through tight land-use controls of central government. Moreover, the Dutch system also consists of the development of shared visions and movement towards cooperative management with obligation from government, the public and the private sector (OECD, 2002 cited in Kennedy *et al.*

2005, 397).

The Netherlands has also been shown as one of the first countries that has developed a transportation planning system with giving much emphasis both on **accessibility** and **mobility** (Table 4.2). *"Switching to a paradigm of planning for accessibility is a key to developing sustainable cities"* (Cervero, 2001 in Kennedy et al. 2005, 397). The system helps classify locations within cities according to their *accessibility levels.* Locations with high accessibility are achieved with using public transport systems, mixed-use developments and connections to neighbourhoods by pedestrian and bicycle networks (Kennedy *et al.* 2005, 397; Cervero 2000, 13).

Table 4.2 Examples of Mobility Planning And Accessibility Planning

Mobility Planning	**Accessibility Planning**
Road construction and expansion	Land-use management and initiatives
Motorways, freeways, interchanges	Compact development
	Mixed uses
Arterial expansion	Pedestrian-oriented design
	Transit villages
Transportation system management	Transportation demand management
One-way streets	Ridesharing
Rechannelizing intersections	Preferential parking for high occupancy vehicles
Removing curbside parking	Parking management and pricing
Ramp metering	Guaranteed ride home programmes
Large-scale public and private transport	Community-scale public and non-motorized transport
Heavy rail transit and commuter rail	Light rail transit and trams
Regional busways	Community-based paratransit or jitneys
Private tollways	Bicycle and pedestrian paths

(Source: Cervero, 2001 cited in Kennedy *et al.* 2005, 397)

Kennedy *et al.* (2005) defines ***an ideal governing body*** for effective land-use transportation planning as balancing four attributes: *"spatial representation, structure, democracy, and market philosophy"*. **Firstly,** although achieving a balanced representation of local community interests and the interests of the urban region as a whole is a widely known planning issue; in some cases, the self-interests of smaller local governments might be harmful to the sustainable growth of a region. Because, without suitable ***regional controls***, the competition between many such

local governments around the edge of cities can cause a 'race to the bottom' as the general development structure in these areas can offer the lowest development incentives. Therefore, some degree of ***regional representation*** is clearly necessary (Kennedy *et al.* 2005, 398).

Secondly, the structure of a body for regional land-use development and transportation planning could lie between a strong hierarchical form and a loosely coupled structure (See Figure 34). It might be claimed that for sustainable development to be actualized, a hierarchy is the ideal structure to implement **a strong top-down policy** focus in government. In such a case, a large '**vertically integrated'** structure controls all decisions under one umbrella and this structure results in a greater control over land use (Kennedy *et al.* 2005, 398-399). On the other hand, a weakness of most hierarchical organizations is '**horizontal integration'.** It is stated that, although the lines of communication are effective within functional groups in the vertical direction, communicating between different functional groups may be inefficient (Kerzner, 2003 cited in Kennedy *et al.* 2005, 399).

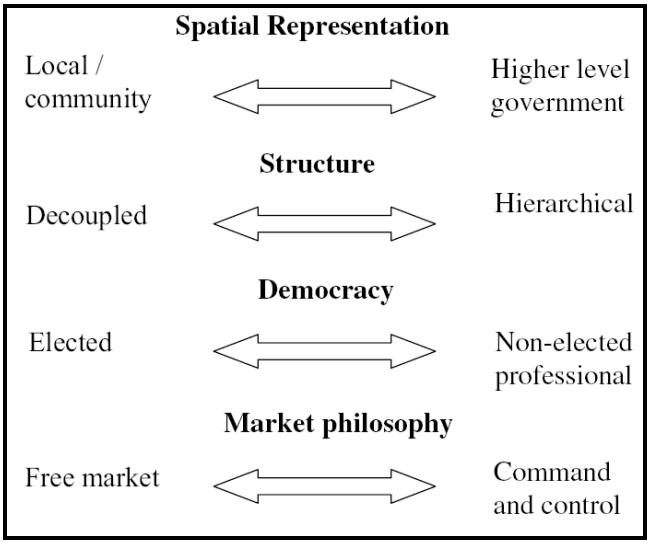


Figure 4.6 Exchanges In The Establishment Of Effective Regional Governance For Regional Land-Use And Transportation Planning
(Source: Kennedy *et al.* 2005, 398)

That problem is mixed especially in the case of transportation planning and policy. This case involves many diverse actors who have various interests in the process. For instance, while public actors from various functional groups within the regional hierarchy, such as departments responsible for transportation, land-use planning, environment, and housing, can be involved; communities and the private sector can also be involved (Kennedy *et al.* 2005, 399).

Actually, Kennedy *et al.* (2005, 399) state that the hierarchical structure is not designed to manage the ***negotiation*** that is necessary between all the actors and in order to deal with this problem, informal communication and negotiation channels are thought as necessary to be developed between the actors to improve the decision-making process. It is stated that these interactions create a new organizational structure within the existing hierarchy which disregards the existing vertical channels for obtaining more efficient horizontal relationships. Dijst and Schenkel (2002) argue that urban governance might become more effective through such policy networks which ensure the replacement of the hierarchical authority with *"a constellation of loosely joined political, economic, and social actors"*. However, it is claimed that there are also strong arguments against such 'decoupled structure' (See Figure 4.7) (Dijst and Schenkel 2002 cited in Kennedy *et al.* 2005, 399).

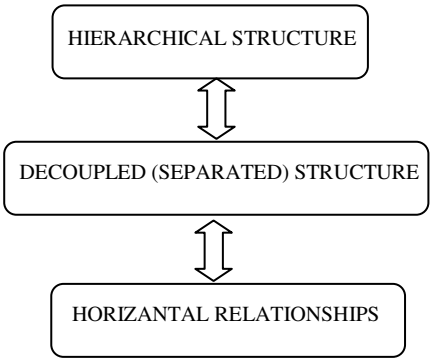


Figure 4.7 Types of Organizational Structures For Effective Regional Land-Use Development And Transportation Planning
(Developed referring to explanations by Kennedy *et al.,* 2005, 398-399)

Thirdly, another difficult concept in regional transportation planning is about which ***decision-making*** should be made under the influence of political processes. However, a significant consideration is that the interactions between urban development, transportation systems and urban economies are complex. Hence, the construction of a **'regional transportation body'** has to be complicated. It is argued that controlling the **monetary policy** of a country may be best done at arms' length from government. Similar arguments could also be made for the development of transportation and land-use planning in large urban regions. On the other hand, **public participation** is also important for developing sustainable cities. Any serious attempt for moving towards sustainability will require a significant change in the attitudes, perceptions and lifestyles of the community in general. Public participation legalizes policy decisions, strengthens relationships between stakeholders and promotes sharing of knowledge (Kennedy *et al.* 2005, 399-400).

In conclusion, the responsibilities of a regional planning body might include capital investment, pricing/taxation, regulation and education/information and the key specific responsibilities may cover the following:

- *"Development of region-wide strategic transportation plans,*
- *Control over zoning, planning, and urban design,*
- *Long-term infrastructure management,*
- *Authority to generate and control funds,*
- *Ensure appropriate scheduling and pricing,*
- *Some responsibility for local economic development,*
- *Support logistics of urban freight movements,*
- *Obligation to monitor and reduce vehicle emissions (Kennedy et al. 2005, 401)"*

4.3.3. Institutional Barriers to Integration of Land-Use and Transport Planning

Cervero (2000, 6) states that one of the **institutional barriers** to transportation and land use coordination is the disaggrement in places where decisions on land development are made **locally** and where the transportation impacts are felt

regionally. In practice, it is said that decision-making is **fragmented** across many legal authorities and often multiple transportation service-providers. For example, there may be separate entities involved with public transport, highways, etc. (Cervero 2000, 6).

Another institutional barrier to integration of transportation-land use is said to be the irregular rate of land-use change. Cervero (2000, 6) argues that local and sub-regional growth often occurs incrementally and land-use maps are continuously changing because of changes in zoning legal frameworks, variances, and new subdivisions. On the contrary, decisions on regionally important transportation improvements often spread over 2 to 3 year time increments, and to change such improvements according to changing land-use patterns is difficult. Hence, it is concluded that while land-use changes are fluent and continuing, large-scale transportation projects tend to be rigid and occur over much longer time increments (Cervero 2000, 6).

4.4. Concluding Remarks

As it has been emphasized before (See Section 2.2.6, 2.2.7 and 3.1.2) that, in order to promote and maintain sustainable transport in a city, it is important to make transport decisions together with considering land-use planning decisions. This means that the macro and micro scale land-use measures, which were expressed in Chapter 3, and the transport policies (especially public transport), which were expressed in this chapter, should be integrated to guard a sustainable transport scheme in a city.

Until this point of the study, the concept of transport sustainability in general, and approaches in planning for sustainable cities and sustainable transport have been reviewed. The focus has particularly been on urban form models for sustainability and the need to improve public transport and NMT, as well as the need to integrate these two areas, namely urban planning approaches and transport investments. The following chapter introduces a different field in planning; CITY-REGIONS. It is the primary aim of this thesis study to combine the arguments and approaches of planning for sustainable transport with the trend of city-region development.

Following the main highlights of sustainable transport arguments presented in the previous chapter as well as this chapter, the review of city-regions in the next chapter focuses particularly on the issue of form / model of development (and its compatibility with principles of sustainability explained so far) and on the issue of planning integration and governance (discussed in this chapter as one of the barriers to sustainable urban and transport planning).

CHAPTER 5

RECENT URBAN DEVELOPMENT TREND: *CITY-REGION*

Globalization is not only a growing force in our daily lives but also a concept of fast intensifying debate. In past few years, with the globalization process, a noticeable demographic boundary has become dominant and for the first time in history, the most of the world's population has started to live in sprawling metropolitan regions of more than one million inhabitants[19]. This significant new threshold covers a concentration of population extraordinarily and a greater concentration of social, economic, political, and cultural power, in around 400 widening urbanized areas which have recently been perceived as global city-regions. In the line with this global city-region concept, the new regionalism appears to be on the rise (Scott 2001, 1; Soja 2005, 1).

The **new regionalism**[20] rejects the view that defines the world as a borderless space of flows as it is sometimes claimed in discussions of the future international development. Instead, the new regionalism takes its root in a series of **dense nodes** of human labor and communal life that are dispersed across the world. These nodes create distinctive sub-national (maybe regional) social formations and the local character and dynamics of these formations are based on major transformations that are caused by the impacts of globalization. Recently, many of these nodes have started to have a definite identity and become a force as economic and political actors on the global world. These regional formations are referred as global city-regions (Scott 2001, 1). The concept of **global city-regions** can be referred to the **"world cities"** idea of Hall (1966), Friedmann, and Wolff (1982), and to the **"global cities"** idea of Sassen (1991) (Scott *et. al* 2001, 1).

[19] *"At least twenty **city-regions** have populations in excess of ten million"* (Scott *et. al.*2001, 11).
[20] *New regioanlism* concept will be discussed in detail in Section 5.2.3.

Global city regions have much importance in today's world and major city-regions occur in both economically advanced and in developing countries (Scott 2001,1). They include not only the popular metropolitan agglomerations that are dominated by a ***strongly developed core*** such as the **London Region** or Mexico City; but they also cover ***more polycentric*** geographic units such as the urban networks of the Randstad or Emilia-Romagna[21]. At the beginning of the 21st century, these city-regions are expanding actively in everywhere, and they introduce many deep challenges to many researchers and policy makers (Scott *et. al.* 2001, 11). Scott *et. al.* (2001, 11) claim that; *"The processes of worldwide economic integration and accelerated urban growth make traditional planning and policy strategies in these regions increasingly problematical while more fitting approaches remain in a largely experimental stage. New ways of thinking about these processes and new ways of acting to harness their benefits and to control their negative effects are urgently needed"*.

Soja (2005, 1) asks; *"What are global city regions and why have they become so outstanding in the contemporary world? What distinguishes* ***global city regions*** *from related concepts such as* ***world city or global city****?"* and concludes that; *"These questions can be answered by looking at each of the three components of the term:* ***global + city + region"***.

In this city-region section, firstly, what the *'city' and the 'region' concepts* refer to, the changing structure of the city and the region, and the formation of the *'city-region'* will be defined in general. Secondly, with the '*globalization process'* and its effects on the cities; the '*new regionalism'* period which Soja (2005, 1) defines as the feature that re-combines the global and the urban in its framework will be described in detail. Moreover, the '*growth trends'* of the urban area and the '*new urbanization processes'* that have been transforming the modern metropolis to the postmetropolis will be discussed with referring to the structures of modern and postmodern city (global city-region) (Soja 2005, 1). Finally, the *structure* – administrative and polycentric spatial structure -of the city-region will be expressed.

[21] London Region's and Ranstad's development structure will be discussed in detail in Section 5.4.2 as case studies.

5.1. The Concepts of The City and The Region

The terms **region** and **regionalism** have been widely used in recent years in relation with a great variety of problems. **Regional planning,** which is also called the 'urban regionalism', deals mainly with the physical planning of town and countryside, and is often used as an extension of town planning. The term 'region' is one of the important phrases that popular and scientific writers use. In practical terms, a region is simply an area with certain characteristics and it is a suitable unit for some purpose of business or administration. In scientific terms, a region is an area that is homogenous with some specific set of associated conditions of the land or of the people, such as industry, the distribution of population, commerce… etc. Regional analysis aims at discovering in what degree the selected areas are 'regionalized'. Therefore, the main problem of a regional study is to select the suitable criteria for the recognition of regional homogeneities (Dickinson 1964, 3-4).

Some authors show **'natural administrative units'** as suitable to be used as administrative units and thus a region is thought as a 'natural' areal unit. The natural is used to state that it is a real and existing unit which arises from the structure of the society, in contrast to the **'artificial administrative units'** of the past. It is shown as essential that there should be proximity between different areas not only in terms of geographical coordination but also in practicable terms. However, this definition reveals many serious problems about what kind of an area it shall be, what purpose it shall serve, and how it should work (Dickinson 1964, 5-6).

A restatement of the concept of regionalism was introduced by Patrick Geddes and then by Lewis Mumford. According to their definitions, it is important to understand that a region is a geographical area with a considerable measure of unity in its activities, services, and organizations. It is indicated as *an area of common living* and an area of common living can only be defined in social terms, not in physical terms. Hence, the region as a social unit must be observed with considering the important issues for social structure. These issues may be related with both the **intensity of economic relations**, which has indicators such as interchange of goods between one district and another, banking relations, communications, accessibility; and **common culture elements** which have indicators such as religious ties,

traditions, similarities of habits, knowledge and skills (Dickinson 1964, 5-6).

In addition, it is important to realize that the ideal hierarchy of community associations, which are centered in city or sub-center, cannot be designed by a planner or an architect; but it occurs throughout the society. Therefore, the geographical structure of this society must be understood if there is a requirement to make planning for meeting the needs of the society. This means that the geographical network of existing space relations is needed to be observed (Dickinson 1964, 7).

On the other hand, the **city** is not only a collection of economic functions although it has been understood as a location of institutions in the service of the people throughout the history. Lewis Mumford states that, *"it is art, culture, and political purposes, not members that define a city"* [22]. These economic, cultural, and political activities are segregated at fixed points in space to serve the society. According to Dickinson (1964, 19), as Mumford calls, the city has the characteristics of both a container and a magnet. The container is the gathering of physical structures in which the functions, processes, and purposes of the city are developed. The idea of magnet indicates the spatial force of attraction of people and institutions of the city (Dickinson 1964, 19).

Blanchard[23] (1935 cited in Dickinson) defines the city as a **regional capital** that gains its importance with its population, its prosperity, its historical reputation and with its being the head of the region. According to Blanchard (1935 cited in Dickinson), it can also be thought as a political capital, because the central authority is situated there and all the administrative functions and decisions are taken there. Besides, the capital has an 'economic role' as it is a center of supply of food (market) for the surrounding regions and it has a key position as it directs those regions' expansion. Those regions depend on the commercial activities presented by the city, so the city has also a 'commercial role' and can be named as the financial

[22] Mumford, L., 1961, *The City in History*, London, 125 (cited in Dickinson 1964, 19).
[23] Blanchard, R., 1935, "Grenoble: Etude de Geographic Urbaine", 205-6, pp. 453 (cited in Dickinson 1964, 9).

capital. On the one hand, as a capital, the city serves as an intermediate center between the production of the region and its demands from the exterior (export and import relations) (Dickinson 1964, 8-9).

Finally, the nature of the city, in general terms, can be described as a **regional center** (Dickinson 1964, 15). Mark Jefferson (1931, 453), one of the important geographers of his period, states that, *"Cities do not grow up of themselves, country sides set them up to do tasks that must be performed in central places"* [24] (Dickinson 1964, 49).

5.2. The History of City-Region

5.2.1. Defining City-Region

The roots of the city-region concept can be followed from many irregular seminal studies that have been carried out throughout the twentieth century (Dickinson, 1964, 1967; Fawcett, 1919; Hall et al., 1973 cited in Harrison 2007, 11). Each study, in its time, made the city-region one of the most important concerns of academic and political debate. However, it is stated that the most recent analysis of the city-region concept takes its starting point from the conceptual framework of the **work of Dickinson** (Harrison 2007, 11). Hence, as the definitions of Dickinson about the 'city' and the 'region' concepts have been expressed in the previous section, some of his explanation will also be given as a reference while discussing the 'city-region' concept.

The term 'city region' has been used by urbanists, economists, and land-use planners since 1950 (Tewdwr-Jones and McNeill, 2000 cited in NLGN 2005, 9). In the **late 1960s,** a sudden initial excitement surrounding city-regions was followed by the accession of the city-region concept to the top of it its academic and policy attention in the **mid-1970s** (Hall et al., 1973 cited in Harrison 2007, 11). However, during **the 1980s,** there started a slow and steady decline of the concept due to its relative uncertainty. Although this process (1960–1980) is a simple historical story of the rise

[24] Jefferson, M., 1931, "The Distribution of the World's City Folk", *Gepgraphical Review,* vol. XXI, 453 (cited in Dickinson 1964, 19).

and fall of the city-region concept, in fact, it covers important links to the current debate surrounding the **transition** from **regions** to **city-regions** (Harrison 2007, 11). The concepts of city region and analysis focusing on this concept have again come to forefront of academic research and debates in the late 1990s and in the 2000s, as presented in this chapter. In this section, firstly, the city-region concept will be reviewed from the perspective of **Dickinson** (1964) focusing on the **1960s' period** and then, other current point of views will be presented by an overview of the period **after 1980s to nowadays – *the globalization effects.***

Dickinson (1964, 227) emphasizes that the city cannot be fully understood by depending only on its administrative area. He gives a reference to Aurousseau (1934 cited in Dickinson 1964, 227) who supports his idea that it has to be conceived as 'an organic part of a social group'[25]. It is stated that in analyzing the four main urban functions of the city – *dwelling, work, recreation, and transport* - it must be realized that every city is associated with a part of an economic, social, cultural, and political unit. Nevertheless, there is the problem of defining and analyzing the *functions and limits* of the city. As a solution to this problem, it is significant to determine and combine the relationships of the city with its surrounding area. Hence, it becomes a necessity to examine the region that city serves. In depth, each group of functions has its specific influence zone. On the other hand, those functional areas have no relationship with each other in their geographical extent; but they all have a *common denominator* in their dependency on the city. That area of functional association with the city is referred as the **city-region** (Dickinson 1964, 227).

According to Dickinson (1964, 227), the concept of city-region can only be made specific and definable as a geographic entity with giving reference to regional extensions of some specific associations within the city. Main determinants of such associations are ***transport facilities, the density and the movements of the population.*** The most meaningful definition of city-regions should be based on such criteria. On the other hand, the regional associations of a city are very complex and fall into **four categories**. The first category covers ***trade relations*** that are gathered under the heading of the trade area. The second category covers a social area where the ***social relations*** are seen, including cultural and educational associations,

[25] Aurouesseau, M., 1934, "Recent Contributions to Urban Geography", *Geographical Review,* Vol.XIX, 444-455 (cited in Dickinson 1964).

conservation of theatres, museums, etc., general social ties and common ideas that find their expression through the voice of the city. These relations can be completely realized through the center's function and historical growth (Dickinson 1964, 227-228).

The third category covers the settlement area that indicates a movement area of population to and from the central city. This is mainly expressed in the ***daily journeys*** to work (commuting), to shopping…etc. Finally, there is the ***impact of the central city*** on both urban and agricultural land uses on its surrounding area. In summary of these associations, it should be stressed that the role of the city as a regional service centre, in terms of 'central place theory', is only one aspect of the relations between the city and its surroundings. The evaluation of the city as a geographic structure requires a balanced consideration of all aspects of the relations' interconnections (Dickinson 1964, 228).

The interpretation of the functions of the city as a center of associations involves two approaches. First approach is to define the ***character of the surrounding area***; its resources, production and its effect on the character of the activities of the city. Second approach is to define ***the effects of the city***, as a center of activity and organization, on its surrounding area. Besides, the limits of the city as a regional center should also be considered. It is required to evaluate both the city and its region in order to understand their mutual relations and their historical development (Dickinson 1964, 228-229).

"The city produces goods and processes and stores imported goods not only for a nation-wide market, but also for its surrounding market where it is in competition with its neighbors" (Dickinson 1964, 229). The population of the city is not only affected by its own natural increase; but also the city attracts people from the surrounding area with its employment opportunities, shops, institutions…etc. For instance, in the 19th and 20th centuries, with the growth of employment in the towns and cities, more people moved to the city center from the surrounding countryside.

Actually, before the development of rapid transport, every city was almost entirely dependent on its surrounding area. After the increasing complexity of the social and

economic structure of the society, the city has become a center for distribution of goods and services. The city gained many new functions with its new role and the impact of the city on its surrounding towns has greatly increased by some impressive factors. Those factors were the ***introduction of automobile*** and ***the expansion of urban land uses*** for residence, industry, and recreation purposes. This situation proves the fact that the way of life of the city affects the character of the social and economic life of the people in its hinterland (Dickinson 1964, 229-230).

Up to now, the city-region concept has been discussed by looking at the relationships between the city and its region with reference to the Dickinson's views. Harrison (2007, 12) has made a comparison with Dickinson's conceptualization of city-regions (1964) and much-cited work of Allen *et. al.* (1998 cited in Harrison 2007, 12) about the social construction of regions. He quotes the following definitions of the two perspectives.

> *"This concept of the city-region, like all concepts, is a mental construct. It is not, as some planners and scholars seem to think, an area that is presented on a platter to suit their general needs. The extent of the area they need will depend on the specific purpose for which it is required. The concept of the city-region can only be made specific and definable, as a geographic entity, by reference to the precise and areal extent of particular associations with the city"* (Dickinson 1964, 227).

> *"Regional studies are always done for a purpose, with a specific view. Whether territorial, political, cultural or whatever, there is always a specific focus. One cannot study everything, and there are always multiple ways of seeing a place: there is no complete 'portrait of a region'. Moreover, 'regions' only exist in relation to particular criteria. They are not 'out there' waiting to be discovered, they are our (and others') constructions"* (Allen *et al*. 1998, 2 cited in Harrison 2007, 12).

Harrison shows that, although these were written over two different decades, clear

similarities emerge between the conceptualization of the city-region in the **1970s** and in the **1990s**: *"specifically, there are multiple ways of seeing each place; they exist in relation to particular associations / criteria; and they are always socially constructed"* (Harrison 2007, 12).

From another point of view, Tewdwr-Jones and McNeill (2000, 131) states that, *"The term 'City Region' …refers to a strategic and political level of administration and policy-making, extending beyond the administrative boundaries of single urban local government authorities to include urban and/or semi-urban hinterlands. This definition includes a range of institutions and agencies representing local and regional governance to possess an interest in urban and/or economic development matters which, together form a strategic level of policy-making intended to formulate or implement policies on a broader metropolitan scale"*.

In addition, it has been defined in Wikipedia (The Free Encyclopedia on Internet), *"The term **city region** means not just the administrative area of a recognizable city or conurbation but also its **hinterland** that will often be far bigger. Conventionally, if one lives in an apparently rural area, suburb or county town where a majority of wage-earners travel into a particular city for a full or part-time job then one is (in effect) residing in the city region"*. It is also stated that in the studies of human geography and urban and regional planning, more attention is given to dominant travel patterns during the working day rather than considering arbitrary administrative boundaries. It is also expressed that, "*Inevitably, city regions change their shapes over time and quite reasonably, politicians seek to redraw administrative boundary maps from time-to-time to keep in-tune with perceived geographic reality. The extent of a city region is usually proportional to the intensity of activity in and around its central business district, but the spacing of competing centers of population can also be highly influential"* (Wikipedia: The Free Encyclopedia on Internet: http://en.wikipedia.org/wiki/City_region, Last accessed date: January 31, 2007).

New definitions of the city-region emphasize the relations and associations between the city and its hinterland as it was also stated in Dickinson's definitions. In both the 1960s and contemporary explanations, it is accepted that the city cannot be realized

only by its administrative boundary, but its hinterland must be considered in administrative, geographical, and functional issues.

5.2.2. Changing Urban Structure: Global City-Region

Soja (2005, 1) expresses that cities have been globalizing for many centuries and gives as an example that London and Amsterdam were global cities in the **16th century.** Hence, he emphasizes that the connection between **globalization** and **urbanization** processes is not a new concept. Particularly, *"from the beginning of the **1960s**, there has been a growing realization that a clear acceleration in the globalization of capital, labor, and culture has started and this intensified globalization has been having significant effects on cities and urban life all over the world"* (Soja 2005, 1). During the twentieth centur, from several parts of the world, most urban regions have witnessed some dramatic changes. They have both grown in size and population in huge amounts and changed their economics, population character, and spatial form (Simmonds and Hack 2000, 3). Globalization has been a very important factor in the growth of global city-regions and this role of globalization has become popular, especially after **1980s** (Simmonds and Hack 2000, 3; Soja 2005, 1)**.** Hence, as Soja (2005) also considers, analyzing this impact of globalization on cities can be realized as the **first step** in understanding the concept of **global city regions** (Soja 2005, 1).

According to Soja (2005, 1), the effects of globalization on cities' development can be seen at **two levels.** He states that; *"Within cities and metropolitan regions, globalization has been playing a role in reconfiguring the social and spatial organization of the modern metropolis and in changing some of the basic conditions of contemporary urban life".* Due to the rise of global flows of labor and capital, and the concentration of these flows in certain urban areas, the metropolitan populations expanded to unexampled sizes up to now. In addition to this expansion in population size, globalization has also stimulated the creation of the most culturally and economically heterogeneous cities in the world (Soja 2005, 2).

There has also been an important change in the **external relations** of cities because of the geographically uneven effects of globalization and the effects of new

information and communication technologies. Cities interact more and more in the global hierarchy and then these **inter-urban linkages** more frequently go beyond the national boundaries and substitute long distance ties for those cities that are in very close distances (Soja 2005, 2).

John Friedmann, the planning theorist, was one of the first scholars that realized this ongoing internal and external reconfiguration of cities and their links to globalization processes. His article, with Goetz Wolff, in 1982, titled *"World City Formation: An Agenda for Research and Action*[26]*"* has played an important role in the development of the concept of global city region[27] (Soja 2005, 2).

In Friedmann's terms, the **'world city hypothesis (1982)'** examined the increasingly clear effects of globalization on the conditions of urban life, especially referring to the growing polarization between those having the financial and political power, and the poor (Soja 2005, 2). It is stressed by Soja (2005,2) that the concept of world cities would continue to influence the studies of planners and geographers, but the specific term ***world city*** was overshaded in the academic and popular literature by the term ***global city*** that was defined and officially announced most forcefully in the work of **Saskia Sassen (1991)**[28]**.**

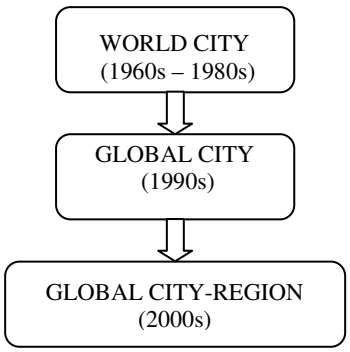


Figure 5.1 Changing Urban Structures and The Differences In Terminology
(Source: Developed referring to explanations by Soja 2005, 1-11)

[26] Friedmann, J. and Wolff, G. 1982, "World City Formation: An Agenda for Research and Action, *International Journal of Urban and Regional Research* 6, pp. 309-44 (cited in Soja, 2005).
[27] The first major publication to use the term "world cities" was Peter Hall's *The World Cities,* published in London by Weidenfeld and Nicolson in 1966. This reference, however, was not directly related to the effects of globalization (Soja 2005).
[28] Sassen, S., 1991, *The Global City: New York, London, Tokyo,* Princeton NJ: Princeton University Press; and 1993, *Cities in the World Economy,* London: Sage (cited in Soja, 2005).

The discussion on urban globalization was enlarged again and significantly refocused around the relations between ***globalization, urbanization, and industrialization*** at an international conference held at the University of California, Los Angeles (UCLA) in October, 1999. Two years later, ***Global City-Regions***[29] was published which was edited by **Allen J. Scott** who was the conference organizer and had a leading position among the UCLA cluster of urban and regional researchers. The first chapter of *Global City-Regions* was collectively written by four UCLA geographers and planners, ***Allen Scott, Edward Soja, Michael Storper, and John Agnew*** (Soja 2005, 2). The following paragraph that defines city-regions has been quoted from that book:

> *"**City-regions** increasingly function as **essential spatial nodes** of the global economy and as distinctive political actors on the world stage. In fact, rather than being dissolved away as social and geographical objects by processes of globalization, city-regions are becoming increasingly central to modern life, and all the more so because globalization (in combination with various technological shifts) has reactivated their significance as bases for all forms of productive activity, no matter whether in manufacturing or services, in high-technology or low-technology sectors. As these changes have begun to run their course, it has become increasingly apparent that the city in the narrow sense is less an appropriate or viable unit of local social organization than city-regions or regional networks of cities"* (Scott et. al 2001, 11).

This approach to global city regions is different from other approaches. Soja (2005) mentions that many have written about how globalization and technological innovations have been reducing the significance of space as global flows of information, capital, labor, and culture, dissolving territorial borders of particular places, cities, and regions. He claims, *"Just the opposite is argued here, that globalization and new technologies may be making space, place, location, networks*

[29] Scott, A. J. (ed.), 2001, *Global City Regions: Trends, Theory, Policy*, New York: Oxford University Press

of urban nodes, territorial development, cities, regions, and regionalism more important in the contemporary world" (Soja 2005, 3).

Within the global city region context, *globalization, urbanization, and industrialization* are analyzed together as essentially spatial and regional processes. There is an emphasis on ***urban-industrial restructuring*** and this is a very distinctive perspective on the globalization process itself. From this perspective, the most distinguishing property of the current phase of globalization is not the dispersal of commercial capital through trade or the global extent of financial or investment capital. Instead, current globalization is more specifically the "*selective diffusion of advanced forms of urban-based industrial production"* (Soja 2005, 3). Regarding this, globalization has been associated with the creation of '**new industrial spaces'** at many different scales. For example, at the metropolitan regional scale, Silicon Valley and many other high-technology production and employment complexes, which have developed in previously suburban or greenfield sites, are 'Newly Industrialized Regions'. Moreover, the growth of global city regions has created distinctive new relationships between *globalization, industrialization, and urbanization* processes due to the massive transnational and inter-regional flows of labor, capital, trade, and information. Therefore, the city region has become the main developmental point between the **global** and the **local** (Soja 2005, 3-4).

The analysis of *urban restructuring* processes follows an explicit path to the concept of global city regions. It is apparent that cities and urban life have been changing over the past forty years and there has been a transition from the **old metropolis** towards **postmetropolis**[30] . The modern metropolis that existed in the **1960s** has changed completely. Among its many changes, the old metropolis has become increasingly 'unbound' in many meanings of this term (Soja 2005, 4). Priemus and Hall (2004) emphasize that under the influence of global and regional factors, cities undergo transformation processes. Currently, the great transition from **industrialization** to **knowledge-intensive** business services can be seen. This transition is in equal significance with the industrial revolution of the eighteenth and nineteenth centuries and it is supported by a rapidly spreading use of information and communications technology (ICT) that influences the ways in which cities function (Priemus and Hall 2004, 338).

[30] Edward Soja has recently coined this phrase 'post metropolis' to describe the 'city-region' of today (Simmonds and Hack 2000, 4).

It is stated by Soja (2005, 4) that the reach of the city extends outward to a **global scale** much more than ever before and the metropolitan hinterland is no more defined only by nearest boundaries of daily commutes or residential identities. He connects this situation to the recently exploded city limits in scale and scope. Besides, he expresses that every urban activity that is linked to production, consumption, exchange, or entertainment, is in not only *local* but *global* as well, and at the same time, "glocalized[31]" city regions reach out to the entire world. The entire world is also said to be reaching in and creating cultural and economic heterogeneity. It looks like as if *"the modern metropolis has been turning itself simultaneously inside-out and outside-in"* (Soja 2005, 4).

All of those changes in the urban structure and the world has risen the discussion whether ***"the world is flat"*** (Friedman, 2005) or whether ***"the world is spiky"*** (Florida, 2005). Halbert *et. al.* (2006, 110) define that while Friedman's hypothesis (2005) depends on the effects of ICT, Florida's hypothesis (2005) is that despite the 'flattening' impacts of ICT, the world is still a 'spiky' place, with some real global players, which are called the 'world cities'. Florida's claim, that not only the world's peaks have become more dispersed; but also the world's tops, the industrial and service centers, which produce mature products and support innovation centers, have reproduced and changed, is also mentioned (Florida 2005, 50 cited in Halbert *et. al.* 2006, 110).

This transition period can be summarized by looking at different perspectives. Priemus and Hall (2004) remark that, after a long period of ***urbanization*** (during the industrialization period), cities were affected by the rising of two **centrifugal forces**: ***suburbanization*** and ***deurbanisation*** (See Section 3.1 and Figure 3.5). In fact, since the **1960s,** industrialization has been changing the appearance of society and the city. The extended family was replaced by the nuclear family while the *laissez-faire* state developed into the welfare state and mobility was stimulated by the development of trains and then cars. These changes caused the process of *suburbanization*, which was the process in which the density of urban areas decreased and the size of the urban field increased, and then *deurbanization* emerged**.** In terms of land-use, multifunctionality formed the basis of monofunctionality. This meant that housing,

[31] **"Glocalization"** refers to describe the increasing interpenetration of global and local worlds (Soja 2005, 4).

business, transport, and recreation became increasingly separated in *place* and *time*. People commuted over longer distances in spite of the improved transportation (Priemus and Hall 2004, 338-339). The terms above are defined as the following:

- ***"Urbanization** is said to take place when the population growth of the core is greater than that of the ring and the population of the agglomeration[32] grows as a whole;*
- ***suburbanization** is said to take place when the population growth of the ring is greater than that of the core and the population of the agglomeration continues to grow;*
- ***deurbanization** is said to take place when the decline of the population of the core leads to a decline in the population of the agglomeration"* (Priemus and Hall 2004, 340).

Dickinson (1964) had also mentioned these centrifugal forces while modeling the new modern city structure of that time, in the 1960s. In fact, Dickinson (1964) and McKenzie (1933) had already seen the future of the cities and the regions from that time and while describing the city-region phenomena, they may have settled the basics of it. Therefore, in order to understand the city-region concept deeply, to review their interpretations may be useful (McKenzie 1933 cited in Dickinson 1964).

Dickinson defines the **structure of modern city** as showing two main differences from the past city. Firstly, there has been a radical change in the character and complexity of city functions. Secondly, the absence of rapid transport in the past necessitated the concentration of population in small areas within which all needs were satisfied. That means **centripetal forces** (See Figure 3.5) have determined the structure of and spatial distribution of towns. The most fundamental change today is the ***specialization of function by place that*** has been made possible by cheap mechanized transport. Therefore, the activities that were formerly concentrated in the city center are now spread over a wide area (Dickinson 1964, 11-12).

McKenzie (1933 cited in Dickinson 1964) states that, *"The modern metropolitan community, unlike pre-motor city, obtains its unity through territorial differentiation*

[32] **"Agglomeration"** here refers to a core municipality and a ring of one or more edge municipalities (Priemus and Hall 2004, 340).

of specialized functions rather than through mass participation in centrally located institutions." Centripetal forces still determine the character of the city; however, **centrifugal forces** have changed the structure of the urban community. The modern city is no longer a compact settlement unit, but a dispersed city. The modern city is becoming the headquarters of a group of interrelated towns and satellite settlements. This close interrelationship between widely scattered places forms an integrated functional unit with sub centers and with its core. Besides, this relationship is the essential character of modern society (McKenzie 1933 cited in Dickinson 1964, 11-12). This general spatial structure of the modern society is called as **city-region** and R. D. McKenzie (1933) described it as:

> *"The metropolitan or **(city) region** thus considered is primarily a functional identity. Geographically it extends as far as the city exerts a dominant influence. It is essentially an extended pattern of local communal life based upon motor transportation. …The city region represents a constellation of centers, the interrelations of which are characterized by dominance and subordination. Every region is organized around a central city or Focal point of dominance in which are located the institutions and services that cater to the region as a whole and integrate it with other regions. The business sub-centers are rarely complete in their institutional or service structure. They depend upon the main center for the more specialized and integrating functions".* (McKenzie 1933 cited in Dickinson 1964).

Finally, Dickinson (1964, 12) points out that the city-region is not defined as a clearly defined geographical unit with strongly defined limits; instead, it is defined as a constellation or cluster of centers around the main center.

Afterwards **(after 1980s),** according to Soja (2005), *"the modern metropolis has been simultaneously **deindustrialized** and **reindustrialized, decentralized** and **recentralized**, in highly varied mixes and intensities, as the postmetropolitan transition takes many different forms in different urban spaces"*. Many dense urban cores have become "hollowed out" by losing population and jobs, while some cores

have become refilled again with the entry of global migrants and renewed global investments. While the inner city is being reformed, **urbanization of suburbia** has also started. This new phenomena refers to intervention of densely populated edge cities, technopoles, and other outer city employment centers into the homogeneous and sprawling outer rings of the metropolis (Soja 2005, 4-5). The terms above are defined as the following;

- *"**Decentralization** implies the shedding of certain of the city's activities – such as industry or commerce or administration – and their dispersal to a distinct and separate town that itself functions as an independent local and regional center"* (Dickinson 1964, 44).

- ***"Recentralization** is a term that is considerably more meaningful than decentralization in expressing the process of urban growth. Decentralization would simply mean the scattering of functions from the urban area to less congested places elsewhere. Recentralization more specifically refers to the regrouping of decentralized activities with other activities"* (Dickinson 1964, 45).

- *"**Deindustrialization** is the process of causing a nation or an area to lose or be deprived of its industrial capability or strength"* (Free Dictionary by FARLEX: http://www.thefreedictionary.com, Last accessed date: April 29, 2007).

Headicar (2000) also defines this postmetropolitan (city-region) transition in another way with different terms, but referring to the same process. Headicar expresses that the exploding 'city region' refers to two spatial processes working in combination: counter-urbanization and deconcentration. **Counter-urbanization** is the net shift in population downwards in the urban hierarchy from larger cities to medium and smaller towns or from more to less urbanized regions. **Deconcentration** is the shift within any urban region from inner to outer parts of the core built-up area and from this area as a whole to the surrounding country ring. In other words, deconcentration is the tendency of people to migrate from the existing concentrations within the urban area to the open land on its outskirts, because **centrifugal** forces are opposed

to **centripetal** forces (Headicar 2000, 160-161; Dickinson 1964, 43).

Soja (2005) emphasizes that, *"In the transition between metropolis and postmetropolis, the typically monocentric focus of the metropolitan region has become increasingly* ***polycentric or multi-nodal"***. The peripheral agglomerations multiply and the dominance of the singular central city weakens. The clear boundaries between city and suburb, the urban and the non-urban, urbanism and suburbanism as ways of life are becoming increasingly blurred. Because, new networks of interaction emerge and the city and the suburb penetrate into each another and this process can be best described as a regional urbanization process. For example, the city region of Los Angeles is one of the most remarkable examples of regional urbanization. In the 1960s, the urbanized area of Los Angeles was among the least concentrated of all major metropolitan areas in the US; but by 1990, it had gone beyond the urbanized area of New York City as the densest in the country (Soja 2005, 5).

In urban areas, through time, more **centers** and **sub-centers** have been developed, which have also been functioning as **nodes** in transport infrastructures and ICT-networks. The integrated development of urban centers, infrastructure nodes, housing and business areas and green networks, with consideration of the preferences of the citizens, is nowadays the most important challenge for urban planners of **Mega-City-Regions** (Priemus and Hall 2004, 338, 348).

In addition, Priemus and Hall (2004, 338,348) conclude that after a long period of a spatial separation of functions like *housing, employment, recreation and transport* in the industrialization period, there is now a shift towards **a multifunctional area** development. There appears a need for multifunctional urban planning approach for mega-city regions (Priemus *et. al.* 2004, 271). Today, the information age has generated a new *spatial synergy* between the home and the work place. Therefore, the home has become a place of work. Regarding to this, a multi-functional approach to spatial planning could serve to gather the home and the work place more than ever before (Priemus and Hall 2004, 338, 348). Priemus *et. al.* (2004) define multifunctional land-use as the association of different socio-economic functions in the same area. Lajendijk and Wisserhof (1999, cited in Priemus et. al. 2004, 270) define it as a process if one of the four conditions is satisfied:

1. intensification of land use (a rise in the efficiency of land use by a function);
2. mixing land uses (using the same area for several functions);
3. using the third dimension of the land (the underground along with the surface area);
4. and using the fourth dimension of the land (using the same area by several functions within a certain time) (Lajendijk and Wisserhof 1999 cited in Priemus et. al. 2004, 270).

Besides, Rodenburg and Nijkamp (in Priemus et. al. 2004, 270) argue that, *"A land use pattern is said to become more multifunctional when, in the area considered,* ***the number of functions****, the* ***degree of interweaving****, or the* ***spatial heterogeneity*** *increases".* In other words, multifunctional land use is the implementation of more functions in a fixed place in a fixed time-period and this type of land use generates advantages of ***synergy.*** This synergy contributes to not only the economic vitality, but also the environmental quality of modern cities (Priemus et. al. 2004, 270).

"Regional urbanization and the postmetropolitan transition have been strikingly associated not just with the blurring of social, economic, and cultural boundaries, but with increasing economic inequalities and social polarization" (Soja 2005, 5). Soja (2005) states that the postmetropolis, which is still evolving, has become a highly volatile space and ready to explode under new conditions due to its deepening inequalities and polarizations, growing cultural heterogeneity, and rapidly changing geography. These urban transformations have had the additional effect of blurring the boundary between the **urban** and the **regional** (or metropolitan) scales. Before, it was quite easy to distinguish the urban from the regional as they are distinctive levels of analysis. On the other hand, in the postmetropolis, the urban and regional concepts seem to be mixed up each other. This is because the simple structure of the modern metropolis, which has a clear and monocentric division between urban and suburban, has become fragmented. Then this structure shifted towards new and still unsettled forms of ***"polynucleated, complexly networked, multi-cultural, and regional urban systems".*** This **urban-regional convergence** adds more to the the distinctive meaning of city-region (Soja 2005, 5-6).

5.2.3. The New Regionalism

Over the past thirty years, **new regionalism** has been playing an important role in making theoretical and practical explanation of globalization, economic restructuring, technological change, and other processes shaping contemporary life (Soja 2005, 6). Actually, the emergence of the new regionalism appears to coincide with the revival of the territorial form, the city-region as the **global city-region.** One of the most important properties of new regionalism, as it has been stated in the introduction of Chapter 5, is that it objects to the notion of the world as a borderless space of flows, which is a result of globalizing forces that are raising the complexity of flows and processes. The new regionalism embraces the conceptual opinion claiming that while some flows and processes are becoming increasingly independent from the limits of the place, a variety of flows and processes are increasingly rooted in a series of **place-sensitive nodes** of dense economic and social activity (Harrison 2007, 1-2).

New regionalism is described as a re-theorization of the key concepts of **region** and **regionalism** by Soja (2005, 6). According to him, **regionalism** is based on the belief that regions are useful tools for achieving a wide variety of objectives. Its objectives may involve achieving greater theoretical understanding, causing more rapid and equitable economic development, improving administrative efficiency, fostering and defending cultural identity, and stimulating innovation and creativity and so on. As a form of collective action, regionalism promotes regional ideas, organizations, and identities in ways that often do not fit easily within existing political structures. *"This connects regionalism to questions of **governance**, and especially to the territorial or spatial dimensions of government, administration, social control, and the shaping of the built and natural environments"* (Soja 2005, 6).

The term 'region' has mostly been used to refer to **sub-national** (Scott 2001, 1) and **supra-urban** scales, such as the metropolitan regions, such as Greater Montreal or Barcelona (Soja 2005, 6). *"The term 'region' can also be expanded conceptually and analytically by describing all distinctive and organized spatial domains, from the personal spaces that surround the human body, and defining the most intimate and mobile nodal region"* (Soja 2005, 6). The term **nodal** emphasizes a main aspect of regionality that refers to the tendency for regions to be gathered around centers or

nodes. **Proximity** to a nodal center usually provides some advantages. In this respect, centrality also defines peripherality with ensuring all regions a core-periphery structure (Soja 2005, 7).

According to Soja (2005), one of the most powerful expressions of the **new regionalism** is by Storper (1996 cited in Soja 2005, 7)[33]. Soja (2005) states that Storper emphasizes that nearly all earlier approaches to *regionalism and regional development* considered the region as an outcome of underlying social, economic, and political forces, conceptualizing it as an external domain. On the other hand, he claims that, *"Today, the region is being conceptualized quite differently, and it is this difference that most emphatically distinguishes the global city region from related concepts"* (Storper 1996 cited in Soja 2005, 7). For Soja (2005), Storper defines regions as fundamental units of social life that are comparable in importance to the family, the state, and the market as ways of organizing societies and social relations (Soja 2005, 7).

Soja (2005) states that under certain conditions, regions can be seen as producing development and change, and encouraging innovation and creativity. Related to the regions' importance, the new regionalism demonstrates why regionality is so central to the concept of global city region. The global city region is not just a new node on the concept of global city; but it is a forceful and effective node for putting regions first in the analysis and interpretation of globalization, the formation of a New Economy, the impact of new technologies, and the patterns of urban and metropolitan development (Soja 2005, 8).

> *"…**New regionalism** has been a closely related revival of interest in **nodality** and the role of urban **agglomeration** and **clustering** in generating forces of creativity and innovation in regional economies. Regions or, more specifically, global city regions are internally comprised of networks of **urban nodes** of different sizes connected together by flows of people, goods, information, capital investment, ideas, etc…"* (Soja 2005, 8).

[33] Storper, M., 1996, *The Regional World: Territorial Development in a Global Economy,* New York: Guilford cited in Soja 2005, 6.

Nodality, as being a form of urban agglomeration, produces economic advantage and developmental force in at least two different ways (Soja 2005, 8). Soja (2005) explains the first advantage as the *time and energy savings* that reduce the frictional costs of distance as they are associated with the clustering of activities in space. This advantage has been the basis for ***agglomeration economies*** or, more specifically, ***localization economies***. These savings and other advantages can be seen in the collecting material inputs for production processes (backward linkages), in access to consumption markets and other producers (forward linkages), in the search for specialized labor and technical skills (labor pooling) (Soja 2005, 8). All of these increase the efficiency and productivity. Secondly, less tangible advantages are identified as *innovation and learning effects.* These advantages not only help to reduce the costs of production, but also they contribute to sustain continuing economic growth and development. (Soja 2005, 8).

In conclusion, the dynamic inter-relationship between **regionality** and **nodality** gives new meaning to **city + region**. In the formation of the city-state in the past, the city and the state became one combined term. Similar to this combination, over the past thirty years, the city and the region have been mixed together to create a distinctive new socio-spatial formation, the **global city region**. In the 21st century, the global city region concept is likely to expand significantly in its use and influence, because there occurs increasing practical and theoretical sense of what is happening at every geographical scale, from the **global to the local** (Soja 2005, 9).

5.3. Structure of The City Region

5.3.1. Administrative Structure of the City Region

Scott *et al.* (2001) states that until now, regions as political entities were mainly considered as administrative units that are located within the territory of the nation state. Hence, regions had the same borders with the local level of government, or other sub-territories within a national territory. It is argued that in such structures, federal states have always let more power sharing between different levels of government than unitary states let. Nevertheless, it is also argued that in the post-war period, even federal governments tried to have more and more influence on lower

levels. Scott *et al.* (2001) expressed that in both cases, regions were mostly seen as units for efficient administration of public goods and services. On the other hand, in the beginning of 1970s, **the new regionalism** began to emerge and tried to superimpose itself on the older regionalism persistently (Scott *et al.* 2001, 21).

Actually, Scott (2001) explains that when the city-regions are observed, it can be seen that they usually make an effort to construct interterritorial bases of collective action and identity. Scott (2001) refers this kind of effort as being seen particularly in cases in which adjacent territorial units possess some degree of functional interdependence, but have been administratively or politically separate until now. The basic aim in these cases are said to be usually building regional political competence, and gathering the **fragmented** territorial units, formally or informally. The reason is to ensure mutual aid and advantage in the struggle with the challenges that globalization is now causing at the local level (Scott 2001, 4).

As a new term, **governance** is now commonly used to describe the multifaceted types of social and economic coordination. In physical terms, today, many processes of governance contain not only government agencies; but also ***non-governmental organizations, civil associations, private-public partnerships, and so on***. The term can either indicate the coordination of the complex economic and social environment of the global **city-region** or indicate collective action concerning specific segments of urban life (Scott *et al.* 2001, 21).

According to Scott *et al.* (2001), *"One important domain of governance can be identified in relation to possible and actual responses of city-regions to the new global competition".* The specific characters of different regions have now become very important because as Keating (1997 cited in Scott *et al.* 2001) emphasizes, the global market and new transportation/communications technologies have supported a restructuring of economic competition. Therefore, the city-regions now emerge increasingly as privileged sites of competitive advantage (Keating 1997 cited in Scott *et al.* 2001, 21). Today, it is said that local policies are increasingly being formulated to intensify competitive advantages, encourage new firm formation, improve the economic environment for local firms, and make the local business environment more attractive to mobile capital. These local economic development

policies are different from previous **top-down** approaches to regional development that tried to ensure equity between regions within a given national territory. Instead, local competitive policies frequently work against equity between regions (Scott *et al.* 2001, 21-22).

Recently, the term governance has two opposing connotations with respect to the role of the public sector. One of these indicates the gathering of the public and private in loose partnerships, where the idea of government is replaced with the idea of the public sphere. From this neoliberal viewpoint, city-region governance would consist of the replacement of competition between private and public interests with an encouragement of a positive *"business climate"* (Scott *et al.* 2001, 22). A second sense of the term sees governance as involving a set of complex institutional responses to the broader problems of economic and social adaptation in the emerging global-local system. From this more institutionalist point of view, the governance of city-regions is part of a larger problem and there is no single geographical scale (Scott *et al.* 2001, 22). *"The critical issue here is coordination across geographical scales, between the policies pursued at* ***supranational, national, and regional*** *levels, involving both formal and informal coordination, and the possibilities of popular input into their formation and implementation at all levels"* (Hewitt de Alcántara 1998; Scott, 1998 cited in Scott et al. 2001, 22).

5.3.2. Spatial Structure of the City Region

Scott (2001) states that, *"City-region development is most common where at least some of these territorial units are already strongly urbanized and where there is some tendency to spatial polarization"*. Hence, according to him, the basic form is defined as combining the basic image of a central metropolitan area with a hinterland of less densely developed territory. Another form is defined as spatially overlapping or convergent urban areas (conurbations), again with a surrounding hinterland. Lastly, another form involves the unions of geographically distinct but proximate urban centers that are working together in order to get the benefits of cooperation, such as the 'synergy networks' of medium-sized cities. Official European Union is an example to the last formation (Scott 2001, 4).

All of these formations refer to a **polycentric development** process. A polycentric development is the one that is associated with the distribution of economically related functions over the urban system in such a way that many urban centers gain importance rather than one or two (Waterhout *et al.* 2005, 163). The growing and expanding metropolitan regions in many parts of the world creates the polycentric city-regions (Scott *et al.* 2001, 11) and these city-regions are said to be insufficiently large spatial units to describe more enlarged metropolitan regions. Those regions are called **polycentric mega-city regions** (MCRs) in Hall and Pain (2006) (Halbert 2006, 110).

5.3.2.1. Polycentricism at the Metropolitan/Regional Level

In the world, there have been made many researches about the polycentric form of city-regions. Polycentricism at the metropolitan/regional level takes many different forms and among them three types of polycentricism is distinguished. As it will be discussed in detail later (See Section 5.5), POLYNET project identifies **eight mega-city regions** which are all displaying the *symptoms of polycentricism* in those three forms although their spatial arrangements differ greatly.

A) Some take the shape of a larger urban agglomeration surrounded by several smaller centres (e.g. **the Paris Region, Greater Dublin and South East England**),

B) Some are perhaps best characterized as something in between A and C (**RhineMain and Central Belgium**),

C) Some are characterized by a fairly even distribution of more or less equally sized cities across space (e.g. **the Randstad, RhineRuhr, EMR Northern Switzerland**) (Lambregts 2006, 116).

In order to reduce complexity, Champion (2001) has introduced a simple but clarifying distinction between **three different modes** of polycentric development: ***centrifugal***, ***incorporation,*** and ***fusion*** mode (Figure 5.2) (Lambregts 2006, 116).

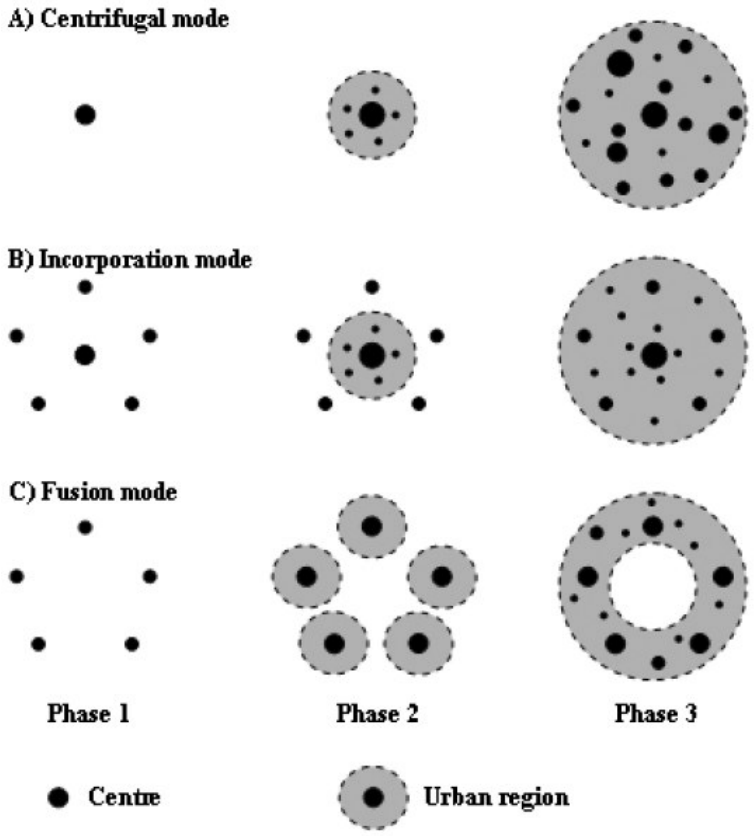


Figure 5.2 Alternative Paths For The Evolution of Polycentric Urban Regions
(Source: Redrawn after the example of Champion, 2001, 665 by Lambregts 2006, 116)

According to Champion (2001 cited in Lambregts 2006), **the centrifugal mode** is associated with a situation in which the continuing growth of **a monocentric city** imposes some severe difficulties such as increasing land rents in the CBD and rising problems of access to the central area from distant outer residential areas. Therefore, the most affected production, and service activities are pushed away to ***alternative centers.*** **The incorporation mode**, refers to the case in which **a large urban centre** enlarges its urban field and wherby it encompasses the ***smaller centres*** in the surrounding area that had previously been largely self-sufficient nodes in terms of both employment and services. These other centers then may create a more powerful catalyst for attracting additional non-residential activities than the centers emerging through the centrifugal mode. Besides, they may provide an even stronger challenge

to the main original centre. **The fusion mode** is based on the situation in which several previously independent ***centers of similar size*** fuse due to their own separate growth in overall size and especially because of the improvement of transport links between them (Champion 2001, 664–665 cited in Lambregts 2006, 116).

Champion's typology of evolutionary modes draws attention to the fact that today's 'polycentric mega-city regions' have developed from separate morphological points of departure. It makes clear that **polycentricism at the regional level** refers firstly the outward diffusion from larger cities to smaller centres within their spheres of influence. This description is suitable for regions such as South East England, the Paris Region and Greater Dublin. Secondly, refers to the kind of development in which the spheres of influence of several smaller or medium sized cities start to get mixed. This development, for example the fusion mode offers a better fit to the development orbits of regions such as the Randstad, RhineRuhr, EMR Northern Switzerland, and Central Belgium (Lambregts 2006, 116-117).

Moreover, different regions may find themselves at different 'stages' (A, B, C) (See Figure 5.2) of polycentric development within these categories. For example, ***Randstad and RhineRuhr,*** which are one of the regions that seem to develop according to the **fusion mode**, may be located somewhere in between stage B and C; while regions in which there is less mixing between different centers may be closer to stage B (See Figure 5.3). For example, in the Randstad, the fusion mode may best describe the developments currently taking place at the level of the Randstad, while at the same time incorporation and centrifugal modes of polycentric development affect the city regions of Amsterdam, Rotterdam, The Hague, and Utrecht (Lambregts 2006, 117).

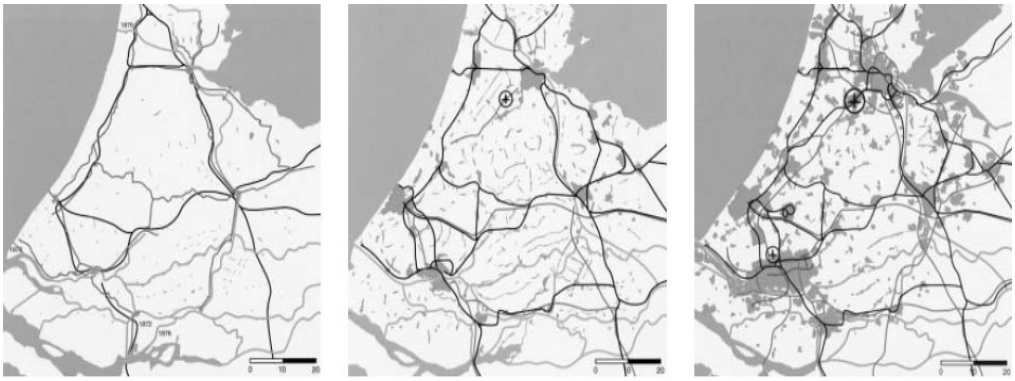


Figure 5.3 Historical Development of The Randstad Built-Up Area And Main Transport Links 1870, 1950, 1990
(Source: De Boer 1996, 185–189 cited in Lambregts 2006, 117)

Finally, in different polycentric mega-city regions, spatial policy-makers show why in some regions the concept of polycentric spatial development is approved as **a possible answer** to problems such as *urban congestion, regional imbalances, and uncontrollable sprawl*. On the other hand, these policy makers also state that in other regions polycentricity is rather seen as **a barrier** to interaction and economic efficiency (Ipenburg and Lambregts, 2001; Lambregts and Röling, 2005 cited in Lambregts 2006, 117).

5.4. A Discussion On The Spatial and Administrative Structures of City-Regions In the Context of Sustainable Transport

The literature on city-regions provides a comprehensive definition of the spatial and administrative structure of these areas. For the core purpose of this study, it is important to discuss and evaluate the main attribution of these structures with reference to sustainable transport literature presented in the previous chapter.

While early definitions of region and city-region emphasize the ever-extending nature of these urban developments, by stating that they geographically extend *"as far as the city exerts a dominant influence",* (McKenzie 1933 cited in Dickinson 1964), it would be misleading to conclude that most city regions experience urban sprawl and expansion, which were defined as unsustainable urban growth trends

particularly in terms of transport sustainability. The explanations and examples above, in fact, point to a polycentric structure that resembles the multi-node city model, which was discussed in previous chapters as one of the three main models of sustainable city arguments.

However, it is important to remember that in the multi-centered city model of the 'sustainable city' arguments, due to the self-sustainability of each compact settlement, the need to travel or the need for interactions with other settlements is supposed to decrease. On the other hand, interaction is a 'key word' for forming city-regions where polycentricism prevails. Increased interaction between the various nodes of city-regions is an expected and possibly welcome result in terms of their economic functioning. However, increased interaction often means increased traffic and more traveling, which contradicts with the strategy of *reducing the need to travel,* one of the main objectives in attaining sustainable transport goals. This appears to be one of the important issues that emerge when city-region development trends are resembled in the context of sustainable transportation.

This difference in the functioning of a polycentric or multi-nodal structure may perhaps be rooted in the different 'interpretations' of this spatial structure in city-region debates as opposed to sustainable transport debates. In the city-region literature, there is inevitably a significant emphasis on the economic benefit of an urban region functioning as a sum of various economic nodes. Improving the region's economy through a well functioning, cooperating, and complementing nodes and sub-centers is probably a major objective for regional polycentiricity, as well as distributing economic gains equally over the region's various centers and sub-centers. While economy is also one of the main pillars of sustainability, the multi-nodal spatial development is in fact more interested in environmental gains (through reductions in the need to travel and hence traffic and emission levels). This appears to be another important area of possible conflict between city-region debates and sustainability debates: whether environmental sustainability objectives and a significant **awareness** of the issue that can surpass economic objectives may be a controversial issue for city-regions that aim at becoming global actors in the world economy.

Another issue is that needs to be further discussed for the **spatial form** of city regions in the face of sustainable transport debates. It was stated above that the expansion and borderless nature of city-regions should not be interpreted as an uncontrolled urban sprawl; however, it is also necessary to note that this trend results in longer travel distances in city-regions. Long travel distances generally increase car dependency as well as overall traffic and emision impacts. It can be remembered from the previous chapters that most urban land-use planning approaches for sustainability seek to minimize the distances, and the need to travel by the car, in urban areas by designing them compact, more intensified, and in mixed-use. Hence, it is important to further analyze and discuss whether city-regions do result in increased travel distances, resulting in more car usage and higher levels of traffic emissions.

Another potential area of conflict between the approaches of sustainable transportation and city-region development trends is the issue of **governance**. The literature on city-regions, as presented above, revealed that in city-regions, there is the *fragmentation of governments,* which may act as an important barrier for attaining policy coordination between different settlements that form the city-region and between land-use planning and transport planning authorities. It will be remembered that, the sustainable transport literature relies heavily on the need to coordinate and integrate urban and transport planning policy with each other, which are often carried out by different authorities.

It is the intension of this study to bring together the debates of sustainable transport, sustainable cities and of city-regions; however, this does not mean that contemporary city-regions do not have the objective of sustainability on their agenda. There are certain cases showing that attaining sustainability is an important issue for city-regions. These are presented in the following section.

5.5. Mega-City Region Cases: A Review of Sustainability Issues In Polycentric City-Regions

This section of the study provides a review of the **POLYNET** project in Europe

carried out under the INTERREG III Initiative. *"Interreg III is the new Community Initiative for the ERDF (European Regional Development Fund) for the period 2000-2006. Interreg IIIB transnational cooperation aims to promote a higher degree of integration across large groupings of European regions, with view to achieving sustainable, harmonious and balanced development in the EU and higher territorial integration, including with candidate and other neighbouring countries"* (Official Website of European Community Initiative: http://www.nweurope.org/, Last accessed date: May 1, 2007).

POLYNET is a € 2.4 million research project that was funded by the European Regional Development Fund under the INTERREG IIIB North West Europe programme. POLYNET searched for the sustainable management of European Polycentric Mega-City Regions. The research investigated the emergence of eight Mega-City Regions (MCRs) in North West Europe.These eight POLYNET cases were Randstad, Rhine-Main, RhineRuhr, Central Belgium, EMR Northern Switzerland, Greater Dublin, South East England, and the Paris Region (Halbert *et. al.* 2006, 110-113).

The project focused on the intra- and inter-firm knowledge-based connectivities that functionally identify these mega-city regions, which shape the sharply pointed (spiky) parts of the world. The study searched for the form of the functional polycentricity depending on the knowledge intensive business flows in Advance Producer Services. At the results of the quantitative study, it was seen that RhineRuhr and the Randstad were the most polycentric MCRs in terms of their office distribution while the Paris Region, Rhine-Main, Gretaer Dublin, and South East England seemed to be at a lesser degree poycentric form (Halbert *et. al.* 2006, 110-113).

In this study, among these Mega-City Regions; South East England, Randstad, and RhineRuhr will be discussed in detail in order to see their management of sustainability in their city-regions. Monocentricity in London case in South East England and polycentricity in Randstad has been also stated in the Introduction part of the City-Region Chapter (See Chapter 5).

5.5.1. South East England Mega-City Region

London's development is given as an example to **regional polycentricity**. London, which takes place in South East England, is thought to be a global city-region by the Globalization and World Cities (GaWC) Study Group at Loughborough University (Pain 2006, 194). There is a strongly developed 'urban field' or 'sphere of influence' that exists around London which is the centre of a system of some 30–40 centres within a 150-km radius (Hall 2001, 10 cited in Pain 2006, 195). In fact, London was considered to have **a monocentric spatial form;** but then it has emerged as the **most functionally polycentric region** studied (Pain 2006, 194). The dominance of the core in London was mentioned before in the Introduction part of the City-Region Chapter (See Chapter 5). On the other hand, the Mega-City Region (MCR) scale is lacking effective powers, finance and governance although there are tensions between European wide objectives that seem to adopt the basic priorities for sustainable development for achieving balanced spatial development, growth and competitiveness (Pain 2006, 194).

Firstly, the general description of the region will be made in detail. **South East England** is the largest of the POLYNET MCRs and it was studied in 2001. It covers fifty-one functional urban regions (FURs) with a total population of 19 million people (See Figure 5.4). When the quantitative analysis of the connectivity of offices in the MCR within regional, national, European and global scale business service networks is done, it is seen that there are potential inter-urban functional linkages between nine important South East service centres including London (See Figure 5.5). The concentration of transnational skills and specializations of London seems to encourage a polycentric functional network of service centres outside it. Thus, the intra-regional linkages with London are very important. Nevertheless, the quantitative analysis of inter-urban commuting and business linkages shows that there is a wide curve of dense connectivity that covers an area to the north-west, west and south-west of London. This connectivity also creates a complex functionally networked area within the MCR. With regarding to this, the outcome is an **uneven development** between two regions: *"a functionally polycentric western curve and an under-linked east"* (Pain 2006, 196).

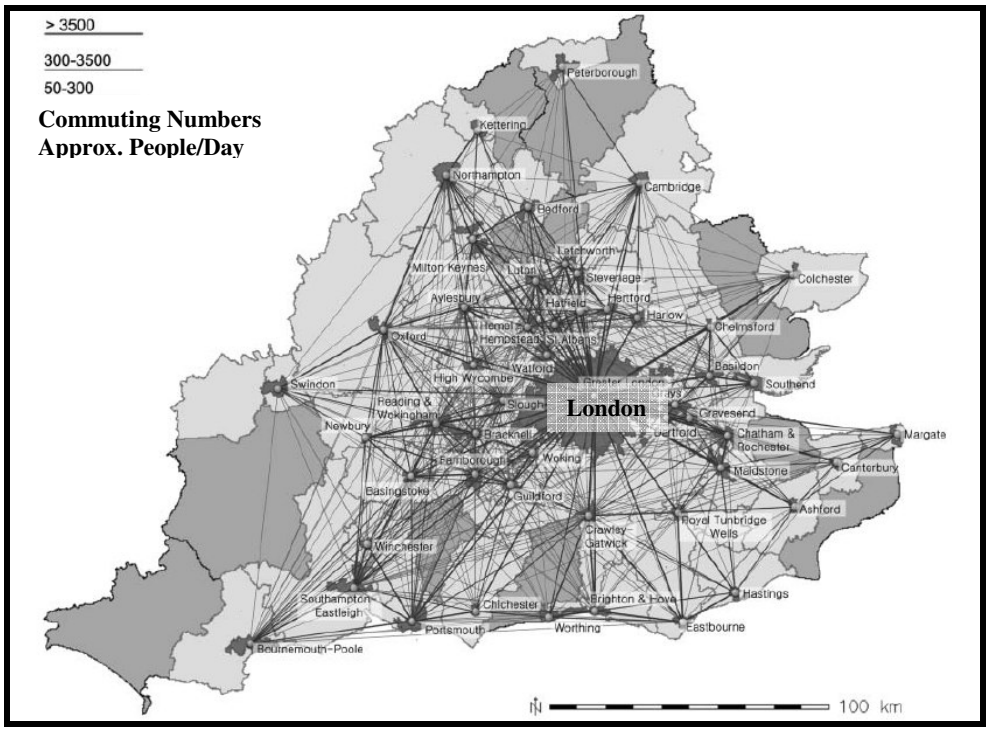


Figure 5.4 South East England MCR: Commuting 2001
(Source: Hall and Gren 2005 cited in Pain 2006, 197)

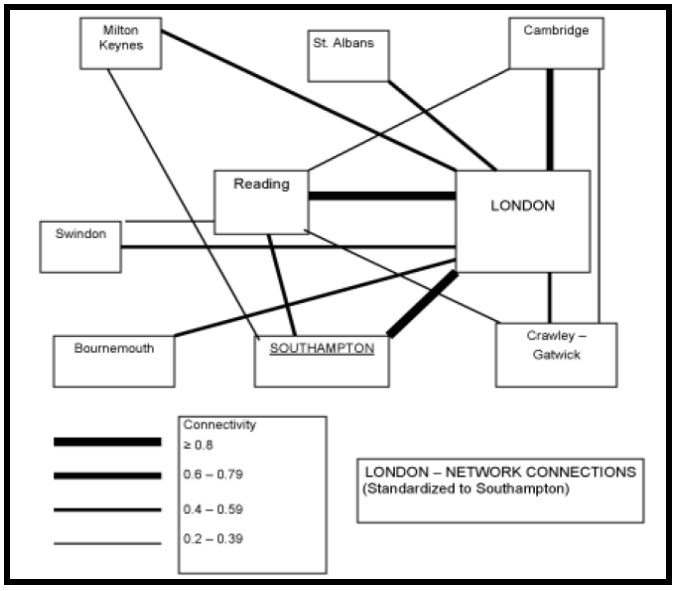


Figure 5.5 Mega-City Region Network Connections: South East England
(Source: Pain and Walker, 2005 cited in Pain 2006, 198)

Secondly, it is known that polycentricity is associated with sustainable development. Actually, there is a presumption that polycentric development will promote the priorities for all three; the **balanced competitiveness, economic growth** and **sustainable development**. The European Spatial Development Perspective of European Commission (1999) defines the context for Europe-wide policy and its objectives are the promotion of economic and social cohesion; conservation of natural resources and cultural heritage; and more balanced economic competitiveness of the European territory. Transport policy should support flows from London by environmentally sustainable modes, including the trans-European network in order to promote more balanced development at an EU-wide scale (NWMA 2000, 29, 33 cited in Pain 2006, 197-198).

Polycentricity is seen as encouraging European territorial integration by linking less-developed regions and cities through larger cities and this allows regions to build on their specific assets and skills for creating functionally integrated networks of complementary, specialized economic activities and developing a common regional cultural and political identity. Besides, the development of balanced systems of dense city clusters, which are connected by sustainable forms of transport, is required to minimize the need for travel and promote environmental sustainability. UK spatial policy that comes from *Sustainable Communities Strategy* (ODPM, 2003*a*, *b*; 2005 cited in Pain 2006, 199) has searched for the implementation of EU priorities for more balanced and sustainable development. This has been done in order to encourage growth along corridors from London to promote development of the English core cities and their regions in the Midlands, North of England, etc. (ODPM, 2003*a* cited in Pain 2006, 199).

Strategy for the South East distinguishes the need for preventing the factors that hinder mobility in order to improve business efficiency and ensure continued economic growth as well as regional re-balancing (SEERA, 2003; GOSE, 2004 cited in Pain 2006, 202). A key target for transport in the region is to prevent car travel and reduce congestion that are damaging environment by re-balancing networks in favour of non-car modes and improving, expanding and maximizing the use of public transport (Pain 2006, 202).

Moreover, **demand management** of the regional transport system, and initiatives such as 'Sustainable Business Partnerships' and travel plans, are seen as tools for rebalancing. On the other hand, car use still remains essential for cross-regional movement for commuting and business travel. Therefore, demand management must be carefully monitored over an extended time period to ensure that there exist new investment decisions which will be essential participants in re-balancing (Hall and Pain, 2005 cited in Pain 2006, 202).

Thirdly, when the institutional structures in the region are discussed, a major issue expressed by policy makers was that there was a lack of funding to maintain London's strategic position as an international business centre and to redress imbalances in regional and inter-regional development. Moreover, decision-making on transport, housing and skills are ultimately decided at central and local levels and so a **coordinated approach** is required to policy across the European, UK, and regional scales. It is emphasized that in the mega-city region, networking and coordination is necessary across horizontal, vertical, and sectoral boundaries to ensure that spatial policy goals are achievable and that the appropriate instruments and funding for delivery are available (Pain 2006, 203).

In conclusion, the **four main priorities** which are crucial for the analyzed European, national and regional spatial policies and which are associated with the development of a polycentric urban system at regional and EU scales are:

- economic growth and 'competitiveness' in the global knowledge-based economy;
- more balanced regional development;
- concentration of urban functions, compact development;
- improvement of sustainable internal and external accessibility and ICT (Pain 2006, 203).

To summarize, the case of London shows that, first of all, there is an important focus on the need to attain sustainability in transport; and secondly, possible problems arising from increased interaction between nodes (particularly the core and other nodes) are intended to be tackled through the improvement of more environmentally

sustainable rail network, as well demand management approaches for the regional transport system. This shows that, traffic and transport problems may indeed be severe in polycentric city-regions between their various nodes and that public transport improvement policies (as discussed in Chapter 4) may be extremely important. Thirdly, coordination of different decision-making bodies is also an issue acknowledged for the London case. This also shows that the case study supports the previous arguments of the thesis on the difficulty of planning coordination posed by fragmented governments in city-regions.

5.5.2. Randstad Mega-City Region

Firstly, the general description of the region will be done. The case of the Randstad Holland is studied as an example to mostly fusion mode of polycentric development (See Section 5.3.2.1). In 1958, the Randstad was first perceived as the *future's Dutch metropolis,* because its scattered layout was agreed as a unique asset that would give the region a considerable advantage compared to cities such as London and Paris. It provided its four million residents an easy access to abundant green and healthy environments due to the absence of a massive central, congested core which enabled the free flow of people and goods between its centres for years. The region's inhabitants still access easily to green environments, but there is now an increasing fragmentation that makes Randstad as one of Europe's air pollution hotspots (Lambregts 2006, 114). It is possible to interpret this problem of air pollution as arising due to the traffic levels caused by the dispersed centers and nodes of this city-region.

Therefore, secondly, the problems of Randstad's polycentric pattern will be discussed. The Randstad covers a large number of more or less equally sized and historically distinct cities. Planners identify the major problem of this area as the direct result of the Randstad's fusion mode of polycentric urban development and the correlated **absence of a dominant metropolitan core** (Lambregts 2006, 116-118). This dispersed nature of nodes, as mentioned above, is likely to create traffic problems, while at the same time making it difficult to manage transport in the region. Lambregts (2006, 116) states that the region's fragmented and dispersed

layout also impedes social and economic interaction and keeps it at lower levels than it can be kept in 'real' metropolises such as Paris, London, Madrid and Milan (See Figure 5.6).

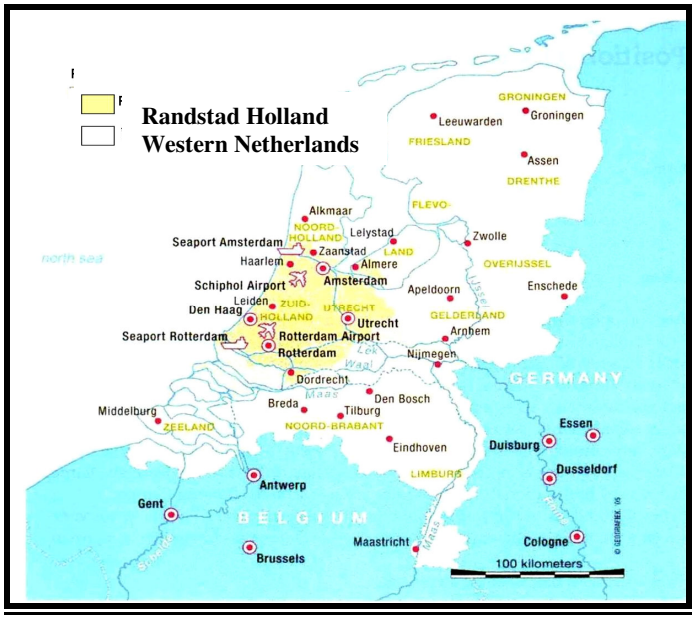


Figure 5.6 Randstad Holland
(Source: Geografiek 2005 cited in Salet 2006, 64)

Thirdly, the main authorities concerned in planning will be discussed. The national government in Randstad is represented by the Ministries of Housing, Spatial Planning and the Environment (MVROM) and Economic Affairs (MEZ). It considers the Randstad as a single urban network and desires to improve the international competitive position of the region as a whole. However, it divides the area into three **'economic core areas'** arguing that these areas have more or less distinct regional economies. *"These core areas are the **'North-wing'** (centred on Amsterdam), the **'South-wing'** (the Rotterdam / The Hague area), and the **'Utrecht region'** (centred on Utrecht)"* (See Figure 5.7). These economic core areas are accepted as the Focal areas for the creation of agglomeration economies and thus, the Randstad gains an intra-regional diversity. This diversity is seen as a key point for Randstad in its international competitive struggle (Lambregts 2006, 119).

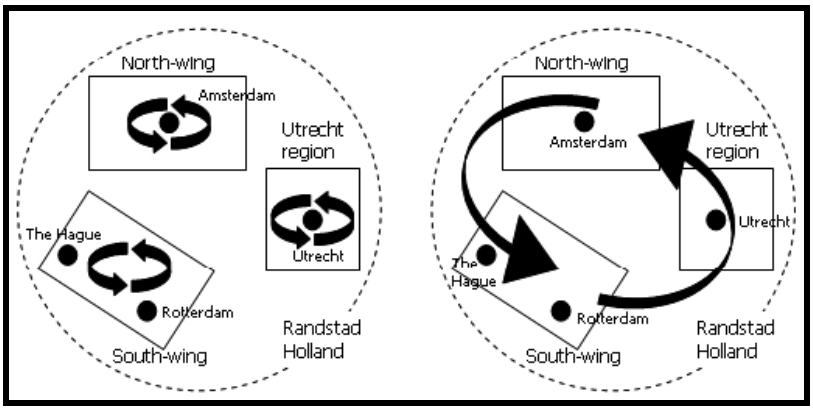


Figure 5.7 Schematic Representation Of The Spatial Development Approaches For The Randstad By The National Government On The Left And The Regio Randstad On The Right
(Source: Lambregts 2006, 120)

The local and regional authorities are incorporated in the **Regio Randstad**[34] and they claim that none of the individual cities or the economic core areas are large enough to compete with the most powerful of European metropolitan regions. These united authorities emphasize the importance of strengthening the interaction between the various economic core areas and the relationships between the various parts of the Randstad, instead of improving conditions within these areas. In fact, it is stated that the national government's strategy has a tendency towards **stage B** while the strategy of the Randstad authorities should be explained as an attempt to reach **stage C** (See Section 5.3.2.1) (Lambregts 2006,119-120).

To summarize, the case of Randstad shows that fusion mode of polycentric development may create more dispersed spatial form, causing transport and environmental problems that are expected from such spatial configurations (See Chapter 3). The lack of a metropolitan core is seen by researchers as problematical causing relatively poor social and economic interaction. From the perspective of

[34] *"**Regio Randstad** is a formal cooperative platform, the origins of which date back to the early 1990s. It unites the four Randstad provinces (North- and South-Holland, Utrecht and Flevoland), the four largest cities (Amsterdam, Rotterdam, The Hague and Utrecht) and their respective **city-regions.** Its mission is 'to strengthen the international competitive position and to improve the quality of life in the western Netherlands and in Randstad Holland"* (Official Website of Regio Ranstad: www.regio-randstad.nl, Last accessed date: May 9, 2007). *"It acts as the discussion partner of the national government as far as issues relating to the Randstad at large are concerned"* (Lambregts 2006, 121).

sustainable transportation policies, this lack of a metropolitan core may also mean that there are no dominant corridors of travel that can be improved by public transport. As for the issue of governmental fragmentation, it appears that there is an awareness of this issue in Randstad and that there is an awareness of this issue in Randstad and that regional platforms and agencies are set up to enhance coordination in the city-region.

5.5.3. RhineRuhr Mega-City Region

The case of the mega-city region **RhineRuhr** is discussed as a specific configuration of polycentricity. In contrast to most other European countries, in Germany, the urban system is characterized by polycentricity with no single city that has a clear dominant position. Among the metropolitan regions in Germany, RhineRuhr, together with **Randstad Holland,** seems to be a unique case not only in Germany, but also in Europe (Meijers *et al*., 2003; Hall and Pain, 2006 cited in Knapp *et. al.* 2006, 137). RhineRuhr MCR has no clear leading and dominant city that dominates in political, economic, cultural, etc. aspects in contrast with most other polynucleated regions. Instead, RhineRuhr MCR covers a number of historically distinct cities which do not differ so much in terms of size or overall economic importance (Knapp *et. al.* 2006, 137).

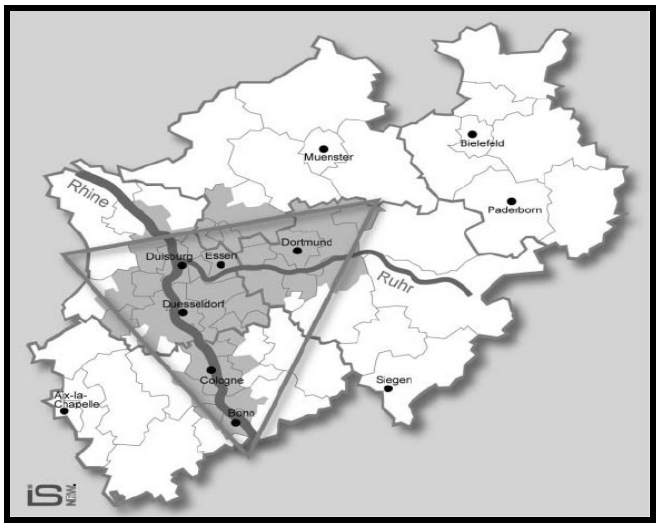


Figure 5.8 The Mega-City Region RhineRuhr Within The Territory Of The Federal State of North Rhine-Westphalia
(Source: Knapp *et. al.* 2006, 138)

First, in RhineRuhr MCR, there is synergy between cities as polycentric urban networks. The individual cities relate to each other in a synergetic way and make the polycentric urban regions ***"more than the sum of their parts"*** (Meijers, 2005 cited in Knapp *et. al.* 2006, 138) through **cooperative** and **complementary** relationships. Synergy is produced with regional organizing capacity (Berg, Braun and Meer, 1997 cited in Knapp *et. al.* 2006, 138) and the related cooperative and complementary features such as differentiation in the economic profiles or urban facilities of cities (Meijers, 2005 cited in Knapp *et. al.* 2006, 138).

Secondly, as RhineRuhr's growth has developed through historically distinct cities, the level of 'self-suffiency' is expected to be high. Moreover, it can be said that, the transportation connections between those historical cities should already exist and then to upgrade these connection routes is thought to be relatively easy.

Thirdly, although RhineRuhr has a **polycentric metropolitan structure**; in the emerging functional urban region, there is a need for developing more **cooperative** strategic planning and related development policies in order to strengthen its competitive advantages. It is stated that such regions must be realized as dynamic socio-economic interrelationships of economic and socio-cultural practices with

unstable boundaries. These boundaries do not normally overlap with the existing territorial administrative structures (Knapp *et. al.* 2006, 138).

In RhineRuhr, it is expressed that the regional government and governance issues have not been discussed on the political agenda and the State government looks for more **intermunicipal cooperation**. Besides, the stakeholders, such as sub-regional development agencies have only the responsibility of focusing on their own developing areas (Knapp *et al*., 2004 cited in Knapp *et. al.* 2006, 139). On the other hand, complementarity seems to be more apparent in main cities which have developed different economic profiles and have functional specialization (Knapp *et al*., 2006). For example, Cologne is traditionally the main location for insurance, design, and media, while Düsseldorf constitutes the leading centre for advertising within RhineRuhr (Knapp *et. al.* 2006, 139).

RhineRuhr has a **fragmented pattern** by different overlapping territories which are represented by different stakeholders and their specific self-interests. The local government authorities have the responsibility to regulate all matters of concern to their local communities. Hence, the State government's wish for more regional cooperation will raise the tension with local government authorities that may lose some of their self-governing status. It is also important to select strategies which will gain public acceptance and support, and which will be implemented easily (Healey *et al*., 1997; Salet and Faludi, 2000 cited in Knapp *et. al.* 2006, 141). On the other hand, currently, no clear shift is seen from traditional land-use planning to more strategic and action-oriented spatial planning (Knapp *et. al.* 2006, 139-140).

Knapp (2006) suggest that RhineRuhr has no choice other than to develop **a governance** style, which is much more flexible regarding its geographic scope and which goes beyond established political territorial or cultural geographies of power. It is the only way to make better use of the synergetic potentials within this specific composition of polycentricity. Only with a new governance style, RhineRuhr could become more than the sum of its parts (Knapp *et. al.* 2006, 137, 146).

In summary, the existence of nodes as distict cities can encourage the approach of 'reducing the need to travel' between nodes from the self-sufficiency point of view.

However, the fragmentation of government is a much more severe issue here, especially since a new regional government would mean the loss of power for individual local governments.

5.6. Summary

The reviews of city-region developments and their assessment with respect to sustainable urban and transport planning approaches, as discussed in Section 5.4 above, reveal four important issues:

- While the regional polycentricity in city-regions resembles the multi-node city-model of the literature on sustainability, the former is based on increased interaction between the nodes, as opposed to self-sufficient nodes that reduce the need to travel between them. Therefore, regional polycentricity probably results in increased traffic problems between the nodes, which are in contrast with sustainable transport policies and models. This is one of the issues that need to be further analyzed in this research.

- Regional polycentricity is also likely to result in longer travel distances in city-regions, and as noted in sustainability debates in Chapter 3, long distances encourage car usage and create car dependency (further effecting the environment through increased traffic emissions).

- Another possible area of conflict between city-region debates and sustainable debates is whether environmental sustainability objectives and awareness for environmental sustainability can surpass economic objectives for city-regions, where the major goal is to become a global player in economy. (Hence, the economic functioning of various nodes can be more important than creating self-sufficient nodes to reduce interaction and traffic).

- The final issue discussed in this chapter was governance: in city-regions, there is the *fragmentation of governments,* which may act as an important barrier for attaining policy coordination between different settlements that form the city-

region and between land-use planning and transport planning authorities. It will be remembered that, the sustainable transport literature relies heavily on the need to coordinate and integrate urban and transport planning policy with each other, which are often carried out by different authorities.

The brief review of case studies from the world also supported these arguments to a certain extent. In the case of **London**, which has the dominance of the center, the important focus on the need to attain sustainability in transport; and the attempt to solve the problems arising from increased interaction with developing more environmentally sustainable rail network and demand management approaches for the regional transport system is seen. Secondly, in the case of **Randstad,** the fusion mode of polycentric development with a lack of metropolitan core is seen. This structure of Randstad is said to create more dispersed spatial form that will cause transport and environmental problems. Besides, the absence of a center is also seen problematical that will prevent social and economic interaction and cause some problems in transport. Thirdly, in the case of **RhineRuhr**, the existence of nodes as distict cities can encourage the approach of 'reducing the need to travel' between nodes from the self-sufficiency point of view.

Although, in all of three cases, the difficulty of planning coordination due to fragmented governments in city-regions is a major problem; the awareness of the importance of ensuring a cooperation platform is higher in London and Randstad than RhineRuhr, which plans to establish a new regional government structure. Moreover, Pain (2006, 195) states that when the international analysis of the implications of London's clear monocentricity for sustainable development were compared with more polycentric urban development patterns in the Randstad, Central London was found to be useful for sustainable economic, social, and environmental development which didn't exist in more spatially polycentric regions (Pain 2006, 195).

These issues are to be assessed in further detail through a case study from Turkey. The following chapter introduces the methodology of this case study, while the next chapters present the research.

CHAPTER 6

METHODOLOGY

6.1. Theoretical Framework: Main Focus Area and Statement of the Problem

In the previous chapter, the analysis of the literature focused mainly on two issues: Firstly, the need to attain a more sustainable urban transport system, which is closely related with urban development patterns; and secondly, the increasing number of city-region developments in the world, which present certain obstacles for attaining sustainable transport, not only because their development patterns result in increased travel and private transport, but also because the fragmentation of governments within such city-regions pose difficulties for coordinated planning. With its focus on these two areas, the discussions in this thesis aim to highlight the increasing emphasis on sustainable transport policies on the one hand; and the increasing tendencies towards city-region development on the other, with a view to provide a better understanding of obstacles as well as potentials for a sustainable transport system in city-regions.

The literature review on the first main focus area, **sustainable transport policies,** showed that the common aims of these policies are *reducing the need to travel, reducing the travel distances*, and *decreasing the car usage* while *increasing the choice of non-car modes*. It is discussed in the literature that there can be two extremely effective policies, namely **land-use planning policies** and **transport policies** (to improve alternatives to the car), that can help attain sustainability in urban transport.

Land-use planning policies are concerned with the interaction between land-use patterns and transport, and argue that with effective land-use planning policies regarding pattern, form, and density of development, it is possible to reduce the need

to travel, and especially the need to travel by car. The land-use planning strategies can be divided into two groups: macro-scale and micro-scale policies.

The macro-scale urban planning approaches are interested in ideal urban form models that can advance sustainable transport. Generally, three urban form models are proposed. These are the compact city, corridor development (radial city) and the multi-centered city models. Compact development model has a monocentric structure that gathers all the functions, linkages, etc. in one leading center. Corridor development suggests a development only at some certain nodes (as settlements) that take place along the corridors radiating from the city center. Multi-nodal development necessitates self-sustaining and smaller scale compact settlements connected through a high-quality transport network. Among these models, the multi-centered city is the most widely accepted urban form providing sustainable travel patterns as it brings multiple nodes of concentrated activity rather than one central node and so reducing the need for travelling.

The micro-scale policies deal with urban design factors, such as density and diversity of development, as well as the design of transport system facilities, access to these facilities, etc. For instance, the level of land-use mix (diversity) is very important in number and distance of journeys. It can be said that both macro and micro policies aim at creating self-sustaining settlements or settlement systems that can help reduce the need to travel as well as the usage of private cars when travelling.

Overall, land-use policies aim to change travel behaviour and affect transport mode choices. Therefore, the successful implementation of land-use policies (as a tool in sustainable transport) requires effective alternatives to the car, which is not an environmentally, economically, or socially sustainable way of solving transport needs. Therefore, transport policies to improve alternatives to the car are also important, and these policies need to be well-integrated with urban planning (macro and micro) policies.

The second important tool for attaining sustainable transport is therefore **transport policies** to improve public transport and non-motorized modes, which is walking and cycling. In order to decrease auto-dependency, a high capacity and high quality

public transport system should be designed that will attract a high number of passengers and help create a modal shift from the car to public transport. In addition, this set of policies aims at substituting car journeys for walking and biking for shorter trips, hence creating another modal shift from the car, this time towards non-motorized modes. Hence, transport policies for sustainability emphasize the need to build new, or improve existing, public transport systems, such as heavy rail, light rail, tram systems, as well as bus systems, and also propose pedestrianisation schema together with provision of pedestrian and cycling networks. On the other hand, the literature on these transport policies show that such improvement in infrastructure is not sufficient alone to alter travel behaviour and that these investments should be supported with land-use policies, too. In fact, the public transport strategies advocate that there should be ***an integration*** between the land-use policies and transport policies for sustainable outcomes. Hence, it is seen that the public transport improvement policies also have an important focus on land-use and development patterns as the major factors that can help improve the effectiveness of alternative transport modes, and consequently increase their usage.

While the vast literature on sustainable transport emphasizes certain urban development patterns as those that should be encouraged in urban planning, it is a fact that there is an increasing tendency in many urban areas in the world towards becoming a city-region. However, whether these city-region development patterns can help attain a more sustainable urban and transport system is a relatively less studied area in the field of sustainable transport. Therefore, the second main focus area of the thesis is this tendency in urban development towards **city-region** systems. The forces behind the formation of city-regions result in unique urban/regional patterns of development, as well as patterns of travel, which are interesting to view from the perspective of sustainable transport policies. In particular, there are three important aspects of city-regions that need to be analyzed with respect to their potential impact on attaining the sustainability objectives:

Firstly, city-region consists of many settlements and some of them are referred as centers or sub-centers. These nodes are connected to each other for many reasons; such as commuting purposes, supply of different services, economic relations, transport facilities, etc. Hence, the intensity of the interactions among these nodes is

very crucial for the creation and durability of the city-region. This **polycentric form** in city-regions actually resembles the **multi-node** city model, which is one of the sustainable city models. However, in the multi-centered city model of the "sustainable city" arguments, due to the self-sustainability of each compact settlement, the need to travel or the need for interactions with other settlements is supposed to decrease. On the other hand, interaction is a 'key word' for forming city-regions where polycentricism prevails. Increased interaction between the various nodes of city-regions is an expected, and possibly welcome result in terms of their economic functioning. However, increased interaction often means increased traffic and more travelling, which contradicts with the strategy of *reducing the need to travel,* one of the main objectives in attaining sustainable transport goals. Providing a better understanding to this conflict appears to be an important research area. Furthermore, due to the specific spatial structure of city-regions, not only the interaction and consequently traffic levels are high, but also *the travel distances are longer*. Long travel distances in urban areas generally increase car-dependency and encourage more car usage. Analysing whether this is the case for city-regions is also a part of that research area.

Secondly, this difference in the functioning of a polycentric or multi-nodal structure may perhaps be rooted in the different 'interpretations' of this spatial structure in city-region debates as opposed to sustainable transport debates. In the city-region literature, there is inevitably a significant emphasis on the economic benefit of an urban region functioning as a sum of various economic nodes. Improving the region's economy through a well functioning, cooperating, and complementing nodes and sub-centers is probably a major objective for regional polycentiricity, as well as distributing economic gains equally over the region's various centers and sub-centers. While economy is also one of the main pillars of sustainability, the multi-nodal spatial development is in fact more interested in environmental gains (through reductions in the need to travel and hence traffic and emission levels). This appears to be another important area of possible conflict between city-region debates and sustainability debates: whether environmental sustainability objectives and a significant **awareness** of the issue that can surpass economic objectives may be a controversial issue for city-regions that aim at becoming global actors in the world economy.

Thirdly, in city-regions, there is the **fragmentation of governments**, which may act as an important barrier for attaining policy coordination between different settlements that form the city-region and between land-use planning and transport planning authorities. It will be remembered that, the sustainable transport literature relies heavily on the need to coordinate and integrate urban and transport planning policy with each other, which are often carried out by different authorities.

These **three aspects** can be referred as **'threats'** for the attainment of sustainable transport and land-use development in city-region. It is the main aim of this thesis to understand how real and severe these threats are; and to search, through the analysis of experience in a selected case study area, whether they are overcome in city-regions.

6.2. Hypothesis and Main Questions to be Answered:

With respect to two main focus areas of the thesis, the **hypothesis** of this study can be stated in three parts:

"There may be very real challenges for city-regions to become sustainable in transportation terms due to three main reasons:

- Firstly, the city-region system brings with itself a large urban and regional system of settlements that have increased interaction between each other, possibly resulting in an increased need to travel, longer distances, and hence increased car dependency; all of which contrast with the objectives of sustainable transport.

- Secondly, polycentric macro form of city-regions, which refers to the growth of settlements with interactions, necessitates giving much more importance to sustainable development and transport in land-use & transport planning approaches. However, economic concerns, which mostly favour the improvement of interaction between the modes and hence increased mobility (resulting in more traffic), are more likely to be considered as priority objectives for city-regions as opposed to objectives of sustainable transport

that aim at reducing traffic through reducing the need to travel. Therefore, the emphasis on sustainable transport and '*reducing the need to travel*' may not receive adequate emphasis in city-regions.

- Thirdly, city-regions, by nature, involve a high number of local authorities and participants in decision-making, resulting in a fragmentation of governments, and this can potentially make it significantly harder to attain policy coordination for an integrated approach to sustainability".

In the thesis, three main research questions are tried to be answered based on the hypothesis with three parts:

1. Are the traffic values of the selected city-region showing a sustainable or an unsustainable growth pattern in terms of transport in time? (To what extent such unsustainable traffic growth can be explained with city-region development, and to what extent can such growth be seen as a result of the normal traffic growth due to car ownership and usage)

2. Is there an awareness of the significance of sustainable urban development and transport (particularly in environmental terms) in the selected city-region's and its settlements' land-use and transport planning approaches?

3. Is there a policy-coordination among different planning authorities for ensuring sustainability and effective implementation of policies in the selected city-region?

6.3. Aim & Objectives

In general terms, the study aims to bring together two important fields of research in the planning literature: sustainable transport and city-regions, with a view to analyse whether they can co-exist, whether their policies comply with, and complement each other, eventually whether it is possible to attain transport sustainability in city-regions.

It can be stated that the **primary aim** of the thesis is to examine whether the current city-region development tendencies impose significant threats for realizing a sustainable transport system, in terms of spatial organization, planning approaches, and policy-coordination. In other words, this thesis aims to provide a better understanding of the spatial functioning and spatial planning as well as governmental functioning of city-regions, with a view to explore whether or not it is possible to attain sustainability objectives in city-regions. In order to attain this aim and to answer the main questions that follow the main hypothesis, some objectives and further research questions are defined. Besides, Izmir City Region is selected as the case study in this thesis because, this city-region has been analyzed and examined by many academic studies (Eraydın 2005, METU 2005, METU 2006) before, and those studies have already defined that Izmir, with its surrounding settlements, have been constituting a city-region in many aspects[35]. Hence, in this thesis, without the need for studying the process about how this region has become a city-region, it is mainly intended to concentrate on the **effects** of this process and its implications for sustainability in transport.

First objective is to assess the results of the analysis done with the traffic data of the selected city-region in order to see whether there is a tendency towards an unsustainable traffic pattern in the city-region. The questions regarding this objective are:

1. How much did traffic volumes change through years (1990, 1995, 2000, and 2006)? Do different corridors in the urban area show differences in traffic growth, which can be associated with city-region development?

2. Did travel distances increase in time? Is there a significant spatial expansion of traffic intensity?

3. How much did the volume of cars, buses, and trucks in traffic change in time (1990-2006)? Is there an increase in private modes, which is usually an expected result of increased travel distances?

[35] Izmir City Region will be studied in depth in the following sections.

4. Does the change in the amount of vehicles in time show that there is an increase in interactions among some settlements? Are these settlements the ones that previous research on the city-region development confirmed as the main city-region nodes? Or is the traffic growth evenly in all corridors, regardless of the primary city-region nodes and their corridors?

5. How much did the car and motor vehicle ownership change in time (1994-2006)?

Second objective is to evaluate the awareness of sustainability in the selected city-region and its settlements. The questions regarding to this objective are:

1. In the land-use plans or planning approaches of the city region and its settlements, is there an emphasis on, or awareness of, 'sustainable development' and 'sustainable transport'?

1.1. Is there a reference to sustainability and sustainable development?

a) Is there any expression that resembles to the main idea of sustainable development that is approximately *"the development that meets the needs of the present without risking the needs of future generations"*?

b) Are there any phrases referring to the three dimensions of sustainable development, *environmental, economic, and social,* in general?

c) Are there any social, economic, and environmental/ecological objectives that promote sustainable development and sustainable transport?

d) Are there any strategies to attain a more sustainable system, in transport terms and urban development/growth terms?

1.2. Are there any 'macro-scale' urban planning policies regarding the urban/regional spatial development models that promote sustainable transport in the city-region?

a) Do the proposed plans or projects support a sustainable urban form model for a city-region?

a.1) Proposing development along corridors and planning according to corridor city form principles

a.2) Strengthening some settlements to make them self-sustaining sub- centers planning according to multi-centered city form

a.3) To adopt both corridor and multi-centered city development principles

b) Are there any policies to prevent urban sprawl, invasion of agriculture and forest areas, leapfrogging or uncontrolled growth?

c) Are there any policies for relaxing the city center if it has become an agglomerated city center and become saturated?

In the following, a, b, and c measures are referred as strategic level; d measure as local level, and e, f measures as neighborhood level. It is accepted in this study that, **strategic level** indicates the measures at ***city-region level*** whereas **local level** indicates the measures at the ***sub-region*** [36] ***level*** and the **neighbourhood level** indicates the ***city level***. Besides, it is important to note that the questions in this objective is developed referring to the explanations and studies by **Stead, D. *et al.* (2000)** and **Stead and Banister (2001).**

[36] The sub-regions in this study are accepted as the sub-regions defined by Greater Izmir Municipality in Izmir City Region Master Development Plan (2006).

1.3. Are there any 'micro-scale' urban planning measures for attaining a more sustainable urban form model and ensuring sustainable transport in the city-region or in its settlements?

STTAREGIC LEVEL

a) **Location:** Is the *location* of a new development area chosen with consideration to how it will affect travel patterns?

   a.1) Proximity (of households) to the urban centre

   a.2) Proximity (of new developments) to the public transport routes: Concentrating development along transport corridors, especially to increase the accessibility to public transport and reduce car dependence

b) **Structure:** Are the *size* (small or large) and *shape* (centralized or not) of new development areas considered that can influence the range of public transport services?

c) **Land-use Type:** Are there any strategies for promoting mixed-use development (mix of land-uses) at the strategic level?

   c.1) Job-Housing Balance: Are commuting distances taken into consideration while planning new development areas in or around the city / city-region?

   c.2) Balanced Communities: Is there an attempt for creating self- contained and balanced growth with a good range of facilities, services, etc. in short travel distances?

LOCAL LEVEL

d) Clustering: Are there any strategies for promoting concentrated development (land-use mix) in the provision of local employment, services, and facilities at the local level?

d.1) Locality: Encouraging more locally-based facilities that can be reached by non-motorized modes

d.2) Land-use Mix: Clustering facilities to increase accessibility and minimize travel distances

d.3) Design: Designing the public transport routes, pedestrian paths or cycle ways that enable direct access to the facilities

NEIGHBOURHOOD LEVEL

e) Density: Is the density considered as an important element that affects the travel patterns at the neighborhood level?

e.1) Higher Population & Development Density: Are there any policies for increasing the population density in some areas or offering high density in some new development areas?

f) Layout: Are there any policies for improving the layout of the current and proposed development in the neighborhoods for a more sustainable system?

f.1) Designing high-quality pedestrian and bicycle paths or renew the existing routes; offering urban design projects

f.2) Pedestrianization of some roads

f.3) Limit the availability of parking (especially in the city-center, along main roads) to discourage car use and encourage use of public transport

2. In the settlements' transport plans or planning approaches, are there any transport strategies that encourage sustainable transport?

2.1. Are there any policies for improving public transport modes?

a) Are there any projects for developing urban/regional rail systems?

a.1) Light rail systems

a.2) Commuter rail systems

a.3) (Heavy) rail systems

b) Are there any projects for developing bus transport?

b.1) Renewal of bus fleet for more the comfortable, secure and frequent travels for passengers

b.2) Improving bus routes and services (accurate route choice, efficient fare system, frequency in timetables, etc)

c) Are there any projects for developing sea transport (if applicable to the settlement in question)?

c.1) New supply of passenger ships, public ferries, etc

c.2) Renewal of existing ship stock

c.3) Improving new piers, harbors, docks, etc

d) Is there integration among different public transport modes in the city-region or in its settlements?

2.2. Are there any policies for improving non-motorized transport modes?

Third objective is to assess the policy-coordination among different participants in the selected city-region's planning process. The questions regarding to this objective are:

3. Is there coordination among different planning authorities in the city / city-region?

3.1. Does a shared vision exist in the city / city-region?

3.2. Do any integrated / shared projects exist between settlements in the city / city-region?

a) Regarding to land-use planning

b) Regarding to transport planning

c) Regarding to infrastructural projects

4. Is there integration / coordination between land-use planning and transport planning authorities? (Are transport and land-use planning decisions made interdependently and in coordination?

6.4. Research Method

6.4.1. Case Study Selection

In the last two decades, there has been a rapid change in the spatial organization of settlements in the western part of Turkey. The organization of space in the rest of the country can still be defined as large cities with main service functions and with a large hinterland consisting of medium to small cities as well as rural settlements. Whereas, the urban-rural dichotomy and the hierarchy among settlements have became less apparent and complex in the west of the country. While **Istanbul** and **Izmir**, which are the most important two metropolitan areas in the west of Turkey, were expanding, some of their functions decentralized to the cities in their periphery, which grew faster with increasing interactions and physical connections with each other (Eraydın 2005). Therefore, Izmir's spatial development changed *"from being a metropolitan area with a large hinterland to a polycentric urban region"* (Eraydın 2005). The main reason for selecting Izmir as the case study is that the city-region characteristics of Izmir are already studied and documented. It is not in the scope of this study to assess whether an urban area has transformed into a city-region; the main aim of the study is to analyze the effects of this transformation towards a city-region and its implications for sustainability in transport. Therefore, Izmir City Region is selected as an appropriate case for the purpose (main aims and objectives) of the study.

6.4.1.1. Spatial Development of Izmir

Izmir is the third largest metropolitan city in Turkey. It is located in the western part of Anatolia, at the coast of Aegean Sea. Balıkesir surrounds the city in the north, Manisa in the east, Aydın in the south and Aegean Sea in the west. Moreover, at international and regional scale, Izmir generally possesses export, import, trade, non-agriculture, tourism, transportation, industry, and fair functions (IzGM 2006, Introduction; Eraydın 2005).

Figure 6.1 Location of Izmir in Turkey
(Source: Izmir Greater Municipality 2006, Introduction)

In 1981, **Izmir Metropolitan Area** was defined within the Izmir province. Throughout the 1990s, Izmir Metropolitan Area boundaries have been expanded for several times due to newly emerging settlements and municipalities around it. The boundaries expanded even further with the Greater Municipality Law **(Law No.5216)** in 2004, which introduced a rule of 50 km radius in defining the metropolitan boundaries of urban areas. This new area is referred as ***Izmir City Region*** by Greater Izmir Municipality[37]. Before the Law No.5216, Greater Izmir Municipality had comprised 9 county municipalities, but New Izmir Metropolitan Area (NIMA) consists of 19 county municipalities, 38 first-degree municipalities and 165 rural settlements. (MoEF 2006, 5; IzGM 2006, 68-69; Eraydın 2005).

[37] New Izmir Metropolitan Area is referred as Izmir City Region mainly in 1/25000 scaled Izmir City Region Master Development Plan (1/25000 Ölçekli Izmir Kentsel Bölge Nazım Imar Planı).

Table 6.1 Izmir Metropolitan Area County Municipalities Before the Law No.5216

Izmir Metropolitan Area County Municipalities
BALÇOVA
BORNOVA
BUCA
ÇİĞLİ
GAZİEMİR
GÜZELBAHÇE
KARSIYAKA
NALIDERE
KONAK

(Source: Ministry of Environment and Forestry 2006)

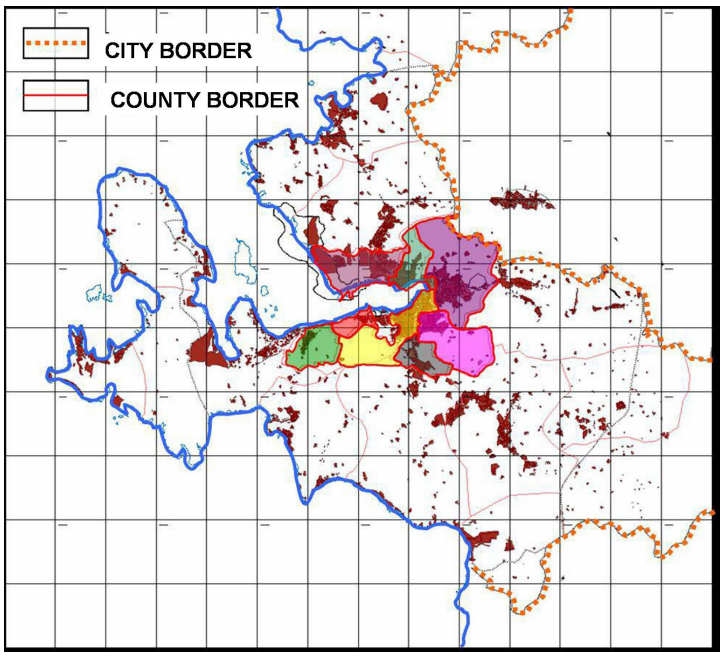
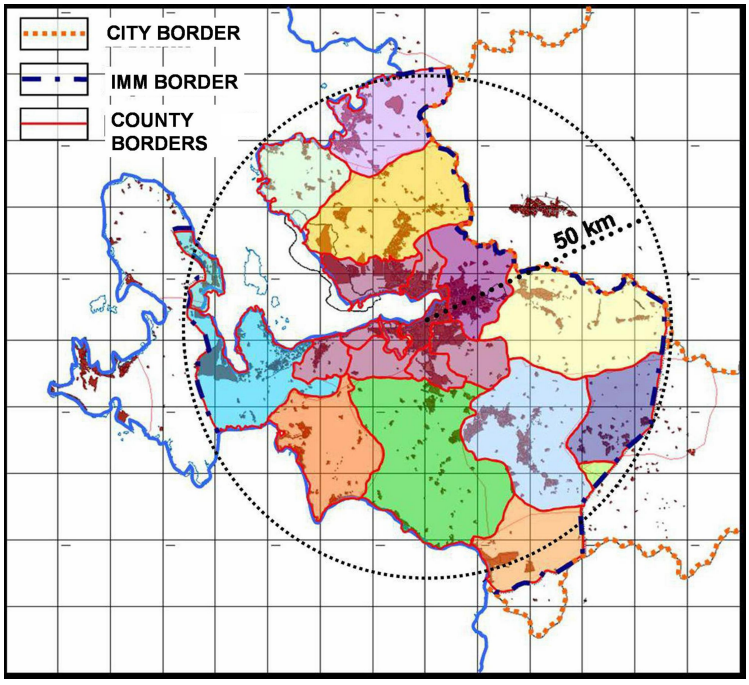


Figure 6.2 Izmir Metropolitan Area Before the Law No.5216 (110 000 hectares)
(Source: Gülerman 2007)

Table 6.2 New Izmir Metropolitan Area County Municipalities

New Izmir Metropolitan Area County Municipalities[38]	
BALÇOVA	BAYINDIR (partially)
BORNOVA	FOÇA
BUCA	KEMALPAŞA
ÇİĞLİ	MENDERES
GAZİEMİR	MENEMEN
GÜZELBAHÇE	SEFERİHİSAR
KARŞIYAKA	SELÇUK (partially)
NARLIDERE	TORBALI
KONAK	URLA
ALİAĞA (partially)	

(Source: Ministry of Environment and Forestry 2006)



Note: IMM: Izmir Metropolitan Municipality

Figure 6.3 New Izmir Metropolitan Area (Izmir City Region) (545 000 hectares)
(Source: Gülerman 2007)

[38] Karaburun is partly included in Izmir New Metropolitan Area but not shown in the list, because Karaburun's city center is out of 50 km radius distance.

On the other hand, the paper, which is a result of a study about these new metropolitan borders, presented at the international meeting for 'EU COST Action A26 European City-Regions in an Age of Multi-Level Governance Reconciling Competitiveness and Social Cohesion' (Eraydın 2005) states that these new borders are not sufficient to comprise all the urban and rural areas where the flows of people, goods and services take place. Hence, this study (Eraydın 2005) defines a new **Izmir City Region** with respect to commuting intensities, which covers an area larger than the New Izmir Metropolitan Area (or Izmir City Region). This Izmir City Region is introduced only by academic studies and it does not have an administrative significance; but Greater Izmir Municipality is managing most of their research on this regional basis (It will be seen in Chapter 8). In this thesis, the definition of Izmir City Region introduced by the above mentioned study (Eraydın 2005) [39] will be taken into consideration and the case study area will be referred as the Izmir City Region (concerning METU 2005 and METU 2006).

This newly emerging Izmir City Region covers 46 settlement units. Nine of these settlements (that are shown in bold in the Table) are in the metropolitan core and the remaining are the individual settlements excluding the rural settlement units (Eraydın *et. al.* 2007) (See Figure 6.4).

[39] In this thesis, 'Izmir City Region' phrase will be used to refer 'Izmir Urban Region' that has been defined by Eraydın (2005) as consisting of 46 settlements.

Table 6.3 Izmir City Region

IZMIR URBAN (CITY) REGION			
BALÇOVA	BEYDAĞ	SELCUK	AYVALIK
BORNOVA	ÇEŞME	TIRE	BURHANIYE
BUCA	DIKILI	TORBALI	GOMEC
CİĞLİ	FOÇA	URLA	AYDIN
GAZİEMİR	KARABURUN	MANISA	GERMENCIK
GÜZELBAHÇE	KEMALPAŞA	AKHISAR	KUSADASI
KARSIYAKA	KINIK	GOLMARMARA	NAZILLI
NALIDERE	KIRAZ	KÖPRÜBAŞI	SOKE
KONAK	MENDERES	SALIHLI	SULTANHISAR
ALİAĞA	MENEMEN	SARIGOL	YENIPAZAR
BAYINDIR	ODEMIS	SARUHANLI	
BERGAMA	SEFERHISAR	TURGUTLU	

(Source: Developed referring to explanations by Eraydın 2005 and METU 2006)

Figure 6.4 Izmir Urban Region (Izmir City Region)
(Source: Developed referring to explanations by Eraydın 2005 and METU 2006)

Actually, Izmir City Region, which consists of 46 settlement units that includes 9 metropolitan core settlements, resembles South-East England Mega-City Region. The development of SEE MCR, is given as an example to regional polycentricity with a dominant metropolitan core, London (See Section 5.5.1). As it will be discussed later in detail in Section 8.1.1, in Izmir City Region can also be given as an example to regional polycentricity with a strongly development 'sphere of influence' that exists around Izmir city center and covers 46 settlements, some of which are defined as sub-centers or nodes along corridors emanating from the center.

There is also another regional definition regarding Izmir and its environs. In the 1980s, State Planning Organisation defined a functional region that is composed of 10 provinces as the **Izmir Region.** This definition is not an administrative boundary either. During the regional planning studies in the 2000s, which were carried out in line with EU requirements, these boundaries were adopted as the **NUTS -** Level 2 (Nomenclature of Territorial Units for Statistics) boundaries for this region (Eraydın 2005) (See Figure 6.5). However, this definition is not based on the economic functioning and interactions between the settlements in this region; and therefore, the city-region area identified above is more appropriate for the purpose of the study.

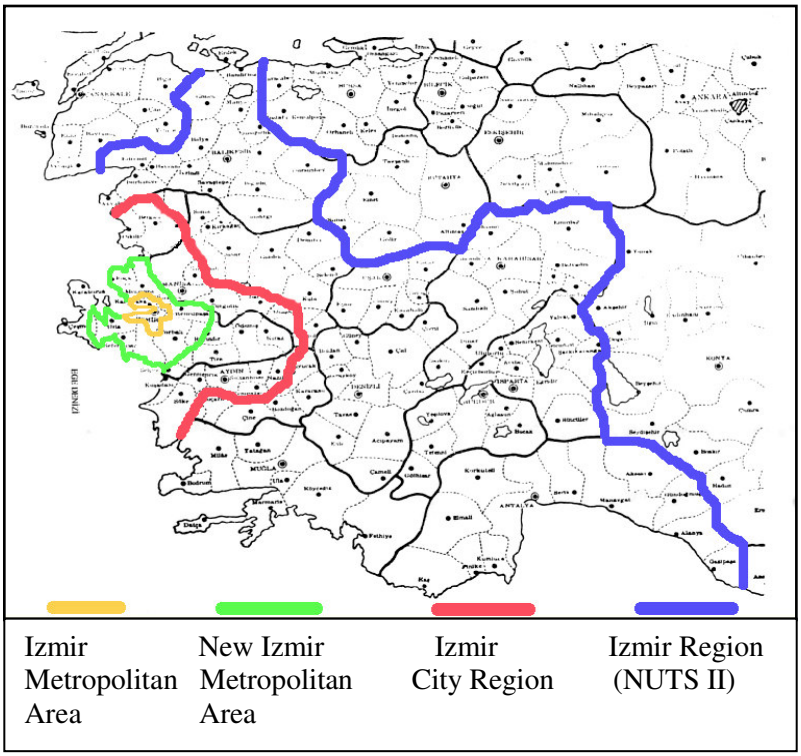


Figure 6.5 Izmir Metropolitan Area, New Izmir Metropolitan Area, Izmir City Region, and Izmir Region
(Source: Eraydın 2005)

In summary, Izmir City Region, defined by Eraydın (2005) (red in color in Figure 6.5), has been chosen as the case study. As mentioned earlier, that is because, this region has already been defined as a city-region and there have been academic studies about the process of its becoming a city-region. In the thesis, it is intended to concentrate on the thesis's main issues without dealing much with the matter of how Izmir has become a city-region. In other words, it is intended to observe the effects on the transportation system, planning approach and policy coordination issues of this city-region formation process.

6.4.2. Method of Analysis and Data Collection

In the thesis, in-depth analysis of a single case study, Izmir City Region is the main method of analysis. To attain the first objective listed above, and to answer its

research questions, an analysis is carried out on the transport system and traffic growth in Izmir City Region. The annual average daily traffic volume tables were obtained from Directorate of Highways and several volume maps and graphs have been prepared using these data. Besides, with using the data of population estimates of middle of year for each city prepared by the State Statistical Institute; ownership levels have been obtained. During the studies, much data has also been gathered from several web sites (See References). On the other hand, at the beginning of the thesis study, according to the first part of the hypothesis, it was considered to make a more detailed traffic analysis that can cover all the criteria that affect the interactions among 46 settlements in Izmir City Region, and particularly reveal changes in travel frequency and travel distance. However, it is important to note that since the traffic data that can be obtained is limited and since it was not possible to conduct a comprehensive traffic survey within the time limit of this study; the traffic analysis has been done and evaluated within the limits of the obtained data.

In order to attain the second and third objectives, a semi-structured interview was formulated. This interview was carried out with various authorities and decision-makers in the city-region. The county municipalities to be included in the interview have been chosen according to some criteria. As it will be discussed in Chapter 8 in detail, Greater Izmir Municipality have defined some sub-regions and some sub-centers in 1/ 25000-scaled Izmir City Region Master Development Plan (ICRMDP or IzGM 2006 in *References*) that has been approved in 2006. The settlements have been chosen mostly referring to these sub-regions. These sub-regions are Central City, Northern Urban Development Sub-Region, Eastern Urban Development Sub-Region, Southern Urban Development Sub-Region, and Western Urban Development Sub-Region. Moreover, according to ICRMDP, the spatial effects in Izmir City Region have mostly been concentrated in ***five corridors.*** These corridors are formed by

- Menemen, Aliağa in the North;
- Kemalpaşa, Turgutlu, Manisa in the East;
- Torbalı, Bayındır, Tire in the Southeast;
- Seferihisar, Menderes in the South; and
- Urla, Çeşme, Karaburun in the West (IzGM 2006)

In these corridors, there are settlements (Turgutlu, Selçuk, etc.) that are not included in the sub-regions of ICRMDP (IzGM 2006) in legal terms as those settlements are not included in the 50km radius area (New Izmir Metropolitan Area) or in other words in the New Greater Izmir Municipality borders (See Figure 6.3). However, as it has been discussed, in this thesis, the Izmir City Region which has been defined by Eraydın (2005) and by some academic studies and which consists of 46 settlements (See Figure 6.4) will be accepted as the city-region. Hence, other settlements have also been considered. Therefore, from Central City, interviews have been made with authorities from Greater Izmir Municipality. Besides, other interviews were made with the authorities from each settlement's municipalities. These settlements are **Menemen** and **Aliağa** in the northern axis; **Manisa** in the northeastern axis; **Torbalı**, **Selçuk**, **Aydın** in the southern axis; and **Urla** and **Çeşme** in the western axis has been chosen.

The interview questions were determined according to thesis hypothesis with its main questions and the objectives with their questions. It was carried out in November 2007 with experts from the planning and transport departments of the municipalities of the nine settlements listed above (Izmir Greater Municipality, Menemen, Aliağa, Manisa, Torbalı, Selçuk, Aydın, Urla and Çeşme Municipalities). The Interview questions are presented in the Appendix A.

In addition, for the second and third objectives, an in-depth examination was made on the plans, plan reports, related articles, books, journals, brochures, reports, etc., which were gathered from the municipalities. Among these, especially the plan reports have been examined in detail. It is important to note that the data obtained from some of the municipalities is limited both in terms of answers given to the interview questions and in terms of plan reports that could be obtained and analyzed.

In order to compare the answers of 9 municipalities to several questions of the second objective of the thesis, which aims to assess the awareness of sustainability of each municipality (particularly Izmir Greater Municipality), some tables are made related to the questions and at the end of the sections; these tables are gathered in one table. According to the evaluation of both the results of semi-structured interviews and the related documents (plan reports, articles, etc.) of 9 municipalities,

these tables have been completed. For instance, the second objective's first question's first sub-questions were determined as follows (For all questions, see Section 6.3):

1. In the land-use plans or planning approaches of the city region and its settlements, is there an emphasis on, or awareness of, 'sustainable development' and 'sustainable transport'?

1.1. Is there a reference to sustainability and sustainable development?

a) Is there any expression that resembles to the main idea of sustainable development that is approximately *"the development that meets the needs of the present without risking the needs of future generations"*?

b) Are there any phrases referring to the three dimensions of sustainable development, *environmental, economic, and social,* in general?

c) Are there any social, economic, and environmental/ecological objectives that promote sustainable development and sustainable transport?

d) Are there any strategies to attain a more sustainable system, in transport terms and urban development/growth terms?

The table is developed according to these questions:

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)		AYDIN
(a) Reference to Sustainability	(a1) Main Idea of Sustainable Development	✓
	(a2) Three Dimensions of Sustainable Development	(✓)
	(a3) Social-Economic-Ecological Objectives	X

For instance, in this table, (a1) is checked off with a sign of ✓. This means that the related municipality (Aydın, in this example) has a statement in its plan (if available) referring to the main idea of sustainability or answered to this question with giving reference to the main idea of sustainable development. (a2) is checked off with a sign of (✓). This means that the related municipality has an emphasis or policies on all three dimensions of sustainable development; but as the sign is shown in parenthesis, this means that these policies or this emphasis is coming from or emanates from policies or plan decisions of Izmir Greater Municipality. (a3) is checked off with a sign of **X**. This means that the related municipality has no objectives related to any of the three (social, economic or ecological) objectives of the sustainable development.

The other tables are developed as in this table with regarding to the questions of the second objective. At the end of the sections; these tables are gathered in one table. As an example, some part of the table related with the awareness in urban planning is given in the following:

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			**OBSERVED SETTLEMENTS**			
			IZMIR	AYDIN	.....	.....
(a) Reference to Sustainability	(a1) Main Idea of Sustainable Development					
	(a2) Three Dimensions of Sustainable Development					
	(a3) Social-Economic-Ecological Objectives					
(b) Macro-Scale Policies	(b1) Strategies Regarding Sustainable Urban Form/Model	Compact				
		Corridor				
		Multi-centered				
	(b2) Prevent Urban Sprawl					
	(b3) Prevent Agglomeration In City Center					

CHAPTER 7

EVALUATION OF TRANSPORT NETWORK IN IZMIR CITY REGION

7.1. Main Features of Izmir City Region

7.1.1. Main Geographical Structure

Izmir City Region is formed by mountains that are parallel to each other in the east-west axis, perpendicular to the sea (See Figure 7.1). In fact, topography enables limited growth for settling in city center and around it. According to slope analyses of New Izmir Metropolitan Area[40], 26, 5 % of Izmir City Region (ICR)[41] is not convenient for settling with more than 40 % topographic threshold areas. 39 % of ICR is convenient for settling with 0-10 % slope. Topographic thresholds generally surround Izmir City Region's central settlements. The areas in the east of Cigli-Menemen axis, in and around Aliağa, in the east of Bornova, in the Ulucak Kemalpaşa, Turgutlu axis, in A.Menderes Airport-Torbalı axis, in Guzelbahce-Urla and Yelki-Seferihisar axes are convenient for settling. Because of its topographic structure, the spatial development of Izmir Metropolitan Area shows **a linear (axial) development** or enables **regional sub-focusing (sub-centers)** instead of a compact form (See Figure 7.18) (IzGM2006, 15,83).

[40] The area that has been introduced by Law No. 5216.
[41] The city region that covers all the settlements in 50 km radius.

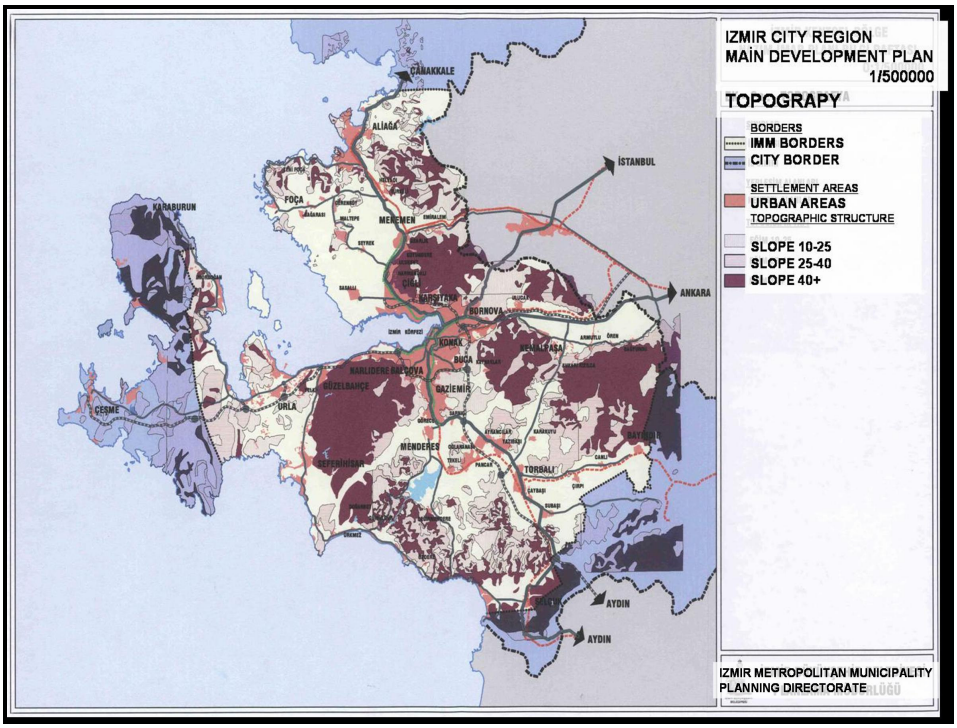


Figure 7.1 Izmir City Region's Topographical Structure
(Source: Izmir Greater Municipality 2006)

7.1.2. Demographic Structure

According to the Turkish Statistical Institute's year 2000 population census, the population of the Izmir province is 3 million 370 thousand 866. In 1990-2000 period, Izmir's population has shown a serious rise and it has risen from 224 person per square kilometers to 287 person. With respect of both population density and population increase rate, it is seen that Izmir's population increase rate is above that of Turkey's average (IzGM 2006, 114).

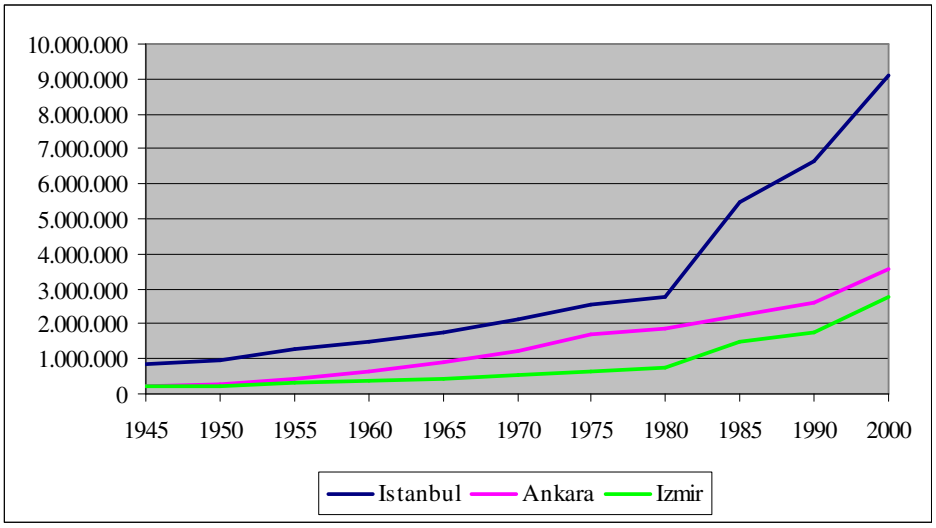


Figure 7.2 Populations of The Three Biggest Cities In Turkey: 1945 – 2000
(Source: TUSIAD 1999)

7.1.3. Transportation

The province, Izmir provides a variety in its transportation network, as well as high capacity modes and good quality integration facilities. These superiorities are a result of its general geographical properties, its regional and international potential, and its location opportunities. Especially in the 18th and 19th centuries, the agricultural products, which were grown in the abundant basins of the Aegean Region, were gathered in Izmir and exported to Europe. In addition, after the Republic of Turkey was established in 1923, with new developments, Izmir has become a metropolis. New economic sectors have settled in the region; settlements have sprawled and therefore infrastructure systems have been developed (IzGM 2006, 193).

7.1.3.1. Main Corridors in the City-Region

The motorways in Izmir City Region started to be built in the 1980s. The motorways in the Izmir City Region are Izmir-Aydın motorway, Izmir-Çeşme motorway, and

Izmir circumferential expressways. Izmir-Canakkale motorway is under construction. Another motorway, which will connect Izmir to Bursa via Manisa, has been planned along Kemalpaşa-Turgutlu route in the east of Izmir (IzGM 2006, 43, 194).

There are **five different road transport axes** that connect Izmir to other provinces and passes through the city (See Figure 7.18). In the **North**, there is the Menemen-Aliağa divided road that is also connected to Manisa from Menemen and continuing to Çanakkale. The road's Karşıyaka part is called the Altınyol and Çiğli part is called the Anadolu Street. In the **Northeast,** there is Izmir-Manisa road that is connected to the city center via Bornova. This road extends from Manisa to Balıkesir, Bursa and Istanbul. In the **East,** there is Kemalpaşa-Turgutlu-Salihli divided road. This road is separated from Altınyol and is called the Ankara Street. It connects Izmir to Inner Aegean and Central Anatolia. In the **South**, there is Torbalı-Selçuk partially divided road that is seperated into two directions: Aydın and Kuşadası. The Torbalı-Tire-Ödemiş Road is seperated from this road at Subaşı. In the **West,** there are Izmir-Çeşme and Izmir-Karaburun roads which have lost their importance because of the motorways in the same direction (IzGM 2006, 43-44; 194).

7.1.3.2. Railways

Izmir has a specific importance in railway transport of Turkey. The **first railway** of Turkey was built in Izmir-Aydın route by British traders in 1866 (Yıldırım 2001, 12). It extends to Tire, Bayındır, Seferihisar, Çivril, etc. that are the centers where products are collected. The railway that is coming from Aydın route ends at **Alsancak Station** whereas the railway that is coming from Manisa route ends at **Basmane Station**. In Izmir, with renewed old lines and with additonal lines, the railways have important functions in both commercial transportation and commuting transportation. Commuter (suburban) trains are operating at Bornova, Buca, Gaziemir and Çigli. Menemen- Manisa route is divided into two at Manisa. Akhisar-Soma route goes from Balıkesir-Eskişehir towards Marmara and Central Anatolia. The other route goes from Turgutlu-Salihli towards Uşak and Afyon. Moreover, Torbalı-Ödemiş route follows Torbalı-Aydın-Denizli direction (IzGM 2006, 44).

According to the information obtained from Ministry of Transportation General Directorate of Railways, Harbours and Airports Construction, there is a line proposal for Izmir-Ankara connection that is connected to Turgutlu via Bornova-Ulucak-Kemalpaşa direction. In addition, according to the Project about the improvement of Izmir Commuting Railway System and within the strategy developed by Izmir Metropolitan Municipality that is based on urban transportation systems integration, there has been bidding. The tenders have been invited for the first stage of improving the capacity, speed and comfort of commuting railways along Aliağa-Izmir-Cumaovası lines and integrating these railways with bus, metro and sea transportation (IzGM 2006, 44-45).

Figure 7.3: High Speed Rail Lines Planned and Under Construction In Turkey
(Source: TCDD, 2006)

7.1.3.3. Harbours

Izmir Harbour started to function in 1876 and it is the oldest organized harbour in Turkey. This Harbour is one of the most important export harbours and transportation of freight has the priority. On the other hand, passenger transportation does not have much significance due to infrastructural and operational inadequacies. The Pasaport Harbour (Old Harbour) and Alsancak Harbour in Izmir Harbour operate as passenger and freight harbours. Among these, Alsancak, Dikili and Çeşme Harbours are used as sea entrance gates. In the North, at Nemrut Gulf, nine piers were built by private sector and are used for freight transportation. At Çandarlı, there has been planned the biggest harbour of North Aegean. Moreover, there are marinas such as Çeşme Altınyunus and Seferihisar Sığacık Marinas (IzGM 2006, 45-47).

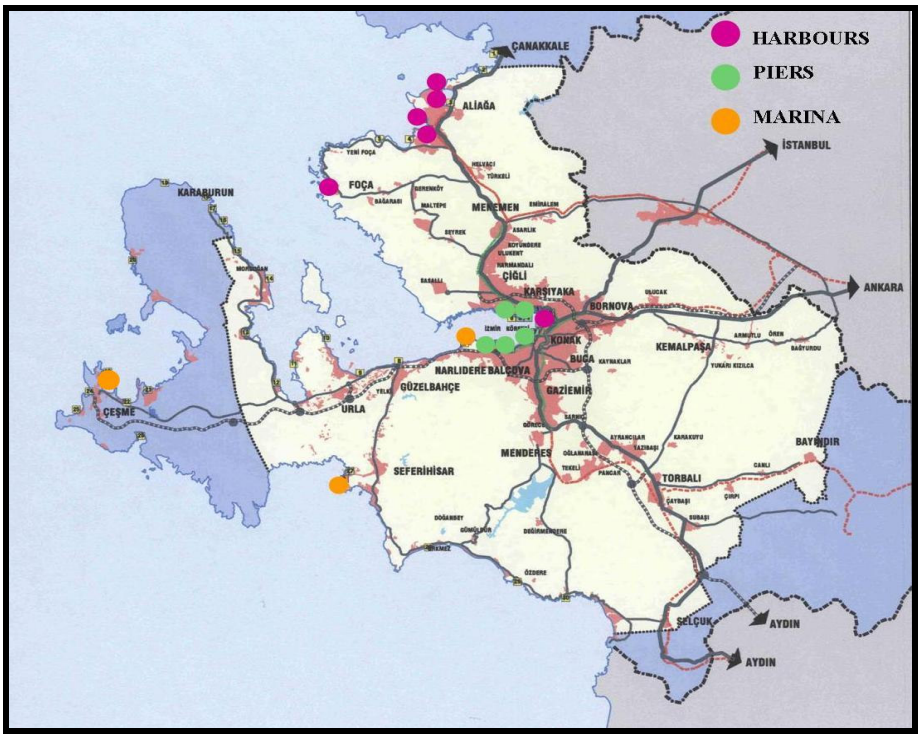


Figure 7.4: Important Harbours, Piers and Marinas In Izmir
(Source: Developed referring to IzGM, 2006)

7.1.3.4. Airports

There are four airports in Izmir, two of them are military (Gaziemir and Çiğli), and two of them are civilian. One of the civilian airports is Adnan Menderes Airport in Cumaovası. This airport was opened in 1987 and it has now a capacity of 157.680 airplanes and 4 million passengers. There are daily domestic and international flights in this airport. The other civilian airport is in Selçuk District, near Efes Ancient City. This airport is used by small planes that make expedition among Izmir, İstanbul and Bodrum (IzGM 2006, 47).

7.1.3.5. Urban Transportation

Light Rail Systems

The city of Izmir operates a light rail system, which was proposed in Izmir Transport Master Plan is made up of **three stages**. The Bornova – Halkapınar – Basmane – Konak – Üçyol light rail line was planned as first stage and opened in May 2000. Besides, the second stage was planned for Üçyol-F.Altay light rail line, and the third stage has been planned as Halkapınar-Çiğli, F.Altay, Narlıdere ve Üçyol-Buca lines (IzGM 2006, 48, 195).

Commuter Rail system

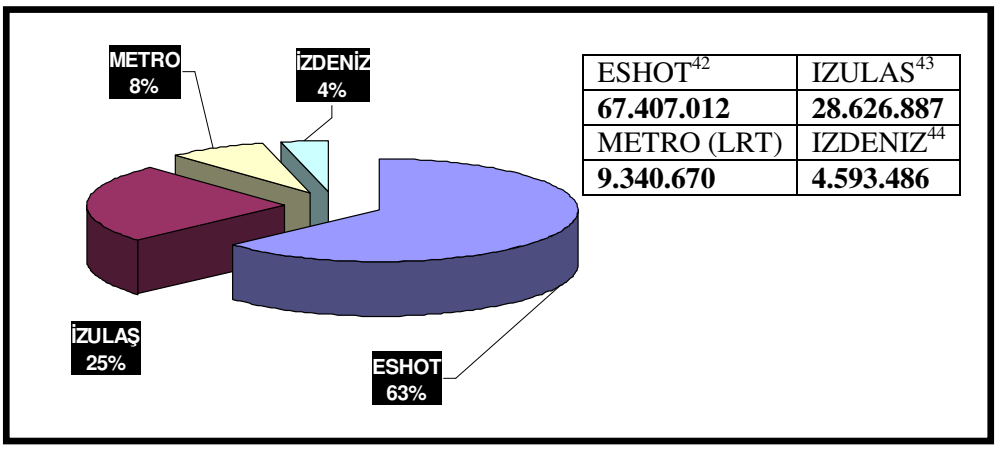
There are commuter rail lines that are operated by the State Railways (TCDD) in the urban area are. These are:

- Alsancak-Buca: 15 voyages per day and 5 stations (8, 7 km in length)
- Basmane-Çigli: 11 voyages per day and 15 stations (17 km in length)
- Alsancak-Menderes: 13 voyages per day and 6 stations (19 km in length) (IzGM 2006, 196)

Sea Transport

Izmir Gulf is very actively used by means of urban transportation because all the urban growth is around the Gulf. The current urban transport system integrates sea transport with the urban bus system. Ferries operate at Konak, Karsıyaka, Bostanlı, Bayraklı, Pasaport, Alsancak, Göztepe ve İnciraltı (Üçkuyular) piers (IzGM 2006, 49, 196).

As shown in the Figure 7.5, in urban transport, the share of bus transport (88%) is the highest, while the LRT accounts for about 8 % of urban transport trips, and sea transport about 4 %.



ESHOT[42]	IZULAS[43]
67.407.012	**28.626.887**
METRO (LRT)	IZDENIZ[44]
9.340.670	**4.593.486**

Figure 7.5 Number of Passengers (By April 2007)
(Source: ESHOT 2007)

7.2. Assessing the Change in Traffic Values in Izmir City Region

In the thesis, as it has been mentioned in the Chapter 6, one of the three main research questions that will be tried to be answered referring to the first part of the hypothesis is;

[42] ESHOT: General Directorate of Electric, Water, Coal Gas and Public Transport
[43] IZULAS: Izmir Public Transport Joint Stock Company
[44] IZDENIZ: Izmir Sea Transport Industry, Shipping, Tourism and Trade Joint Stock Company

Are the traffic values of the selected city-region showing a sustainable or an unsustainable growth pattern in terms of transport in time? (To what extent such unsustainable traffic growth can be explained with city-region development, and to what extent can such growth be seen as a result of the normal traffic growth due to car ownership and usage)

Regarding this main question, the **first defined objective** is to assess the results of the analysis done with the traffic data of the selected city-region in order to see whether there is a tendency towards an unsustainable growth pattern in the city-region. In this chapter, the questions regarding this objective will be tried to be answered. Those questions are:

1. How much did traffic volumes change through years (1990, 1995, 2000, and 2006)? Do different corridors in the urban area show differences in traffic growth, which can be associated with city-region development?
2. Did travel distances increase in time? Is there a significant spatial expansion of traffic intensity?
3. How much did the volume of cars, buses, and trucks in traffic change in time (1990-2006)? Is there an increase in private modes, which is usually an expected result of increased travel distances?
4. Does the change in the amount of vehicles in time show that there is an increase in interactions among some settlements? Are these settlements the ones that previous research on the city-region development confirmed as the main city-region nodes? Or is the traffic growth evenly in all corridors, regardless of the primary city-region nodes and their corridors?
5. How much did the car and motor vehicle ownership change in time (1994-2006)?

For the first and second questions, the traffic flow or volume maps, which have been obtained from the annual average daily traffic tables by Directorate of Highways, have been examined. To compare the change in volumes of each vehicle type in years with each other, annual traffic volume figures were developed (for 1990, 1995, 2000, 2006) that show the volumes of all motor vehicles (Figures 7.6, 7.7, 7.8, 7.9).

For the second question, in order to assess the change in number of cars, busses, and

trucks between 1990 and 2006, figures were developed for each motor vehicle types (cars, buses, and trucks) that show the change in time (See Figures 7.10, 7.13, 7.15). For the third question, to see the spatial expansion of traffic intensity, an analysis was made that shows the car volumes in the roads on which traffic exceeds 2500 vehicles per day in year 1990 compared with 2006 (See Figure 7.11).

The fourth question will be answered through the findings of all other questions. Lastly, for the fifth question, an analysis was made to observe car numbers per 1000 people between 1994 and 2006 for Izmir, Manisa, and Aydın. An analysis was also made for total motor vehicle ownership values (See Figures 7.19, 7.20). Moreover, in order to understand the reasons behind the changes in car and motor vehicle ownership values, figures were prepared for each settlement (Izmir, Manisa, Aydın), which shows the change in number of each type of motor vehicle (car, minibus, bus, small truck, truck and motorcycle) in each year between 1994 and 2006 (See Figures 7.22, 7.23, 7.24).

It is important to note that, at the beginning of the thesis study, according to the first part of the hypothesis, it was considered to make a more detailed traffic analysis that can cover all the criteria that affect the interactions among 46 settlements in Izmir City Region, and particularly reveal changes in travel frequency and travel distance. However, since the traffic data that can be obtained is limited and since it was not possible to conduct a comprehensive traffic survey within the time limit of this study; the traffic analysis has been done and evaluated within the limits of the obtained data.

7.2.1. Comparison of Volumes of Motor Vehicle Types in Each Year

When the figures of each years are observed, it can be seen that in general, there is increase in number of each type of vehicle from year 1990 to year 2006. When each year is examined in itself, there can be seen that in some corridors, there is the dominance of some vehicle type or types. In year 1990, it can be seen that car volumes are higher between Izmir and Menemen, Izmir and Manisa, Izmir and Turgutlu, Izmir and Urla, Torbalı and Bayındır Junction, and Selçuk and Germencik,

when compared to car volumes in other road segments. Besides, the truck volumes are relatively more significant when compared to other vehicle types (bus and small truck). Truck volumes are higher between Izmir and Menemen, Izmir and Torbalı, Izmir and Kemalpaşa, Kemalpaşa and Manisa Junction, Manisa Junction and Salihli, and Selçuk and Germencik when compared to the truck volumes in other road segments (See Figure 7.6).

Traffic volumes in 1995 reveal some significant changes when compared to those in 1990: while Izmir-Menemen represented the extent of interactions in the northern corridor in 1990; traffic volumes in 1995 reveal that interactions and hence traffic is significant until Aliağa, exceeding the Menemen boundary. Izmir-Manisa-Akhisar corridor also appears to have much increased traffic in 1995 when compared to 1990. The most striking difference in 1995, however, is along the Izmir-Torbalı-Selcuk corridor: while this corridor experienced rather insignificant amounts of traffic in 1990, this appears to have changed in 1995. The increase is particularly in car traffic in this corridor. Car traffic also seems to have increased in the Izmir-Turgutlu corridor, whereas truck traffic increase is mostly experienced in the Izmir-Aliağa corridor (See Figure 7.7).

In years 2000 and 2006, it can be seen that car and motor vehicle volumes are extremely different from the previous years and there are sharp increases in volumes. This may be due to the rise in car ownership levels as well as the rise in interactions or flows between settlements. This issue will be discussed in detail later (See Section 7.2.2) (See Figures 7.8, 7.9). The figures for 2000 and 2006 clearly show the corridors of interaction (or functioning) between the settlements of Izmir City Region: Izmir-Torbalı-Selcuk-Aydın corridor in the south and southeast reveal an important corridor with high amounts of traffic. Izmir-Manisa-Akhisar in the northeast and Izmir-Menemen-Aliağa in the north also have significant volumes of traffic. Izmir-Urla section in the west, although representing a more urban link, reveals an important corridor of interaction and traffic.

All of these findings of this section are also evaluated together with the findings of Section 7.2.2 at the end of Section 7.2.2.

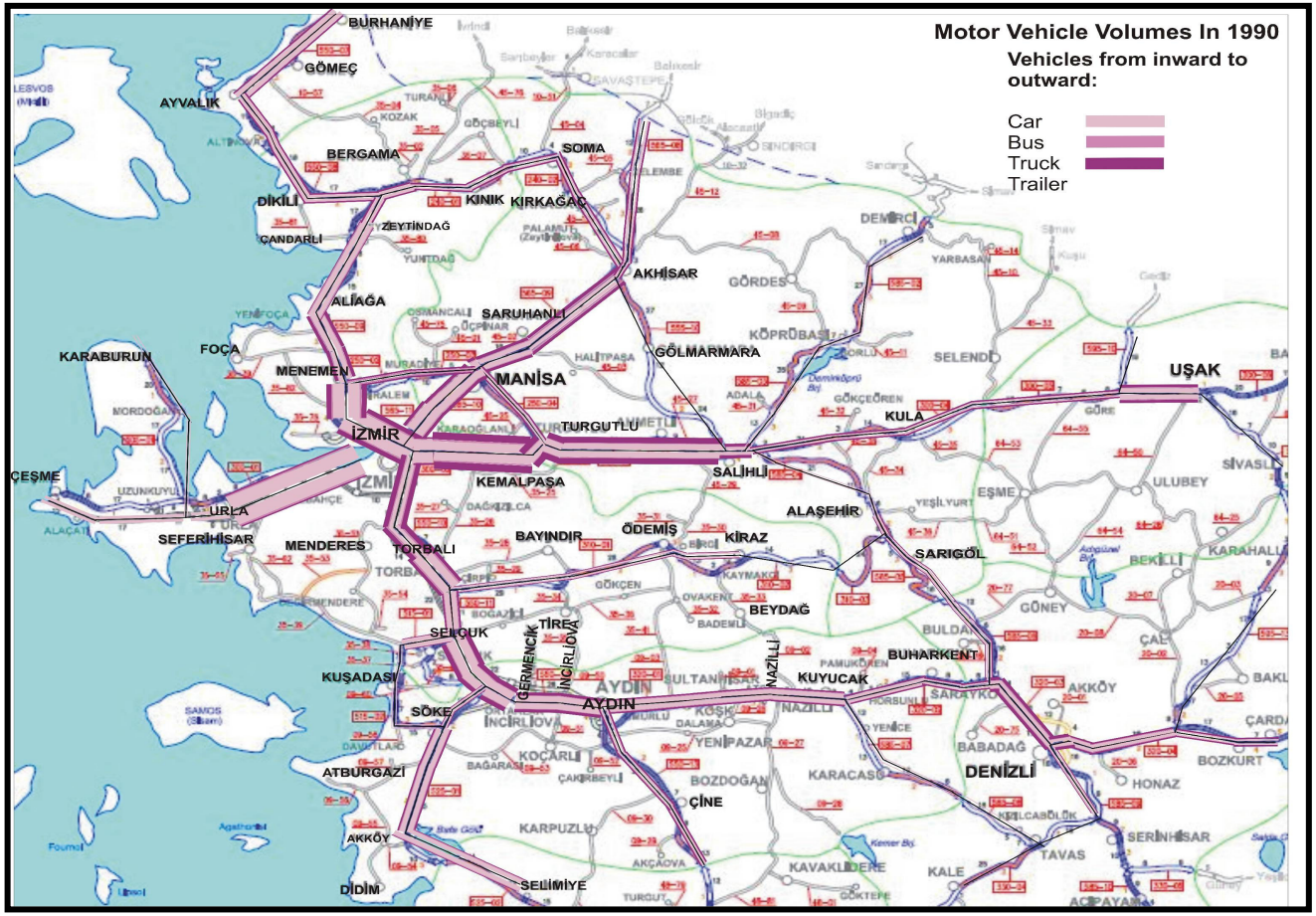


Figure 7.6 The Annual Average Daily Traffic Volumes (1990)

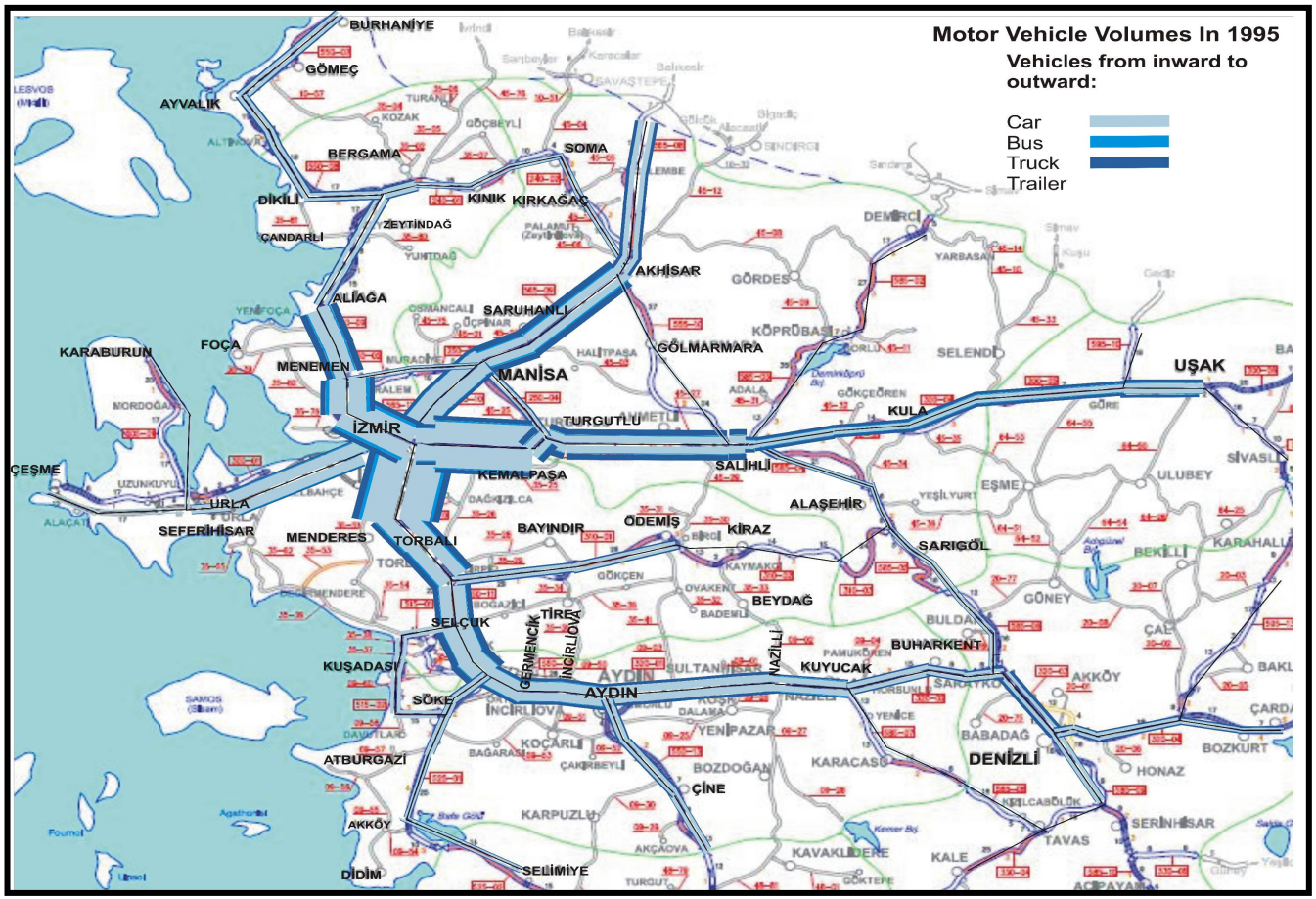


Figure 7.7 The Annual Average Daily Traffic Volumes (1995)

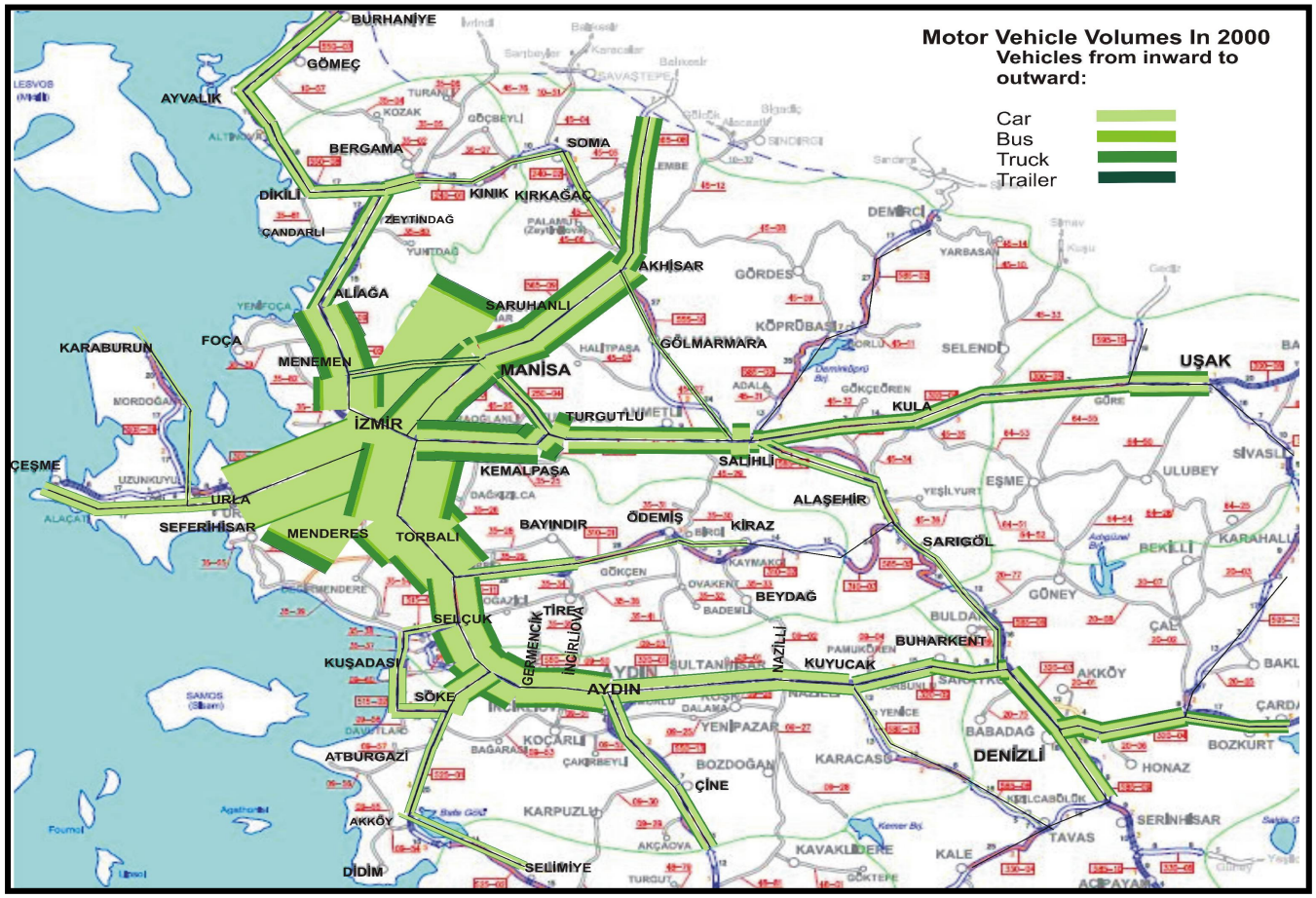


Figure 7.8 The Annual Average Daily Traffic Volumes (2000)

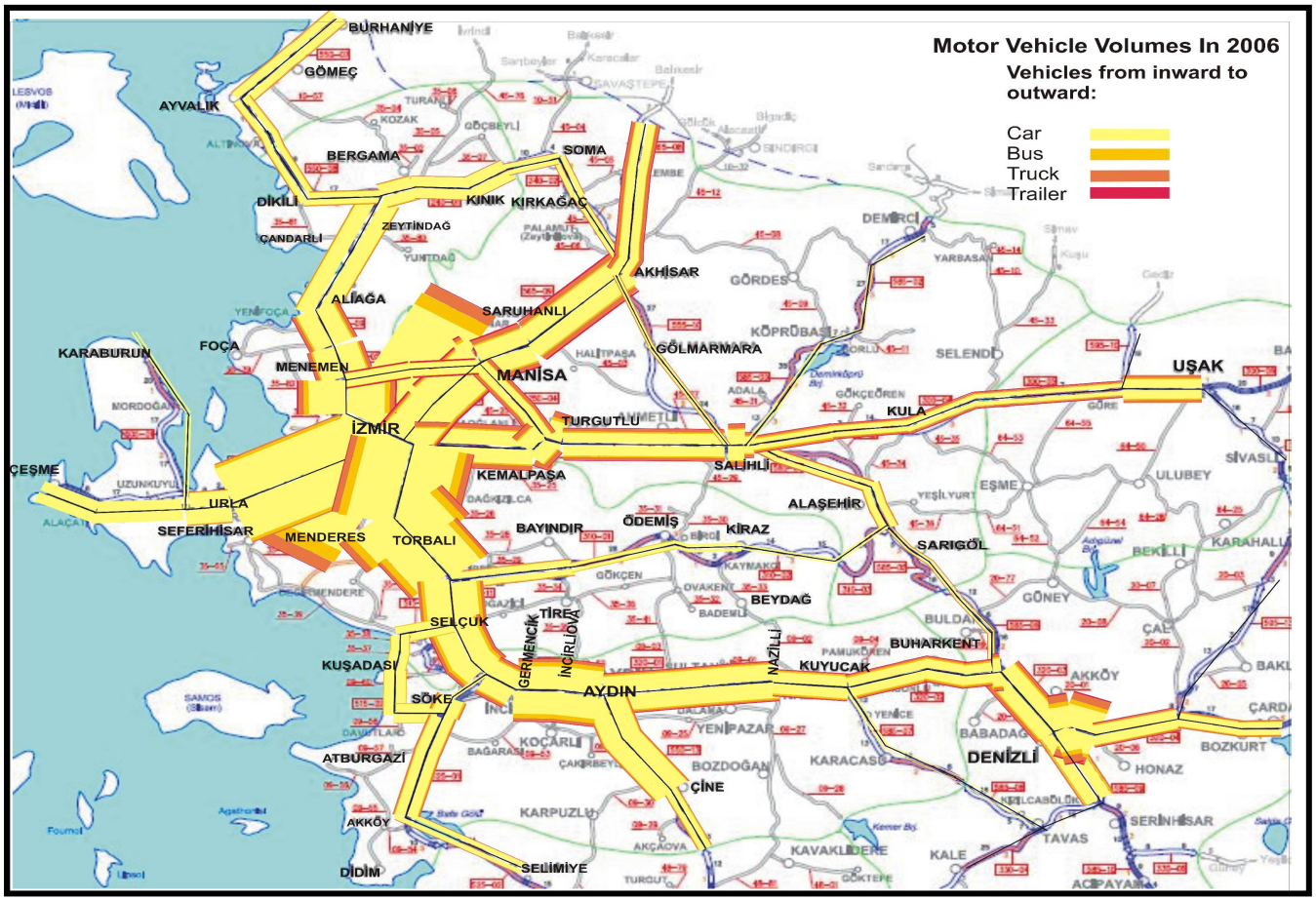


Figure 7.9 The Annual Average Daily Traffic Volumes (2006)

7.2.2. Changes in Volumes of Each Motor Vehicle between 1990 and 2006

First, to present the change in **automobile volume differences** among settlements along the corridors, two kinds of maps were prepared. One shows the changing car volumes in time (1990-2006) (See Figure 7.10) and the roads on where car volumes exceed 2500 vehicles a day (See Figure 7.11). In both of the maps, it is clearly seen that in some corridors, between some settlements, car traffic has intensified.

In year 1990, in Izmir-Menemen, Izmir-Manisa, Izmir-Kemalpaşa, Izmir-Urla, Kemalpaşa-(300-02) 2nd Segment[45], Torbalı-Bayındır Junction, Selçuk-Germencik and Germencik-Aydın road segments, the annual average daily volume values of automobiles are above 5000 vehicles/day. 5000 vehicles/day is taken as a reference point because most of the car volumes aggregate around 2500 vehicles/day. In year 1990, **Menemen** in the north, **Manisa** in the northeast, **Kemalpaşa** in the east, **Torbalı** in the south, and **Urla** in the west are distinguished as nodes of the city-region. This can be interpreted as that most of the traffic flows occured between Izmir city center and these settlements in 1990; because the highest car volumes are seen in these corridors. In other words, it may also be said that most of the interactions are concentrated among these settlements.

On the other hand, in year 2006, what was mostly concentrated around Izmir city center and in old Izmir Metropolitan Area (with nine county municipalities) in 1990, has enlarged significantly. Firstly, in all road segments, the annual average daily car volumes have increased. But, in some of them, the values have increased extremely. The most extreme one is the car volume between Izmir and Torbalı in the south. The annual average daily car volume has increased with a 967 % ratio between 1990 and 2006. After Izmir-Torbalı road segment, the other most extreme road segments are Salihli-Koprubasi Junction (395 %), Bayındır Junction-Selçuk (294 %), Saruhanlı-Akhisar (275 %), Akhisar-Gelembe (269 %), and Aydın-Çine (255 %). In this new expanded transport schema, in year 2006, **Çandarlı** in the north, **Akhisar** in the northeast, **Salihli** in the east, **Aydın** in the south, and **Urla** in the west are distinguished as nodal points in the Izmir City Region. However, it is also seen that

[45] In order to see road segments, See Appendix B.

mainly Menemen, Manisa, Kemalpaşa, Torbalı, and Urla are also still functioning as important.

The increasing amount of interactions and traffic flows among settlements in Izmir City Region can be explained both in economic and legal terms. As explained earlier, in year 2004, with Law No.5216, the New Izmir Metropolitan Area (NIMA) was defined in a 50 km radius area from the city center consisting of 19 county municipalities. Besides, many industrial and financial developments have affected the economic growth of Izmir in time. The study by Eraydın (2005) states that, 1990s have been a turning point for industry in Izmir and in 1990s, with Izmir Atatürk Industrial Estate; twelve industrial estates were also established in this time. This trend has continued during the 2000s and Eraydın (2005) emphasizes that these new industrial estates have transformed the spatial distribution of industry in Izmir Metropolitan Area and have caused **a polycentric industrial structure** in Izmir. Besides, the micro scaled firms have also increased and their importance in Izmir's regional growth has become obvious in time (Eraydın 2005).

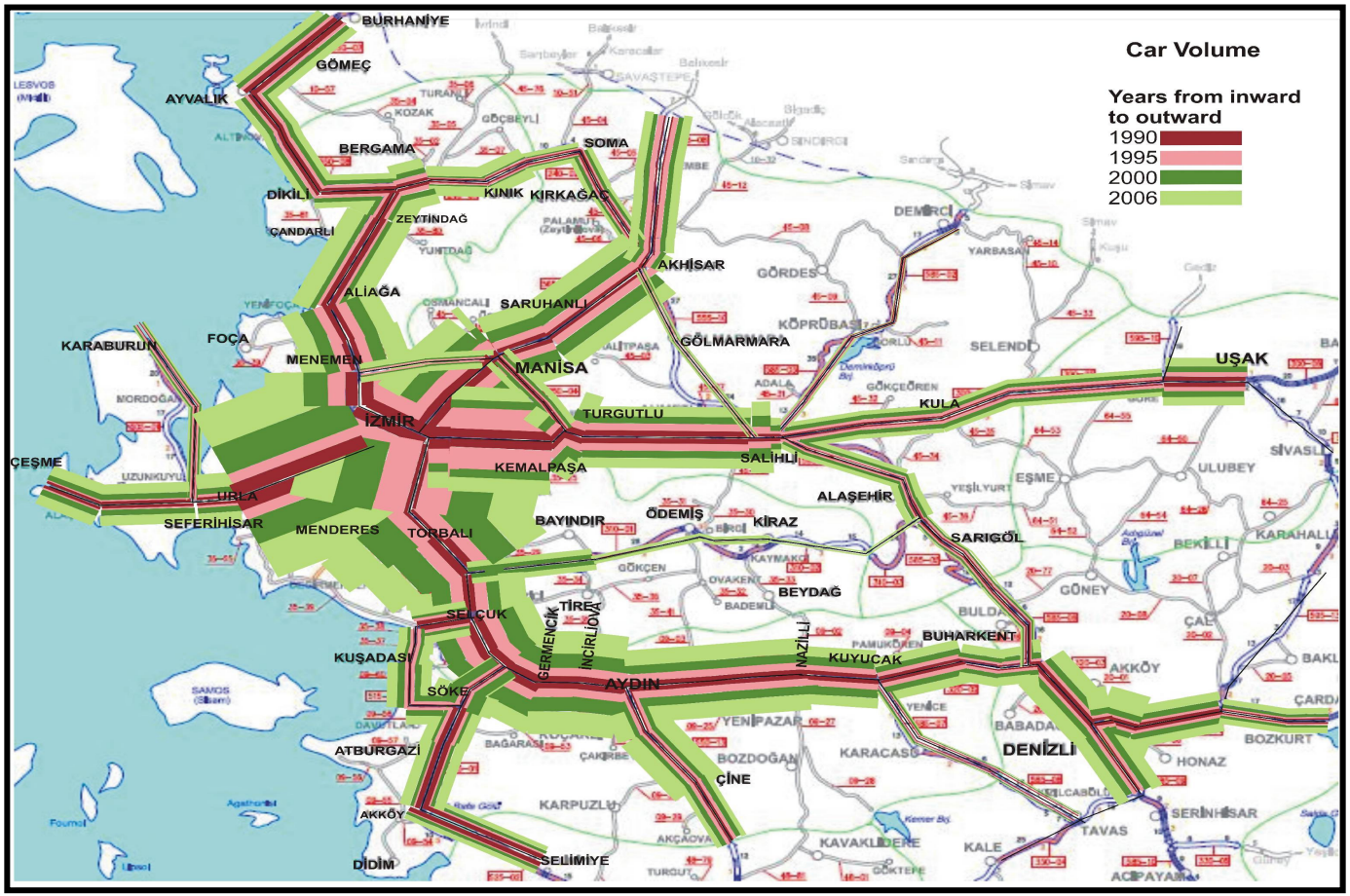


Figure 7.10 The Annual Average Daily Traffic Car Volumes (1990-2006)

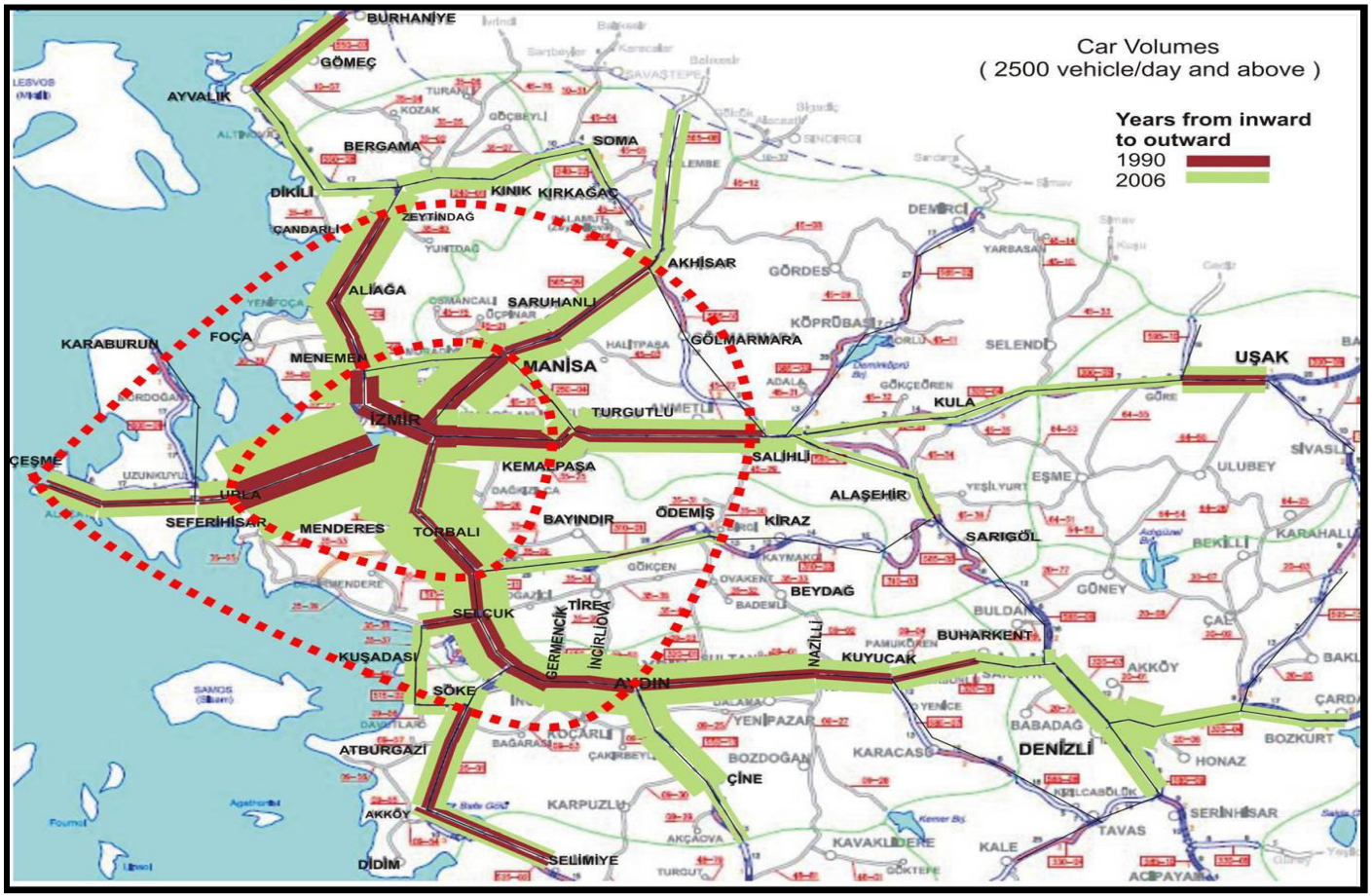


Figure 7.11 The Annual Average Daily Traffic Car Volumes (2500 + Vehicle Per Day) (1990–2006)

Figure 7.12 The Annual Average Daily Traffic Car Volume Differences Between Years 1990 and 2006 In Different Corrdiors In Izmir City Region

Secondly, annual average daily volume values of **buses** are observed. In year 1990, most of the bus volumes are under 1000 vehicles/day. However, the bus volumes between Izmir and Menemen, Izmir and Torbalı, Izmir and Urla, Kemalpaşa and (300-02) 2nd Segment, Torbalı and Bayındır Junction are between 1000 and 2000 vehicles/day. Hence, Menemen in the north, Kemalpaşa in the east, Torbalı and Bayındır Junction in the south and Urla in the west are distinguished as nodes regarding the bus volumes. In year 2006, bus volumes in almost all road segments increased. The highest increases are in Germencik-Aydın segment with a 360 % ratio, followed by those in Bayındır Junction-Selçuk (263 %), Torbalı-Bayındır Junction (258 %), Ayvalık-Burhaniye (258 %), Salihli-Köprübaşı Junction (231 %), and Izmir-Torbalı segment (205 %). There is a decrease in bus volumes between Karaburun Junction and Çeşme by 49 % (See Figure 7.13).

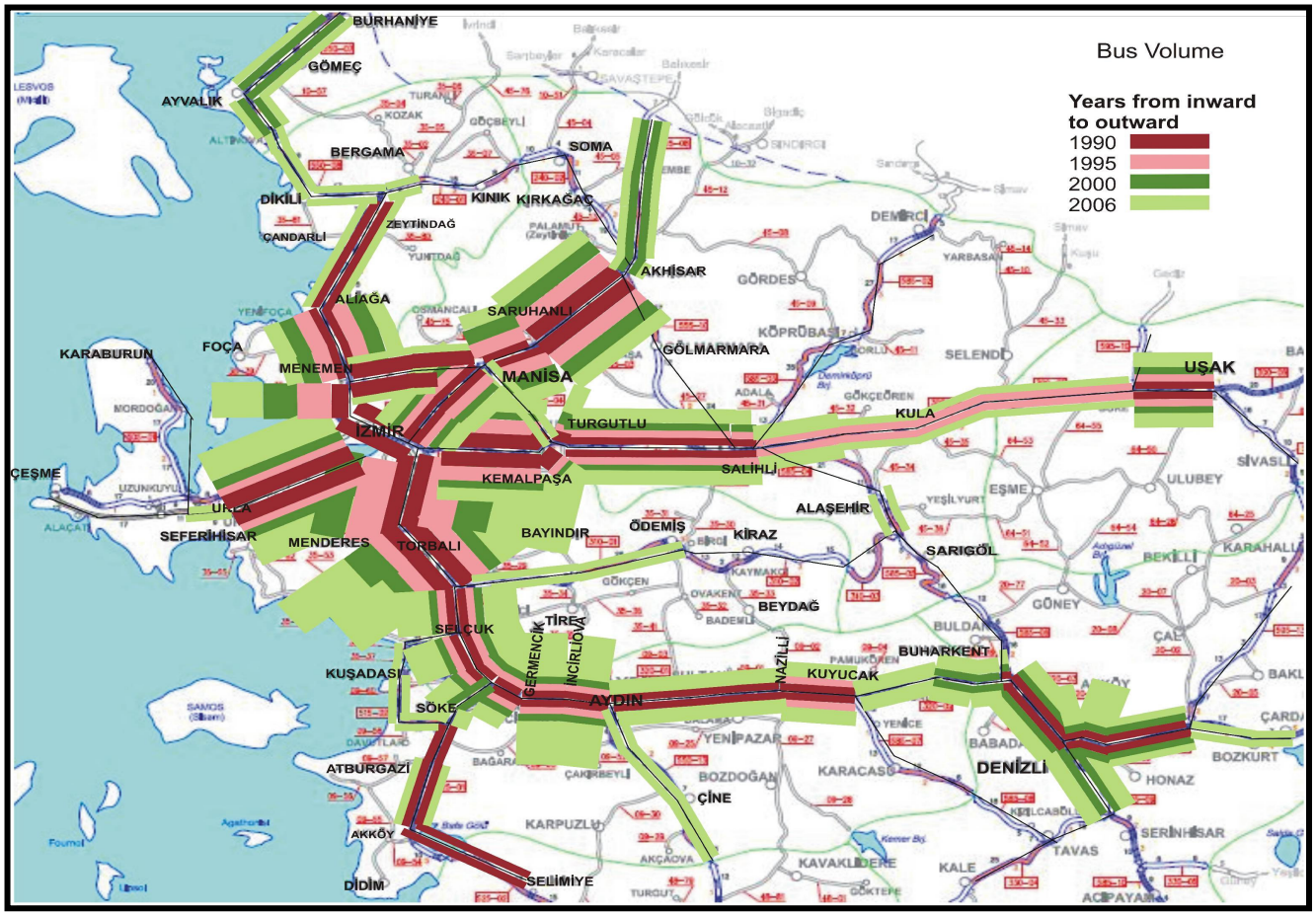


Figure 7.13 The Annual Average Daily Traffic Bus Volumes (1990-2006)

Figure 7.14 The Annual Average Daily Traffic Bus Volume Differences Between Years 1990 and 2006 In Different Corridors In Izmir City Region

Thirdly, annual average daily volume values of **trucks** are observed. In the 1990s, as it can be seen clearly from the Figure 7.15, the truck volumes between Kemalpaşa and (300-02) 2nd Segment, (300-03) 1st Segment and Manisa Junction, Manisa Junction and Turgutlu, Turgutlu and Salihli are significant with values between 4000 and 6000 vehicles/day. Hence, the highest truck volumes are seen in the east corridor of Izmir in year 1990. Then, the truck volumes between Izmir and Menemen, Izmir and Torbalı, Selçuk and Germencik are significant with values between 3000 and 4000 vehicles/day. It can be said that, firstly the east corridor, secondly, the north and south corridor, and lastly the northeast corridor are identified as the lines that truck volumes are high in 1990. Menemen, Manisa, Kemalpaşa with Salihli, and Torbalı can be defined as nodes.

In year 2006, most of the truck volume values in corridors among settlements are seen to have decreased compared to 1990 values. The biggest decrease is in Turgutlu-Salihli road segment with a 49 % ratio and then in Kemalpaşa-(300-02) 2nd Segment (43 %), Aliağa-Zeytindag road segment with a 46 % ratio. On the other hand, between Izmir and Kemalpaşa there is an increase in truck volumes with a 129 % ratio. Besides, there are rises in annual average daily volume values of trucks in Izmir-Torbalı (38 %), Saruhanlı-Akhisar (41 %), Akhisar-Gelembe (47 %), Salihli-Köprübaşı Junction (33 %), Bayındır Junction-Selçuk (60 %) and Urla-Karaburun Junction with a 145 %. As a result, there is a growth of truck traffic especially among settlements in the northeast, east and south corridors (See Figure 7.15).

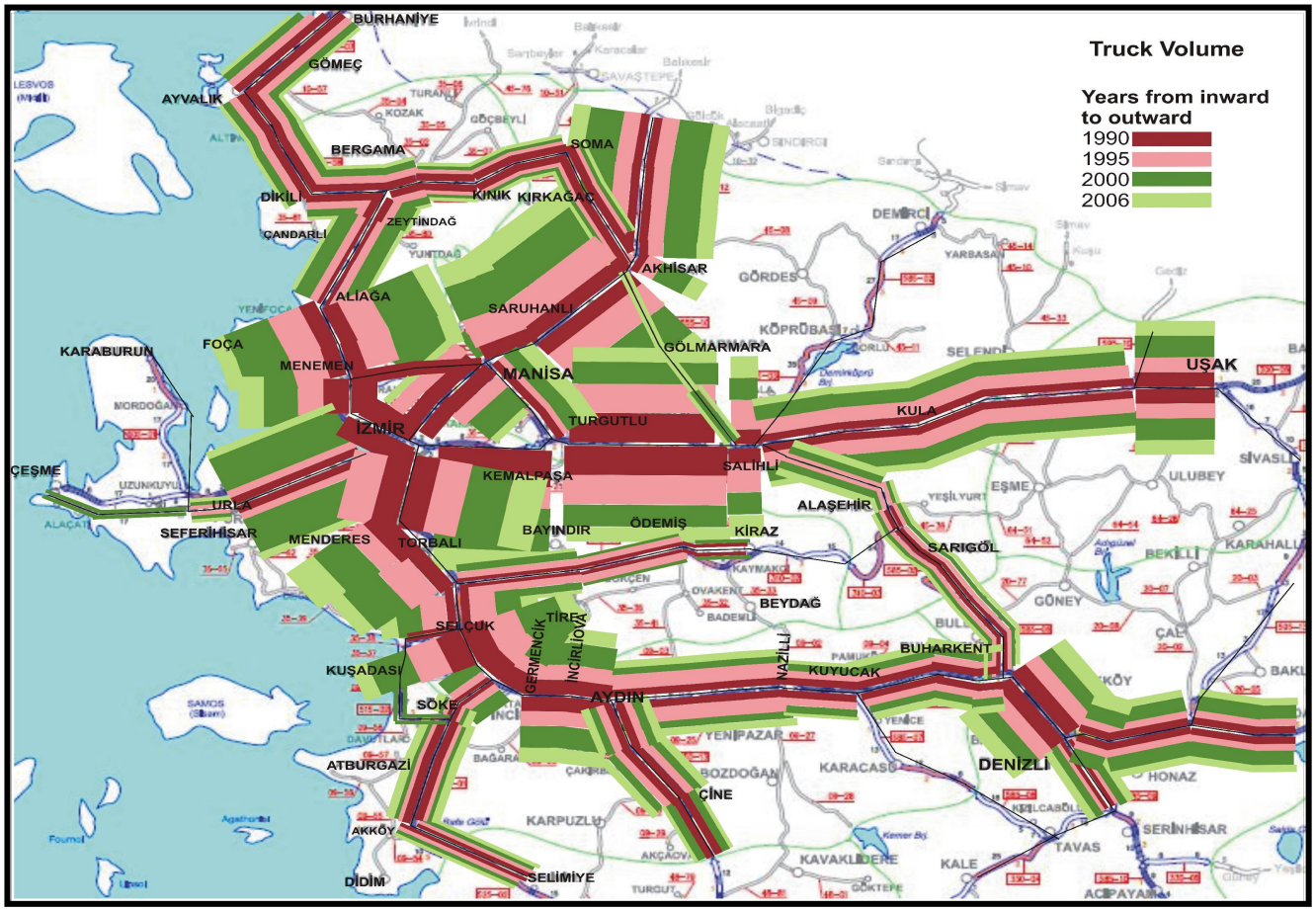


Figure 7.15 The Annual Average Daily Traffic Truck Volumes (1990-2006)

Figure 7.16 The Annual Average Daily Traffic Truck Volume Differences Between Years 1990 and 2006 In Different Corridors In Izmir City Region

The factors behind this transport schema can be explained with industrial developments in the defined nodes. For instance, Kemalpaşa Industrial Estate was opened in 1990 and Kemalpaşa has a high potential of industrial activity. Besides, Manisa, in the regional development process, has been specialized in high value-added products rather than labour-intensive sectors (Eraydın 2005). After Manisa Industrial Estate's 1st Part had reached to 90 % occupation ratio in year 1986, the Estate's 2nd Part was started to be settled. In the end of year 1991, it was opened (Official Website of MOSB: http://www.mosb.org.tr Tarihce.asp, Last accessed date: January 15, 2008). In Gaziemir in the South of Izmir, there has been Free Trade Zone (ESBAS) since 1989 (Eraydın 2005).

Actually, as Yılmaz and Kelek (2004) stated, it can be said that Izmir city center has interactions with the other Focal points or nodes in the city-region through ***corridors*** and Izmir city center, where those corridors gathers and ends, is the most powerful Focal point of the city-region. It can also be said that in Izmir City Region, there are some ***nodes (Focal points)*** through which the city region makes interactions in itself and with the other regions. These transport Focal points have been discussed as the settlements among where traffic volumes are intensified and it can be seen that these ***transport nodes*** overlaps with the ***industrial Focal points*** of the city-region.

In order to see the intersection of industrial and transport nodes, firstly, industrial structure of Izmir City Region can be observed. As it has been discussed earlier, while Law No. 5216 in 2004 enlarged the boundaries of Greater Izmir Municipality to a 50 km radius area, studies (Eraydın 2005, METU 2005, METU 2006) defined the boundaries of Izmir City Region larger than the legal borders, including Aydın and Manisa. It is stated by Eraydın (2005) that, due to the changing economic structure, rising flows of interactions and some government policies, Izmir has been transforming *"**from a metropolitan core with a large hinterland to a polycentric urban region with a metropolitan area and rapidly growing cities in close proximity**"* (Eraydın 2005). Eraydın emphasizes that this transformation from a monocentric structure to a polycentric structure has been ensured by developing industry in Izmir Region with the support of infrastructure and investments. Izmir and Manisa are referred as main industrial modes in Izmir City Region. After the 1990s, with the encouragement of the Central Government, many **new industrial**

estates have been established and they have become new nodes of industrial development that are growing with their hinterlands. They also caused the dissemination of industrial activity from the core to the cities in close proximity. All of these developments supported the emergence of polycentric urban region (Eraydın 2005).

In the Figure 7.17, important industrial nodes in the city-region are presented. The bigger circles symbolize the most important industrial nodes in the city region. The industrial estates specialised in certain activities in Izmir City Region are: Izmir Ataturk Organized Industrial Zone (1976), Tire OIZ (1993), Odemis OIZ (1994), Bergama OIZ (1997), Kınık OIZ (1997), Aliağa OIZ (1997), Aliağa Petkim OIZ (1998), Aliağa II OIZ (1999), Menemen OIZ (1999), Kiraz OIZ (1999), Torbalı OIZ (1996), Torbalı II OIZ (2000), Bayındır OIZ (2000), Buca OIZ (2000), Kemalpaşa OIZ (1990), Manisa I OIZ, Manisa II OIZ, Sererihisar OIZ, Aydın OIZ, Söke OIZ, Turgutlu OIZ, Salihli OIZ, Akhisar OIZ (1991), etc.

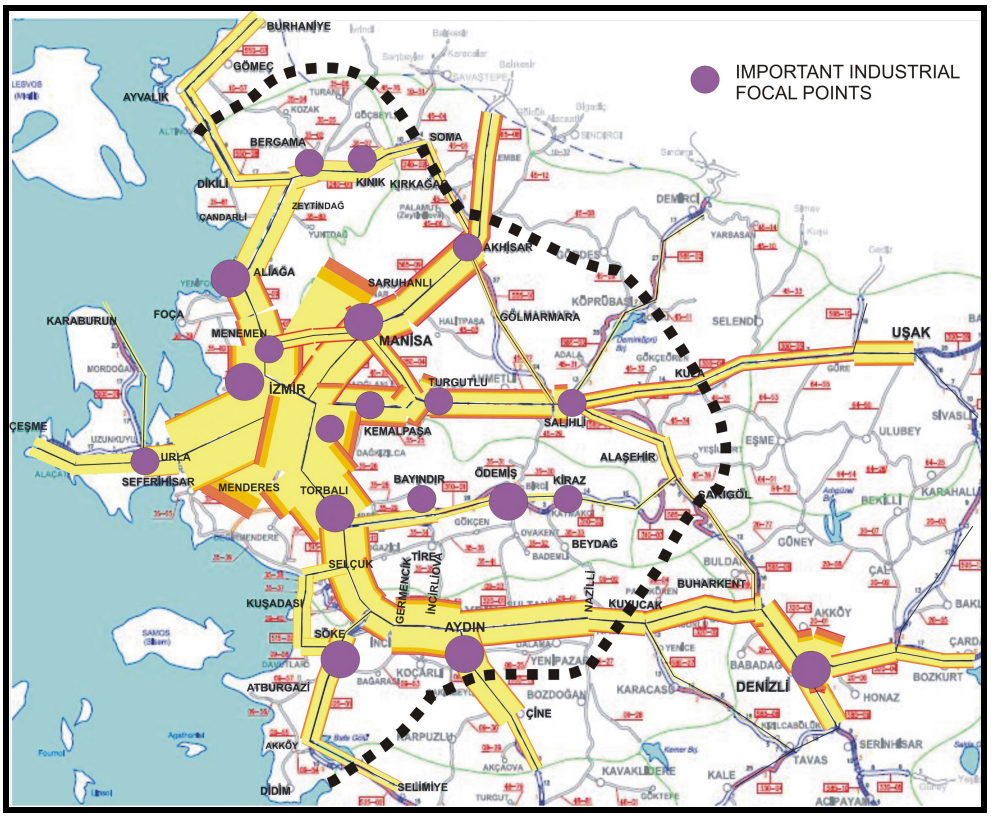


Figure 7.17 Important Industrial Nodes InThe Izmir City Region's Sphere of Influence
(Source: Developed referring to explanations by Eraydın 2005, and Yılmaz and Kelek 2004)

Secondly, the transport nodes can be observed. As it will be discussed later, the Greater Izmir Municipality has prepared a 1/25000 scaled development plan for New Izmir Metropolitan Area (See Section 6.4.2). It has been called the Izmir City Region Master Development Plan. Some of those nodes are referred as sub-centers of the sub-regions of Izmir City Region in ICRMDP (IzGM 2006). These sub-regions are Central City, Northern Urban Development Sub-Region, Eastern Urban Development Sub-Region, Southern Urban Development Sub-Region, and Western Urban Development Sub-Region. These sub-regions emerged through five corridors. According to ICRMDP, the spatial effects of many industrial, economic, financial, service, and social sectors, etc. have been concentrated in ***five corridors*** that are formed by;

- Menemen, Aliağa in the North;
- Kemalpaşa, Turgutlu, Manisa in the East;
- Torbalı, Bayındır, Tire in the Southeast;
- Seferihisar, Menderes in the South; and
- Urla, Çeşme, Karaburun in the West

These corridors are not the same with but resemble to the five transport axes that have been defined in Section 7.1.3.1. It can be seen that these identified corridors also coincides with the corridors where the traffic volumes are intensified. The important transport nodes that have been determined through the volume values can be seen in Figure 7.18.

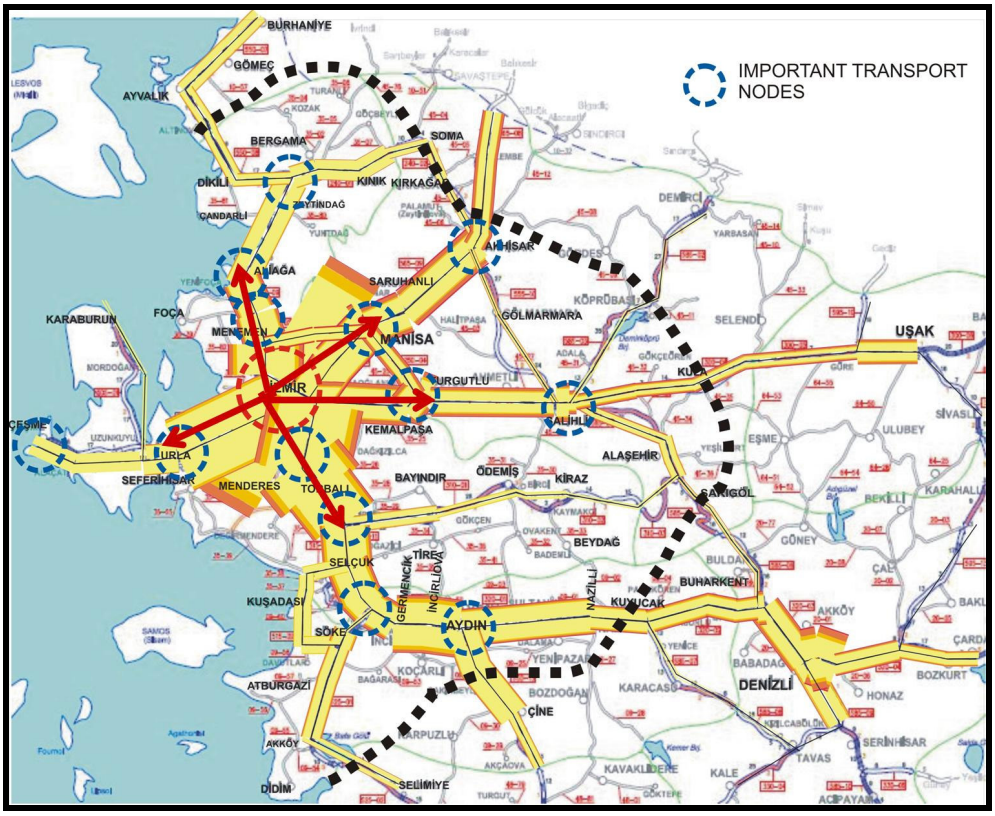


Figure 7.18 Important Transport Nodes and Corridors in the Izmir City Region's Sphere of Influence

As a result, it can be seen that the highest increase is in the car traffic values. Accordingly, it can be said that usage of car, which is an urban transport mode, has been spreading and increasing to the regional extent and that from year 1990 to 2006, the biggest component of the traffic in the corridors of Izmir City Region is the automobile. However, as is known, this transport schema constitutes trouble for sustainable transport perspective. Moreover, as this tendency does not go beyond the Izmir City Region's 'sphere of influence' that is formed through settlements that are defined as 'nodes' (meaning that both the traffic and the car ratio in this traffic decrease beyond these nodes) decrease, it can be said that this result emanates from city-region growth.

The figures (in Section 7.2.1 and 7.2.2) reveal important findings: First of all, considering that there are daily average traffic volumes, it is clear that traffic is increasing significantly along certain corridors, which connect the main settlements (nodes) of the city-region. The fact that traffic volumes fall sharply after a certain point in all these corridors, almost to the levels of 1990 traffic volumes, is a proof that the increase in traffic in these corridors is not merely a result of natural growth in traffic (due to increase in vehicle ownership and usage) (See Section 7.2.3). In the past ten years (from 1995 to 2006), traffic volumes increased by almost 50 % in many of the corridors mentioned above, representing significant traffic growth in the city-region. This vast growth in traffic, centering around the metropolitan core of Izmir, is clearly a problematic trend in terms of transport sustainability, resembling transport/traffic problems of South-East England Mega-City Region with its dominant metropolitan core in London suffering severely from traffic congestion and emissions.

7.2.3. Changes in Car and Motor Vehicle Ownership in Time (1994-2006)

When the car and total motor vehicle ownership graphs (vehicle numbers per 1000 population) are observed, it can be seen that an important increase has been experienced between 1996 and 2000, followed by a rather stagnant trend until the 2003, and that after 2003, the rate of growth in ownership levels started to increase again. The main factor behind this rapid change can be explained with the severe

economic and political crisis that Turkey experienced in November 2000, and again in February 2001(Yeldan, 2006) (Figures 7.19, 7.20, 7.22, 7.23, 7.24).

In order to understand the changes in the transport system of Izmir City Region, first, it is important to discuss the changes of prior to and after the **2001 crisis** (1999-2003[46]) in Turkey. The value of Gross National Product (GNP) decreased with a 9,4 % ratio compared to one previous year. In **year 2001**, the stagnation in the domestic market affected each sectors completely (Fırat, 2002). In March 2001, the banks and financial institutions stopped to give consumer credits and then the sales in the automotive (motor vehicle) industry decreased in a large amount in all year. However, after a new arrangement of the taxes in the beginning of year 2002, the automotive sector entered a growing trend in March 2002 (Oğuz in Fırat, 2002). Tezer (2004) emphasizes that, after the crises in 2001 and 2002, with the management of political and economical stability, there was a reliable environment that provided the rise in demand again. Besides, the rise of the sales in the sector was caused also by the fall in the inflation and interests. In parallel with the decrease in real interest rates, the consumer credits presented to the consumers in better conditions raised both the sales and the rate of sales with credits.

[46] In 1999-2003 period, the IMF has been involved with the macro management of the Turkish economy and provided financial assistance of $20.4 billion, net (Yeldan, 2006).

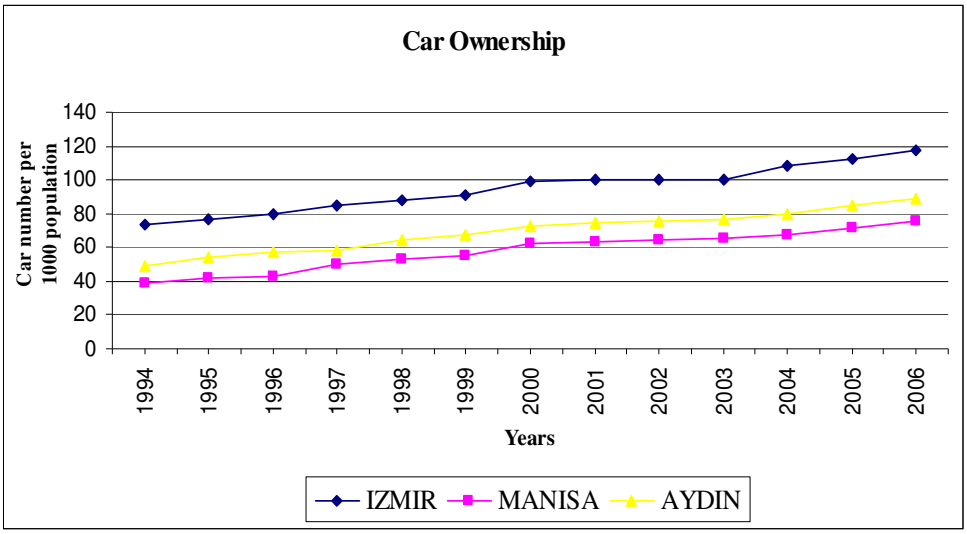


Figure 7.19 Car Ownership Values
(Developed referring to TUIK[1], 2007; TUIK[2], 2007; DPT, 2002)

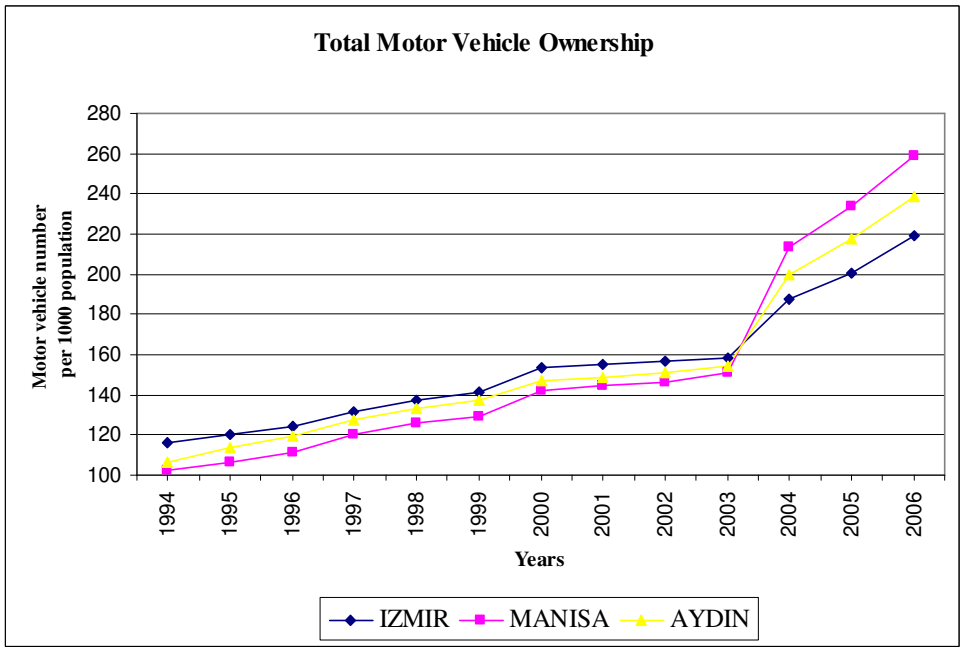


Figure 7.20 Total Motor Vehicle Ownership Values
(Developed referring to TUIK[1], 2007; TUIK[2], 2007; DPT, 2002)

In addition to these positive improvements, in **year 2003,** after the arrangements of the Government to provide the 'private consumption tax' reduction for junked auto, there was seen a 20 % increase in the **demand,** especially in the private car sales. While in year 2002, the total market fell to 175 000 vehicles in number, in 2003, it increased to 395 000 in number (Tezer, 2004).

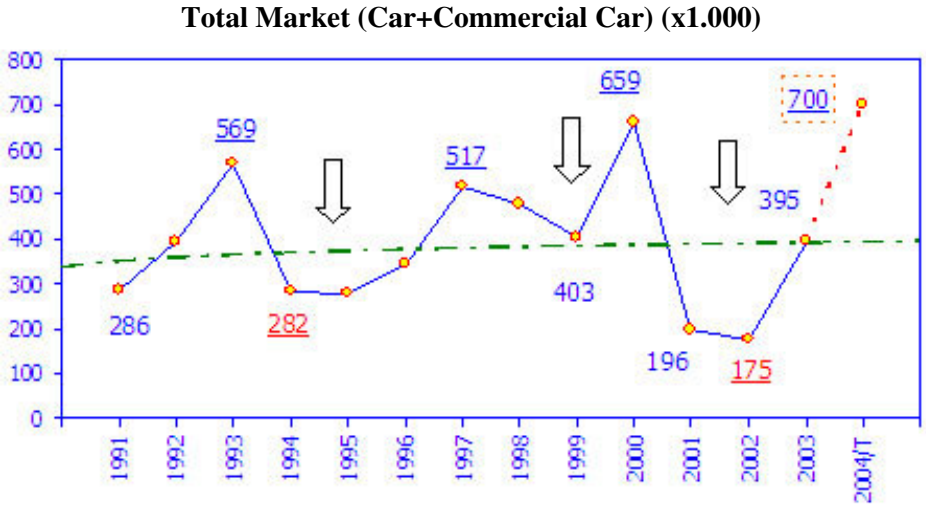


Figure 7.21 Total Demand in the Market Between 1991 and 2004
(Source: Tezer, 2004)

With the growth of the market, the production also increased. With **year 2003**, the production of total motor vehicles was 562 000. In addition to the revival in the domestic market in year 2003, the export rates and total motor vehicle production increased and car production increased with a rate of 44 %. However, when the ownership graphs are examined, it can be seen that the rise in the ownership levels continue to increase but with a decreasing acceleration after year 2004. This can be explained with the increases in the automobile taxes in succession and with the removal of incentives proposed for junked autos partially in year 2004 (Tezer, 2004). As a result, the radical rise in the ownership levels after year 2003 can be explained with the events in the period after 2001 crisis.

It will also be useful to compare the car ownership and total motor vehicle ownership graphs with each other (See Figures 22, 23, 24). The crisis effects can be

seen in both graphics. For instance, in the period between 2000 and 2003 (crisis), in the car ownership graph, car ownership rates do not increase (stagnation period) while in the total vehicle ownership graph, the rate of increase is very small compared to the rate before year 2000. Then after year 2003, after the crisis, in both of the graphs, there is a rise compared to the previous period. However, in total vehicle ownership graph, the rise is sharper, meaning that the increase rates of some other vehicles are much higher than the rate of car ownership. Besides, in total motor vehicle graph, Manisa's ownership level is higher than Aydın and Izmir after year 2003. In order to understand the causes of this scheme, the change in motor vehicle numbers of each city, especially after year 2003, can be discussed. It is also important to state that the population does not show a radical change in each city between years 1994 and 2007, according to population estimates of middle of year for each city provided by State Statistical Institute.

First, the stagnation period in 2000-2003 can be seen in each mode of vehicles in each city graphs. The rapid boom period after year 2003 can also be seen in each mode of vehicles in each city graphs. Car and motorcycle are private transport vehicles. In Izmir, the rise in number of cars is 10 % between 2003 and 2004. However, in Aydın and Manisa, the rise in number of cars is approximately in the same rate with previous years. In Aydın, the rise in amount of motorcycles is 11 % while in Manisa the rise in amount of motorcycles is 19 % between 2003 and 2004. The increase in the number of this type of vehicles may be due to the growth in the economy and new developments in the automotive (motor vehicle) industry after 2001 crisis (as discussed in detail above). Moreover, the increasing interaction among settlements and the spatial growth in Izmir City Region may be effective in this growth.

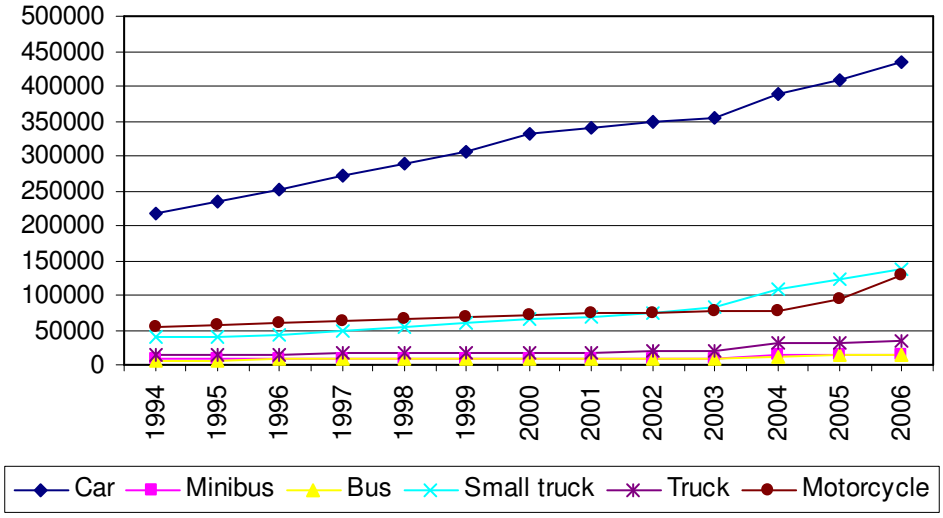


Figure 7.22 Izmir Motor Vehicle Numbers
(Developed referring to TUIK[1], 2007; TUIK[2], 2007; DPT, 2002)

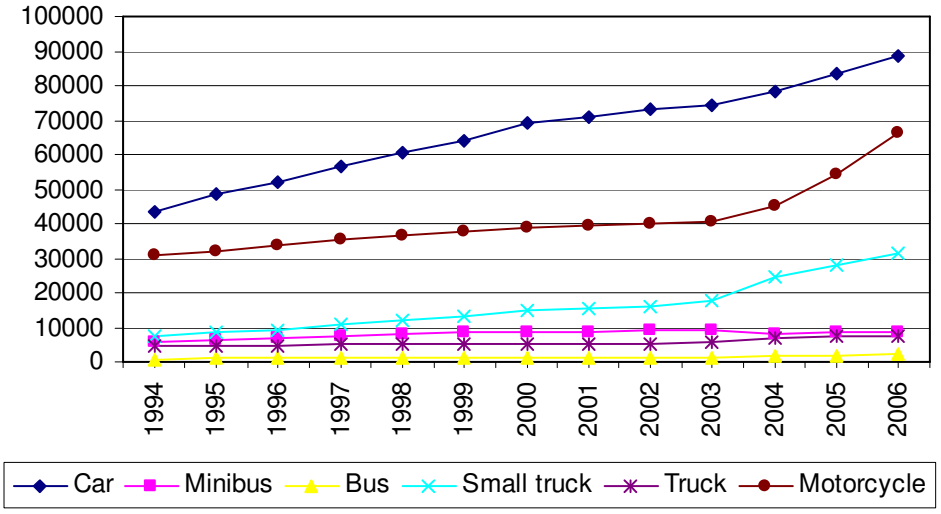


Figure 7.23 Aydın Motor Vehicle Numbers
(Developed referring to TUIK[1], 2007; TUIK[2], 2007; DPT, 2002)

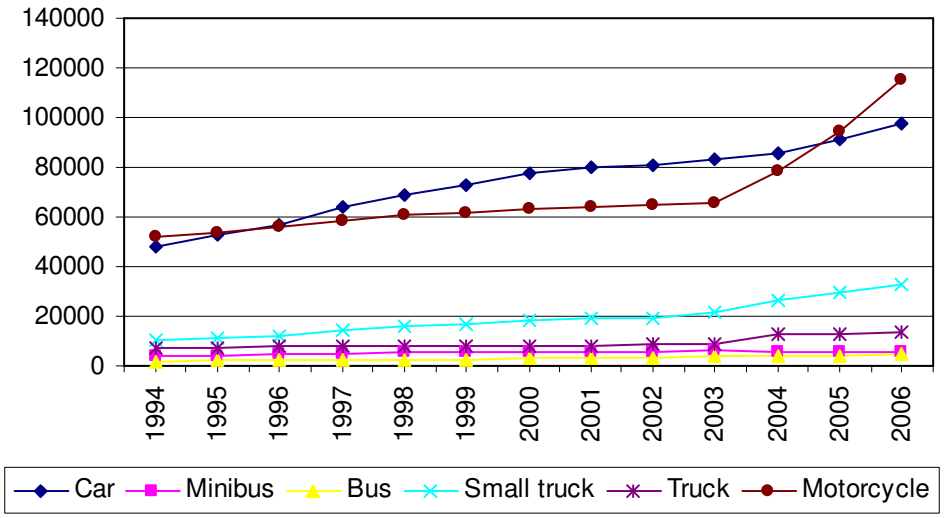


Figure 7.24 Manisa Motor Vehicle Numbers
(Developed referring to TUIK[1], 2007; TUIK[2], 2007; DPT, 2002)

Moreover, among the other modes of vehicles, especially the small truck and truck numbers show rise in numbers after 2003. In Izmir, the rise in amount of small trucks is 30 % and of trucks is 59 % between 2003 and 2004. In Aydın, the rise in amount of small trucks is 38 % and trucks are 28 % between 2003 and 2004. In Manisa the rise in amount of small trucks is 24 % and trucks is 40 % between 2003 and 2004. These increases in these modes can be explained with the increase in flow of goods among settlements with increasing interactions among settlements in Izmir City Region. Besides, Izmir City Region's economy is highly dependent on industry and there are many industrial estates in the region. After year 2003, the favorable conditions in the economy may have affected these areas and so the flows among settlements. For example, in year **2003**, Manisa Industrial District's third part has also reached to 100 % land fullness ratio (Erdemli, 2004).

7.2.4. Conclusion

In conclusion, it can be said that due to many changes, there has been significant increases in interactions among settlements and it may be said that the 'sphere of influence' of Izmir City Region has been enlarged. This is mainly due to the

significant economic changes that have been experienced in Izmir City Region since the 1990s. Moreover, in the Izmir City Region, many industrial estates were developed and opened; improving settlements and making them become a node. In addition, with the introduction of New Izmir Metropolitan Area, the interactions and so the traffic flows between settlements have increased and some sub-regions with some sub-centers have emerged. Hence, its urban form has transformed from being a monocentric form with a powerful center into a polycentric urban form with the development of many self-sustaining and multi-functional cities, which has its reflections in the traffic volumes in the region.

Actually, Izmir City Region's polycentric urban form resembles South-East England Mega-City Region (See Section 5.5.1). As it will be discussed later in detail in Section 8.1.1, Izmir City Region can be given as an example to regional polycentricity with a strongly developed 'sphere of influence' that exists around Izmir city center and covers 46 settlements, some of which are defined as sub-centers or nodes along corridors emanating from the center.

The main centers (nodes) within this polycentric form can be identified generally as Aliağa, Menemen, Manisa, Kemalpaşa, Turgutlu, Menderes, Torbalı, Aydın, Söke, Urla, and Çeşme, while Izmir remains the metropolitan core, where traffic intensifies significantly. These sub-centers lay along corridors and they can also be referred as transport nodes as the vehicle volumes are intensified in these corridors. Besides, these transport nodes are also the points where industrial activities are gathered. Among the drawn figures, the figures for 2000 and 2006 clearly show the corridors of interaction (or functioning) between the settlements of Izmir City Region: Izmir-Torbalı-Selcuk-Aydın corridor in the south and southeast reveal an important corridor with high amounts of traffic. Izmir-Manisa-Akhisar in the northeast and Izmir-Menemen-Aliağa in the north also have significant volumes of traffic. Izmir-Urla section in the west, although representing a more urban link, reveals an important corridor of interaction and traffic.

ICRMDP also supports these findings. According to ICRMDP, the spatial effects of many industrial, economic, financial, service, and social sectors, etc. have been concentrated in ***five corridors*** that are formed by

- Menemen, Aliağa in the North;
- Kemalpaşa, Turgutlu, Manisa in the East;
- Torbalı, Bayındır, Tire in the Southeast;
- Seferihisar, Menderes in the South; and
- Urla, Çeşme, Karaburun in the West

It has been found that these corridors are not the same with but resemble to the five different transport axes that have been defined in Section 7.1.3.1 and covers

- In the North, there is the Menemen-Aliağa road
- In the Northeast, there is Izmir-Manisa road
- In the East, there is Kemalpaşa-Turgutlu-Salihli road
- In the South, there is Torbalı-Selçuk road
- In the West, there are Izmir-Çeşme and Izmir-Karaburun roads (Section 7.1.3.1)

It has also been found that these identified corridors coincide with the corridors where the traffic volumes are intensified. The important transport nodes that have been determined through the volume values can be seen in Figure 7.17, 7.18.

The traffic analysis showed that corridors between the main nodes of the city-region experienced significant growth in traffic. The fact that traffic levels decrease sharply after these nodes (outside the city-region) verifies that the increase in traffic is due to the city-region development and its inevitably increased interactions between nodes. While increased interaction and mobility can have positive aspects in terms of economic functioning of city-regions, it was stated in this study that they are likely to result in increased motor traffic and emissions, increased travel distances and increased car usage. In addition to the increased motor traffic levels in the city-region, the traffic volume maps indicate significantly longer distances, as well as a vast increase in car usage. Although it is not straightforward to claim to interpret these findings as pointing an unsustainable trend in transportation, the increased interactions, increased car usage, and motor traffic levels, all show that there is a possible problem area in Izmir City Region. The traffic analysis also reveal results that resemble the problems experienced in South-East England Mega-City Region where traffic problems intensified in and around London as the metropolitan core of

the urban-region. It was seen that Izmir metropolitan core might have a similar fate with London in terms of traffic intensity.

As a result, as it was stated in the introduction part (Section 7.2), this section aimed to answer one of the three main research questions referring to the first part of the hypothesis: *"Are the traffic values of the selected city-region showing a sustainable or an unsustainable growth pattern in terms of transport in time? (To what extent such unsustainable traffic growth can be explained with city-region development, and to what extent can such growth be seen as a result of the natural increase in car ownership and usage)"*. Regarding this main question, other questions related with the first defined objective, which were *"to assess the results of the analysis done with the traffic data of the selected city-region in order to see whether there is a tendency towards an unsustainable growth pattern in the city-region"* were answered.

It may be deducted from the results of this section that in Izmir City Region, there may be a tendency towards an unsustainable transport, with much increased traffic levels and car-usage within the city-region, particularly intensifying around the metropolitan core. Therefore, the findings from Izmir Case supports the first part of the hypothesis of this study to a certain extent. At this point, the land-use and transport planning policies of especially the Greater Izmir Municipality and then the other municipalities in the city region become very significant. The planning and decision-making authorities' attitudes towards a sustainable development with sustainable transport priorities are crucial. Regarding this claim, in the following chapter (Chapter 8), the planning and transport policies, land-use and transport plans (if available), targets, and general attitudes of the municipalities towards sustainability in Izmir City Region will be questioned.

CHAPTER 8

EVALUATION OF TRANSPORT AND LAND-USE PLANNING APPROACHES IN IZMIR CITY REGION

In the past, cities occupied limited areas and remained mostly compact and small in size. Particularly with the introduction of cars, cities started to experience expansion of urban land uses for several purposes such as residential, industry, etc. This situation made the city to become a center for distribution of goods and services, and gave rise to increasing complexity of the social, economic, and spatial structure of the city with its hinterland. In the past, the absence of rapid transport necessitated a concentrated urban form with **centripetal forces.** Today, with rapid and affordable transport modes, the activities, which were intensified in the city center before, have dispersed over a large extend with **centrifugal forces.** Then, the modern city form has transformed into a postmodern city form with a group of **interrelated towns** and **satellite settlements**. Therefore, as cities should be considered with their hinterland in terms of geographical, administrative, and functional aspects, the relations of the cities with their surrounding settlements have been redefined. With the great transition from industrialization to knowledge-intensive business services, there has been a transition from **regions** to **city-regions**. The concept of city-region is defined with the regional extensions of some specific associations within the city and these associations are determined with ***transport facilities, the density, and the movements of the population*** (Dickinson 1964, Scott *et. al.* 2001, Harrison 2007, Priemus and Hall 2004, Soja 2005, Headicar 2000). All of these processes can also be seen in the growth of Izmir City Region and as Eraydın (2005) states, there should be some new planning approaches and policy coordination among the decision-makers in such a new territorial development area.

As it has been stated in the Methodology Chapter, the second main question of the thesis is as follows:

Is there an awareness of the significance of sustainable urban development and transport (particularly in environmental terms) in the selected city-region's and its settlements' land-use and transport planning approaches?

This question depends on another main challenge of the city-regions for managing sustainable transport. In the city-region literature, there is inevitably a significant emphasis on the economic benefit of an urban region functioning as a sum of various economic nodes. Improving the region's economy through a well functioning, cooperating, and complementing nodes and sub-centers is probably a major objective for regional polycentricity, as well as distributing economic gains equally over the region's various centers and sub-centers. While economy is also one of the main pillars of sustainability, the multi-nodal spatial development is in fact more interested in environmental gains (through reductions in the need to travel and hence traffic and emission levels). This appears to be an important area of possible conflict between city-region debates and sustainability debates: whether environmental sustainability objectives and a significant **awareness** of the issue that can surpass economic objectives may be a controversial issue for city-regions that aim at becoming global actors in the world economy.

Hence, the aim of this section is to find answers to the questions of the 2nd objective, which is defined based on the second main question above and which refers to evaluate the awareness of sustainability in the selected city-region and its settlements. Regarding this objective, firstly the *awareness of sustainability in urban planning* will be assessed and secondly the *awareness of sustainability in transport* will be assessed in observed settlements, in which interviews were made, in Izmir City Region.

It is important to indicate that while answering the questions related to second main question about assessing awareness; the thoughts, views and attitudes of decision-making authorities for transport and land-use planning in the related municipality in Izmir City Region will be discussed based on mainly plans (if available) and then interviews. Besides, the data obtained from some of the municipalities (particularly Aydın and Çesme) is limited both in terms of answers given to the interview questions and in terms of plan reports that can be got.

8.1. Awareness of Sustainability in Urban Planning

8.1.1. 1 / 25000 - scaled Izmir City Region Master Development Plan (2006)

As it has been mentioned in Section 6.4.1.1., in year 2004, with Law No. 5216[47], Greater Izmir Municipality's New Area, which is circumscribed with **50 km radius**, has been introduced. The New Izmir Metropolitan Region (Izmir City Region with 19 counties) consists of more settlements than older Izmir Metropolitan Area (with 9 counties). Hence, in order to improve, orient, and control spatial development processes in this city-region with planned interventions, planning should be handled with a holistic[48] approach. This approach refers to making plans with considering whole interactions between city center and the city region. With respect to this approach, 1 / 25000-scaled Izmir City Region Master Development Plan has been prepared (IzGM 2006, 68-69).

Before starting to evaluate this Plan, it is important to note that the 'Izmir City Region' mentioned in ICRMDP, which consists of 19 municipalities and is also referred as 'Izmir New Metropolitan Area' should not be mixed up with the 'Izmir City Region', which is used specific to this study and consists of 46 settlements (See Figure 8.1).

a. Reference to Sustainability

a.1. Main Idea of Sustainable Development

It is important to emphasize that the main objective of the development plan is to prepare 'New Izmir City Region' for a *sustainable* future with enabling modern and confident life conditions that have strong social and economic infrastructure which guarantee the future for all parts of the society (IzGM 2006, Preface). From this point of view, throughout the whole plan, it can be said that *sustainability* is considered as an important target to be achieved by several planning approaches.

[47] Law No: 5216 = Greater Municipality Law that passages into law in year 2004.
[48] The meaning of *holistic* here is focusing on the connection between parts of a whole comprehensively (Babylon Online Dictionary).

Whether this includes a sufficient emphasis on sustainability in transport, which is the main focus of this study, is to be further explored below.

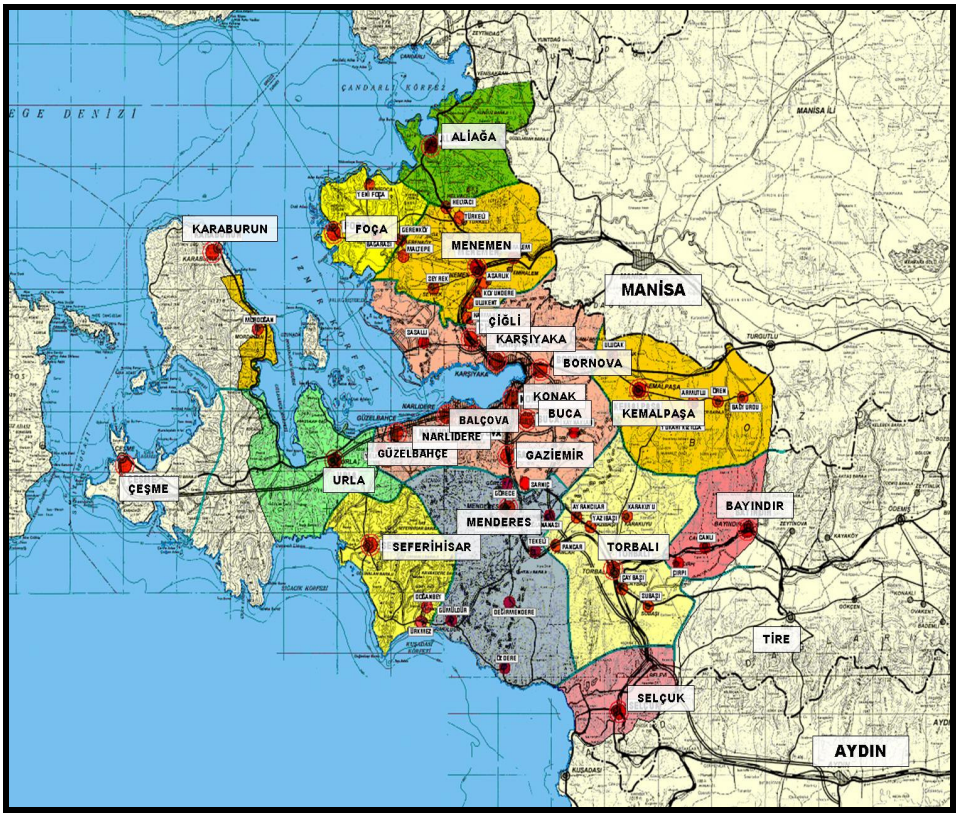


Figure 8.1 Izmir City Region Borders That Are Defined In ICRMDP With Reference To Law No.5216
(Source: Izmir Greater Municipality 2006, 69)

a.2. Three Dimensions of Sustainable Development

In the '*Introduction'* part of the plan, it is highlighted that Izmir's growth with migrations and urbanization affects Izmir's peripheral settlements beyond Greater Municipality borders. Therefore, "there is a need for a detailed development plan that covers all the settlements in the domain",[49] in order to solve the problems

[49] The meaning of *domain* here is the circle where the effect is seen (Babylon Online Dictionary: http://www.babylon.com/, Last accessed date: January 13, 2008).

coming with migration and urbanization; to redefine socio-economic and spatial aims; to guide investments in a planned way; to develop infrastructure and serve it rationally; and in this way to *sustain planned growth* in Izmir City Region. These phrases also overlap with the main ideas of sustainable development.

In the plan, it is also stated that with some empirical tests, it has been proved that Izmir's population growth speed has decreased. Hence, the main problem of the plan is described as not to plan how, how much and in what direction Izmir city center and other city region's settlements will grow. The problem is "how to implement the *sustainability*, *viability, and fairness* principles and so how to create healthier, safe, and high-performance city region" (IzGM 2006, 71-72).

In conclusion, it can be said that the **three dimensions** of the sustainability, environment, economy, and society, are paid attention throughout the Plan. For a sustainable development to be achieved, not only environmental but also two other aspects should be considered (See Section 2.1.). The plan also proposes improvement in three dimensions. The plan aims cooperation among each parts of the society, increasing the quality of life for all, conserving the nature and a planned growth for the future.

a.3. Social-Economic-Ecological Objectives

There are some phrases in several parts of the plan that promote sustainability or sustainable development. For example, in the ***'ICRMDP's Visions'*** part (IzGM 2006, 77), some of the visions for Izmir City Region are;

- Ensuring an environment where all urban and rural societies are in *assurance, healthy, accessible* and are included in the process,
- Generating several employment opportunities and supply of *qualified* infrastructure and services,
- *Sustainable* and well-designed growth that considers the region's historical and agricultural heritage,
- Urban and rural areas that support each other and *collaborate* with each other for the welfare of the society,

- Preserving, appreciating and giving importance to *ecologically and culturally* important landscapes,
- Making accessible every green open-spaces for all parts of the society *equally*

Among these visions, particularly the one about "sustainable and well-designed growth that considers the region's historical and agricultural heritage" suggests an awareness and focus on the potential problems of uncontrolled growth, and on the need to plan and design growth to prevent sprawl in agricultural areas.

In another section, the ***'ICRMDP's Targets'*** (IzGM 2006, 78-80), the plan's most important **communal target** is stated as to present *a democratic atmosphere* where different human beings can find the opportunity to express themselves. Besides, the plan's most important **economic target** is to increase the portion of income and to carry out investments for generating new job opportunities in the New Izmir Metropolitan Area; but without contradicting with *main ecological elements*. Lastly, one of the **spatial targets** of the plan is to circumscribe both the city center and the peripheral settlements' growth with **green belts/zones**. These can also be interpreted as significant emphasis on environmental sustainability and on urban sprawling as a major threat.

Table 8.1: ICRMDP's Policies for Sustainability

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)		ICRMDP
(a) Reference to Sustainability	(a1) Main Idea of Sustainable Development	✓
	(a2) Three Dimensions of Sustainable Development	✓
	(a3) Social-Economic-Ecological Objectives	✓

b. Macro-Scale Urban Planning Policies

Before looking into 1 / 25000 - Scaled Izmir City Region Master Development Plan's planning principals for spatial development of Izmir City Region, it is

important to discuss the Plan's inferences about the existing land-use schema in Izmir. Afterwards, the components of the problem that the Plan puts forward in order to solve with planning will be discussed. Lastly, the Plan's macro-scale urban planning principles will be disputed.

Izmir controls a city region that exceeds today's legal greater municipality borders in **50 km radius**. The population change analyses show that a region with approximately **90 km radius** grows up with the effect of Izmir. According to ICRMDP (IzGM 2006), the spatial growth of the city-region have been concentrated in ***five corridors*** that are formed by Menemen, Aliağa in the North; Kemalpaşa, Turgutlu, Manisa in the East; Torbalı, Bayındır, Tire in the Southeast; Seferihisar, Menderes in the South; and Urla, Çeşme, Karaburun in the West. Therefore, the master development plan analysis studies have been done in the city region with a 90 km radius at the 1/100 000 scale by the municipality authorities[50] although the legal border was drawn with a 50 km radius. The area at 1/100 000 scaled maps was restricted by Çandarlı in the North, Turgutlu in the East, Çeşme and Karaburun in the West. For example, according to Dayangaç, without regarding the project that proposes a harbour in Çandarlı, making plan will be inadequate. She also emphasizes that it was a necessity to make data collection in the whole region (Dayangaç 2007, 4 December; IzGM 2006, Introduction, 1, 68).

This is a positive approach in terms of city-region perception of the municipality authorities, because only to draw a 50 km radius from the city center and announce it as Izmir City Region cannot be acceptable and is a controversial subject in academic terms, too. This approach also shows that there is a high awareness of the 'city-region' phenomena in Greater Izmir Municipality.

In spatial analysis of Izmir City Region, some **sub-regions** are defined based on the formation of the urban areas' macro form. The entire plan is established upon these sub-regions and planning decisions are made according to this segregation. In order to specify these urban development sub-regions, firstly, a threshold synthesis of the spatial data, which have been collected at the analyzing step, has been done. The factors that mostly affect the formation of the macro-form of the settlements in the city region are introduced as *coastal character, topography, dispersion of*

[50] Housing Department

agricultural areas, the creation and improvement of transport corridors,…etc. These factors are thought as affecting not only development of spatial pattern, but also the socio-economic character of the sub-regions and as causing spatial differences and specializations among these regions (IzGM 2006, 28-29, 57). These sub-regions (or planning regions) are:

- ✓ First, **Central City** that covers Konak, Karsiyaka, Bornova, Menemen, Balçova, Buca, Gaziemir, Cigli, Narlıdere and Güzelbahce central counties;

- ✓ Secondly, **Northern Urban Development Sub-Region** that is defined by Aliağa-Foça settlements;

- ✓ Thirdly, **Eastern Urban Development Sub-Region** that is described by Kemalpaşa-Ulucak settlements (Turgutlu is considered in 90 km radius);

- ✓ Fourthly, **Southern Urban Development Sub-Region** that is formed by Torbalı-Bayındır settlements (Selçuk and Tire are considered in 90 km radius)

- ✓ Fifthly, **Western Urban Development Sub-Region** that is defined by Urla-Seferihisar settlements (Karaburun and Çeşme settlements are considered in 90 km radius). In addition to those sub-regions where urban development is aimed, there is one more sub-region, called **Tahtalı Basin Sub-Region,** where conservation is aimed (IzGM 2006, 28-29, 75, 89).

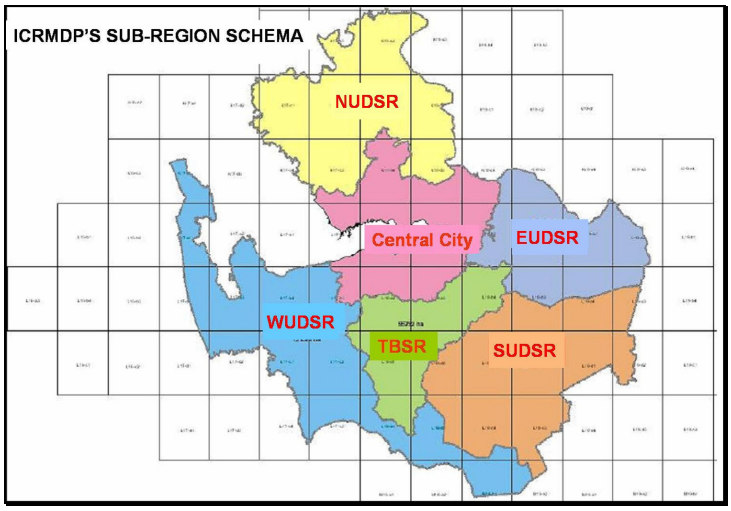


Figure 8.2 ICRMDP's Sub-Region Schema
(Source: Izmir Greater Municipality 2006, 89)

Firstly, all these sub-regions have some specific features. Central City covers all metropolitan districts and there is the concentration of ***metropolitan functions*** in this sub-region. These functions are urban residential areas, central business district, transport services (harbour, airport…), and urban services such as trade, culture, education, health…etc. Secondly, Northern Sub-Region has a rich biodiversity and ecologically sensitive coastal areas. This region is under the pressure of Izmir Metropolitan Area's ***industrial development*** includes strategic industries that are important at the country-scale. Thirdly, Eastern Sub-Region has also rich agricultural potential but in a limited area. As all the settlements are close to the metropolitan city, it is seen as the axis where ***unorganized industry*** is concentrated. Fourthly, Southern Sub-Region's economy is based on agriculture. This region is convenient for physical development and due to the strong highway (with Aydın motorway) and railway links; it is seen as one of the ***industrial development axis***. Lastly, Western Sub-Region has rich agricultural potential and high tourism potential. Because of the effect of Izmir-Çeşme Motorway to accessibility, in this region, the dominance of ***secondary housing*** and the tendency of university development with public institutions are seen (IzGM 2006, 30-31).

The four sub-regions that are radiating from the central city sub-region are shaped by corridors each of which is formed by certain settlements that have different

properties. These corridors have also been defined in 90 km radius area by the plan. As it is mentioned in the plan, these properties originate from various thresholds. Throughout the plan, it is highlighted many times that *"The spatial development of Izmir City is concentrated on* ***corridors*** *or around these corridors that are defined by* ***geographical thresholds*** *and* ***especially by transport axes****"* (IzGM 2006, 68). It is also mentioned that the settlements, which are located at these **development axes**, have underwent changes or improvements not only with their own socio-economic dynamics, but also with Izmir's effect (IzGM 2006, 68). Hence, the plan's inferences about the existing spatial development of Izmir City Region point to one of the sustainable urban form models, **corridor development (radial city)**.

Therefore, the definitions for Izmir in the plan overlap with the definitions of corridor development in Section 3.2.2.1 One of them is; *"****Corridor city development*** *is a focus of growth along linear corridors emanating from the central business district (CBD), supported by upgraded public transport infrastructure, and separated by rural green belts (or "wedges")"*(Newton 2000, 46). In Section 3.2.2.1, linear growth has been referred as a natural growth pattern of the urban regions due to both topographical or ecological circumstances and transportation infrastructure. In the ICRMDP (IzGM 2006, 75-77), the same case is shown for Izmir City Region.

On the other hand, to characterize different sub-regions and their specific settlements with different specialization areas along certain axes, can be thought as similar to multi-centered urban form model. Actually, Izmir's current land-use schema has been formed through the 1973's Plan. 1973's Plan had proposed improvement of some certain settlements along some certain rail lines.1973's Plan can be thought as planning to create some sub-centers especially along public transport routes. However, as it will be shown as one of the problems identified by the new plan, the 1973 Plan's vision could not be realized completely.

There are some **problems** identified by ICRMDP about the current urban form (IzGM 2006). According to Law No. 5216, New Izmir Metropolitan Area's borders have been introduced. This area's most important sub-region is the city center sub-region that is circumscribed by Menemen in the North, Bornova in the East, Gaziemir in the South, and Guzelbahce in the West. This city center has very strong

historical references and has been exposed to very dense development. Hence, in the plan, it is concluded that there is an over- intensified city center and its performance has become very low that cannot satisfy the principles of sustainability, *viability, and fairness,* which are necessary to be succeeded by a settlement system. Then, the **first problem** that the plan will solve is to enable the agglomerated city center to meet the criteria of performance principles (IzGM 2006, 70). Thereby, it can be said that the plan is faced with a compact city center that is deprived of sustainability principles. This shows again that the plan is aware of the importance of sustainability and the possible negative aspects of the extremely compact city development.

According to the Plan, the **Central Business District role** of Izmir City Center could not enable the development of the adjacent settlements as strong sub-centers at the regional scale. Besides the geographical position proximity, the dispersion of economic relations and administrative, financial, service functions cannot be enough for the development of strong sub-centers outside the greater municipality borders (IzGM 2006, 34). In other words, the city-region is under the pressure of an intensified center with some decentralized urban functions that are not enough to make the sub-regions self-sufficient completely (IzGM 2006, 69). Between the sub-regions and the city center, there are strong transport linkages and a green belt that should be preserved (IzGM 2006, 75). Therefore, multi-centered city model cannot be seen in Izmir City Region now.

The **second problem** identified by the plan is described as leapfrogging (fringing) issue (See Section 3.1.3.2). This peripheral leapfrogging is defined as the uncontrolled development processes of the hybrid region that take place out of the city but adjacent to it. The plan states that the periphery of the Izmir city center, in which development for housing, industry, warehousing, and tourism take place, experiences a leapfrogging period. Moreover, it gives the example that in the peripheral area between Guzelbahce and Seferihisar there is a fringing for housing aims (IzGM 2006, 70). This type of growth contradicts with sustainable urban form and the Plan highlights this.

The **third problem** identified is that the independent plans and projects that have been produced by independent authorities in New Izmir Metropolitan Area because

of different legal arrangements (IzGM 2006, 70-71). (This issue will be discussed in detail in Planning Coordination Part)

The **fourth problem** identified is about the difficulty of planning a city that is becoming smaller since the population increase rate of Izmir has been decreasing (IzGM 2006, 71).

The main struggle in the Plan is how to achieve the defined principles (aims, visions, and targets) and how to solve these defined problems. Therefore, in the plan, firstly the general strategies and then the strategies for the sub-regions have been determined.

b.1. Strategies Regarding Sustainable Urban Form / Model

Corridor and Multi-Centered

The plan's main strategy is planning a ***'green belt'*** surrounding the city center in order to prevent the leapfrogging profile of the city center towards its periphery by forcing its borders. In other words, in order to prevent the city center to enlarge in leapfrog (oil stain) form, by developing an '*urban growth border'*, to control spatial growth is the main strategy. This green belt around the city center is formed by existing agriculture and forest areas (Gediz, Nif, Küçük Menderes, Tahtalı Basins). The plan emphasizes that it is very important to conserve this green belt and allow using it only directed to its aim, for the ***ecological balances*** of the city-region. By this strategy, it is thought that the agglomerated (intensified) city center's population density will be relieved. This strategy's sections that are belonging to the sub-regions have been taken as a sub-program area among the sub-region strategies. For example, one of the projects for the northern section of the green belt, which is also the northern periphery of the city center, is to use the region for agricultural irrigation and forestation. Northern Karsiyaka Forestation Project is a part of this plan (IzGM 2006, 73, 89-90). The plan's main strategy about the macro form is a positive approach for the sustainability point of view, since it has a significant focus on preventing sprawl and uncontrolled growth.

About the green belt formation, some principles about the natural environment have been determined by the Plan. All of them also support a sustainable macro form. Some of them are:

- The agriculture, pasture, and forest areas that encircle the city and its region with a partite land-use pattern at present will be transformed into two-level green corridors by alternative projects. Hence, the continuity of the ecologic system will be enhanced again in the region.
- To create alternative settlement nodes that will eliminate the urban development pressures over the four main agricultural basins cutting the environs of the city region in the east-west axis.
- In the conservation areas, to develop environmental land-use strategies that are harmonious with standards.
- To protect the coastal areas which are potential dispersion areas of urban functions (IzGM 2006, 84-85).

The plan pays attention to guard ecological balances and tries to prevent the city center's growth in leapfrog (oil stain) form, which contradicts with sustainable development.The plan is aware of the fact that, this type of settling pattern increases infrastructural costs, destroys natural resources and cultural environment, and creates an unhealthy system (IzGM 2006, 69). In fact, the current growth schema of Izmir City Center resembles 'urban sprawl' that brings too many problems that create an unsustainable environment (See Section 3.1.3.1). Besides, the plan stresses that there is an agglomerated city center with a high population density. In the Literature Part (See Section 3.2.1.2), the positive and negative aspects of intensification have been shown.

There can be seen a compact city center and although this macro form is proposed as a sustainable urban form model in the literature, for city regions it cannot be thought as sustainable for many reasons. For instance, Izmir City Center seems to be very strong and influences the other settlements in the city-region, so the other settlements cannot be self-sufficient to sustain their growth without being addicted to Izmir completely. Therefore, the interactions between the city center and the settlements in the city-region increase and result in more traveling, more use of petrol, and more

car usage. In such a region, to enable sustainable transport will be very difficult (See Section 2.2.1). In addition, many researchers highlight that the city-region has a polycentric structure rather than having one dominant city center (See Section 5.3.2).

It appears that through green belt policies around the metropolitan core of the Izmir City Region, the plan intends to limit growth in this core and ***to create an attraction towards the sub-centers and prevent the development in the center*** (Dayangaç 2007, 4 December) For example, in Menemen-Cigli axis, the west of Canakkale Expressway has been defined as new potential housing development area according to threshold studies. Therefore, the residential growth is tried to be kept under control in order to relieve the high-density city-center, and to prevent urban sprawl. It can be said that, together with these policies, a more sustainable growth is tried to be enabled in the city-center (IzGM 2006, 221-225).

In the Plan, one of the general strategies is expressed as: *" To create sustainable, and healthy sub-regions, which has high self-sufficiency and high economic performance"* (IzGM 2006, 400). This policy of the Plan, which aims to create self-sufficient sub-regions, can be considered as a good attempt not only in terms of city-region development, but also in terms of sustainable transport. As the self-sufficiency of settlements increases, some of them will become nodes of the city-region and besides, the number of travels will be decreased to some extend between the center and these nodes.

The spatial/sectorial growth strategies for the sub-regions can be classified in three main headings. The first one is the **housing sector** that points out the settled population's building stock capacity and other spatial needs (existing, proposed, rural, and secondary housing stock). The second one is the **workspaces** (industrial, trade, touristic, infrastructural, etc. areas) that show the employment capacity of the sub-region. The last sector is the **threshold values** (natural assets, protected areas/buildings, regional open areas, especially agricultural areas) that assign the limits of the growth in each sub-region. The main policies for each sub-region are shown in the following map (IzGM 2006, 93-94).

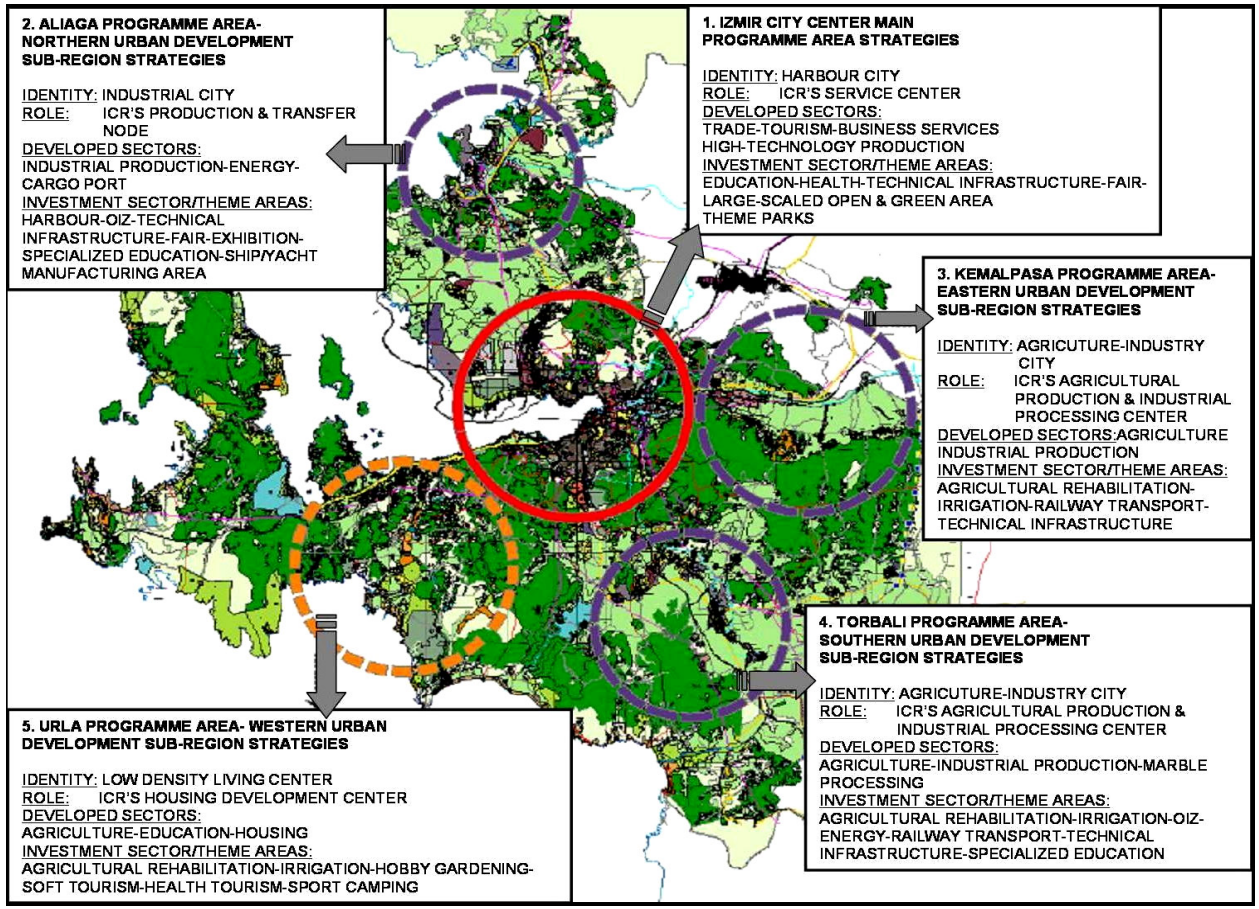


Figure 8.3 The Strategies for Sub-Region Planning Areas
(Source: Izmir Greater Municipality 2006, 93)

From Figure 8.3, it can be seen that the city center keeps its central business district property. Besides, some big open and green areas, like regional parks, are planned to limit the growth in the compact center. Dayangaç says that in the plan, areas that were vacant but open to development were planned. In some areas, there were decisions to demolish the buildings and some open areas were created. In the center, the main policies are to ***strengthen the transport connections***, *to design some recreational areas and planning for conservation* (Dayangaç 2007, 4 December). Therefore, some rehabilitation, consolidation, and renewal areas have been determined especially in the areas that have been developed with squatter improvement plans. In each of these renewal areas, inadequate facilities (green spaces, education, health or cultural areas) were planned to be supplied (IzGM 2006, 201) (See Figure 8.4).

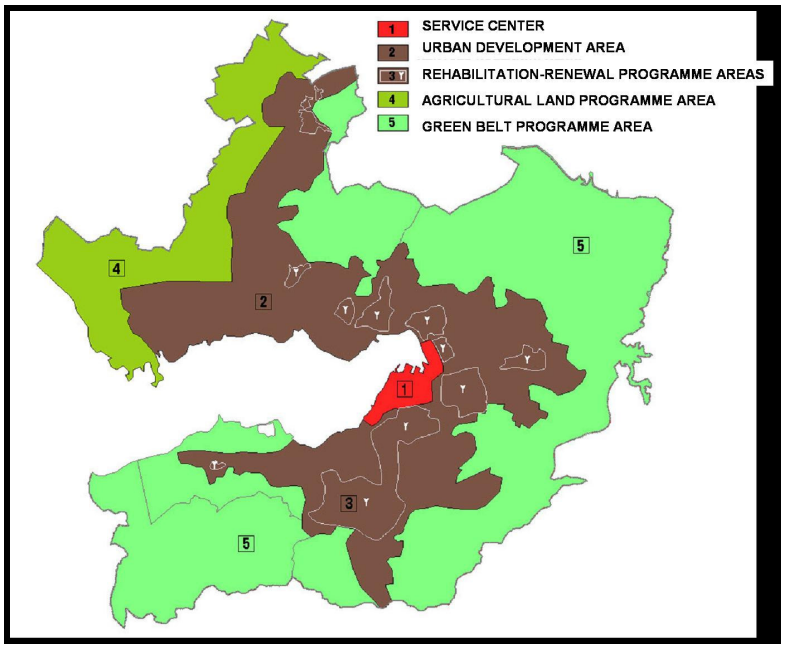


Figure 8.4 Izmir City Center's Programme Areas
(Source: Izmir Greater Municipality 2006, 200)

In fact, while the planning decisions were made, the existing properties of the settlements have been considered mostly. In the western corridor, secondary housing and touristic activities are planned. In the northern corridor, industrial activities are

dominant. For example, Aliağa is defined as a node where industry-intensive production and transfers are taken place, whereas in Foça, touristic functions are planned (Dayangaç 2007, 4 December).

Dayangaç emphasizes that the areas that do not overlap with the defined thresholds have emerged as potential planning areas. In these areas, some educational, residential, cultural and public, etc. services have been proposed with the aim of ***enforcing sub-centers***. For example, in Torbalı, a regional park has been planned. Generally, in studies, it has been tried to protect Büyük Menderes and Küçük Menderes Basins (Dayangaç 2007, 4 December).

The plan's aim to attribute some specific functions to certain settlements and corridors is a positive approach for ensuring sustainable development and transport in Izmir City Region. Because, as it has been told before, this encourages the multi-centered macro form, which supports self-sufficiency. Moreover, trying to solve the intensification problem in the city center and stop the growth in it is another positive aspect for sustainability. Because, when intensification increases in a city, in spite of the sustainable sides of the compact city model, unsustainable results can occur (Section 3.2.1).

b.2. Prevent Urban Sprawl

As discussed above, there are policies of Izmir Greater Municipality for preventing urban sprawl. For example, the Plan has 'green belt' policy, which aims to control spatial growth of the Izmir city center (See b.1).

b.3. Prevent Agglomeration In City Center

As discussed above, the Plan has some policies in each sub-center in order to control the agglomerated city center and its leapfrog (oil stain) development. As the city center has become over-intensified, the plan tries to increase the attractiveness in sub-centers and make them self-sufficient (See b.1).

To summarize, the plan has significant awareness regarding urban forms for

sustainable cities and sustainable transport. While the current corridor form is strengthened, a more polycentric form is proposed where each mode is tried to be developed as self-sustaining centers. Preventing urban sprawl appears to be a very significant focus of the planning approach. Problems of agglomeration and over-intensification is also recognized and tried to be prevented by the strengthening of other settlements.

Table 8.2: ICRMDP's Macro-Scale Policies

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			ICRMDP
(b) Macro-Scale Policies	(b1) Strategies Regarding Sustainable Urban Form/Model	Compact	
		Corridor	✓
		Multi-centered	✓
	(b2) Prevent Urban Sprawl		✓
	(b3) Prevent Agglomeration In City Center		✓

c. Micro-Scale Urban Planning Measures

Although the Greater Municipality's major planning approaches have been shown in the macro-scale policies part above, some other policies for its five sub-regions will also be discussed to show the micro-scale planning measures of ICRMPD (IzGM 2006).

c.1. Location

Proximity to Urban Center

As discussed before, ICRMPD aims, in the sub-regions, to create self-sustaining sub-centers that will meet their basic needs without being dependent on Izmir city center. Besides, it is tried to prevent urban sprawl and leapfrog (oil stain) shaped growth with some green belts (parks, recreational areas, forest areas, natural protected areas)

in the plan. Therefore, new development areas in each sub-center have been planned close to its own urban center and with considering five main development axes, some of which are supported by current and proposed railways. These planning approaches encourage sustainable transport as they provide a decrease in journeys towards the Izmir city center and increase the tendency towards each sub-center. Hence, it can be told that ICRMDP considers how a new development area's location will affect travel patterns (IzGM 2006).

Proximity to Public Transport Routes

As it has been discussed, Izmir City Region's urban growth is formed through ***five main development axes*** that are defined by geographical thresholds and especially by transport axes. Batkan emphasizes that in the new transport master plan, transport policies are decided according to these axes (Batkan 2007, 4 December). This type of corridor development enables high level of accessibility of settlements both to main transport axes and to public transport routes. It can be said that existing and proposed light rail, heavy rail, and commuter rail lines had been planned and have been planned or being improved by considering some important service areas or new developments (See Figure 8.6). Conversely, also some new development areas are planned along these five main development corridors. In ICRMDP (IzGM 2006), it is emphasized that the areas that do not coincide with thresholds are chosen as new development areas and that the plan aims to strengthen the corridors with giving specific functions to these growth areas.

c.2. Structure

The new development areas are generally planned with considering transport routes in ICRMDP and also the new public transport routes are planned according to new development areas' shape, size and new demand.

c.3. Land-Use

Job-Housing Balance and Balanced Communities

Along the planned commuter rail system in the North-South axis between Aliağa and Menderes; Aliağa, Menemen, and Cigli are identified to have important job opportunities due to mainly industrial facilities. Therefore, there are many interactions between these settlements and Izmir city center as people that work in those places prefer to live in Izmir.

It can be said that ICRMDP's some aim and targets for Izmir City Region's settlements are, firstly, to create several employment opportunities with necessary educational and health services and then in the long term, to make some plan decisions for providing high life standards to both urban and rural settlements (IzGM 2006, 275). For instance, there are some sub-strategies for the city center in ICRMDP. One policy is to organize the sectoral allocation and specialization throughout the city-region and ensure its balanced distribution and multi-sectoral development. Another one is to provide a classification between central and sub-central trade areas. Besides, to improve the quality of urban technical and social infrastructure facilities in the city center and its sub-centers is another strategy (IzGM 2006, 200-201). In addition, Torbalı case in Southern Urban Development Sub-Region (SUDSR) is another example. As Torbalı is in very close distance to Izmir city center, the financial and health services are not developed so much, and ICRMDP aims to supply infrastructural, social, and cultural services in this area (IzGM 2006, 355-356). Therefore, it can be said that ICRMDP helps to promote mixed-use development at the strategic level, which can help reduce the need to travel to the Izmir metropolitan core from the other settlements of the city-region.

Table 8.3: ICRMDP's Micro-Scale Policies (At Strategic level)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			ICRMDP
(c) Micro-Scale Policies (At Strategic Level)	(c1) Location	Proximity to Urban Center	✓
		Proximity to Public Trans. Routes	✓
	(c2) Structure		✓
	(c3) Land-Use	Job-Housing Balance & Balanced Community	✓

c.4. Clustering

Locality

There are some strategies of ICRMDP for encouraging locally-based facilities that can be reached also by non-motorized modes. As it has been stated, ICRMDP's (IzGM 2006) aim for land-use development is to strengthen some sub-centers in order to orient new development growth towards these centers. In order to actualize this aim, the Plan gives some new functions to these sub-centers in defined sub-regions, tries to determine the inadequate or missing facilities in these areas, and provide these facilities in the settlements with strengthening the locally based functions that can be reached by people easily (Dayangaç 2007, 4 December).

Land-Use Mix

In order to relax the over-intensified Izmir city center, the Plan tries to create an attraction towards some certain settlements in defined sub-regions. For instance, some of the strategies for the Western Urban Development Sub-Region (WUDSR) are;

- ✓ to increase the performance of the region in order to decrease Izmir city center's density
- ✓ to provide multi-sectoral investment opportunities to the region
- ✓ to ensure the self-sufficiency of the peripheral settlements
- ✓ to highlight the tourism potential of the region by encouraging the agricultural rehabilitation, operating pension, hobby gardening, agriculture-health tourism, etc. (IzGM 2006, 399-403).

There are also some certain strategies special to some points in the WUDSR. For example, for the coastal areas, it is planned to increase the touristic facilities. In these areas, coastal tourism will be planned together with natural tourism, accommodation facilities and convention tourism. The areas under the control of the University (Izmir Institute of Technology) is planned to be allocated for public institutions that need large areas to settle, because existing light rail system, coming from the city center, is being extended to Narlıdere by Greater Izmir Municipality and the accessibility to the university campus area will be increased (See Section 8.2.2). Therefore, it can be said that the Plan would like to cluster some facilities in some certain parts of the sub-regions in the city-region.

Design

While planning strategies support mixed-use and self-sufficiency for settlements as a tool to reduce the pressures (and traffic) on Izmir metropolitan core, there are actually no strategies or principles regarding the design of urban areas in a more transit and pedestrian friendly or less car-oriented way. It is possible to claim that this is a regional scale and more general plan, and hence such urban design policies may be too detailed for the scope of this plan. Nevertheless, such approaches are not even mentioned as general principles that can shape urban design approaches.

Table 8.4: ICRMDP's Micro-Scale Policies (At Local level)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			ICRMDP
(c) Micro-Scale Policies (At Local Level)	(c4) Clustering	Locality	✓
		Land-Use Mix	✓
		Design	x

c.5. Density

Although the Plan determines the future densities in settlements according to population estimations, it does not state any clear decisions about increasing the population and development densities in certain parts of the region. It can be said that there is no direct policies that promotes high density development along transit corridors.

c.6. Layout

High-Quality Pedestrian and Cycling Facilities

In Urla, some pedestrian and bicycle paths, facilities for recreational areas and thematic parks are proposed. In Seferihisar and Selçuk, in order to support coastal tourism, some pedestrian and bicycle paths are proposed (IzGM 2006, 404).

Pedestrianization

There are many pedestrianization strategies of ICRMD. For example, Altındag neighbourhood in Izmir City Center has been chosen as one of the renewal areas and regarding this, for providing high-quality technical and social infrastructure to this settlement, ICRMDP proposes pedestrianization and urban design studies to be developed (IzGM 2006, 246).

Parking Policies and Other Policies to Discourage Car Use

This policy may be too detailed for the scope of the Plan, but there is no emphasis on limiting parking or any other policies to discourage car use in some certain areas.

Table 8.5: ICRMDP's Micro-Scale Policies (At Neighbourhood level)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			ICRMDP
(c) Micro-Scale Policies (At Neighbourhood Level)	(c5) Density	Higher Population & Devl. Density	X
	(c6) Layout	High-Quality	✓
		Pedestrianization	✓
		Parking Policies	X

Note: See Table 8.30 for the overall evaluation of Izmir City Region Master Development Plan

8.1.2. Aydın City Health Development Plan (2005)

In Aydın, it was learned that the 1/1000 and 1/5000 scaled development plans will be improved according to 1/100 000 scaled Denizli-Aydın-Muğla Territorial Development Plan. However, this Plan could not be obtained as it has not been approved yet. Besides, it was also learned that the previous Aydın Master Plan was done in beginning of 1990s. Therefore, in this thesis, Aydın City Health Development Plan have been discussed although it has no decisions in spatial terms.

Aydın City Health Development Plan will be examined together with Aydın Municipality Action Plan (2006) and Aydın Municipality Strategic Plan (2006-2010). That is because, it is highlighted in the Action Plan that, the Strategic Plan has been prepared with considering the City Health Plan. Besides, the Action Plan has also been prepared according to activities performed by Aydın Municipality according to City Health Plan's plans and proposals. Moreover, Aydın is not legally included in the 50 km radius of Greater Izmir Municipality, however, as it has been mentioned (See Section 6.4.1.1) that Aydın is being included as one of the 46

settlements in Izmir City Region in this thesis regarding the academic studies, and especially Eraydın (2005).

In year 2004, Aydın Municipality was included in the 'Healthy Cities Project', which was initiated by World Health Organization (WHO) and has been implemented in Turkey since 1993. Projects and other studies in Aydın have been carried out by several working groups that are coordinated by 'City Health Center' established under the Aydın Municipality. In September 2005, 'Aydın City Health Profile' Report and then within this context, in November 2005, 'City Health Development Plan' was sent to WHO. Finally, In March 2006, Aydın received the 'Healthy City Certificate' within the context of 4th phase of World Health Organization Healthy Cities Project. Accordingly, it is said that Aydın has undertaken a task to make studies for city health and sustainable development (Aydın Municipality and ADU[1] 2005, Preface; Aydın Municipality, 2007; Küçükyumuk, M.[2] 2007, 1).

Healthy Cities Project has three completed phases and one continuing phase. Aydın has been included in the fourth phase (2003-2008) which considers comprehensively the health and health indicators. According to the fourth phase, four important issues are considered and the implementation of Healthy City Plan has been done with giving priority to these issues by **four working groups** in 2006-2008 period. These groups are; 1. Health Impact Assessment (HIA) Group, 2. Healthy City Planning Group, 3. Active Life and Physical Activity Group, 4. Healthy Aging Group (Aydın Municipality[1], 2006, 84; Aydın Municipality, 2007).

1) Health Impact Assessment Group: In Aydın, for the first time in Turkey, a health impact assessment[51] study has been done in parallel with environment impact assessment[52] study.

2) Healthy City Planning Group: This group has taken a very active role in the formation of 'City Council' in order to increase participation, to make people aware

[51] Health Impact Assessment Study refers to 'Sağlık Etki Değerlendirmesi (SED)' in Turkey.
[52] Environment Impact Assessment refers to 'Çevre Etki Değerlendirmesi (ÇED)' in Turkey.

of the services that have been provided or will be provided and to specify the priorities. Then the City Council has been pioneering the working groups.

3) Active Life and Physical Activity Group: This group has pioneered to enhance more physical activity areas.

4) Healthy Aging Group: This group has been formed in collaboration with Directorate of Province Health and Adnan Menderes University Faculty of Medicine (Aydın Municipality, 2007).

As Aydın is a unique case in Turkey that implements HIA, it is important to know HIA's content. Health Impact Assessment is entire operations and methods that evaluate the effects of policies or programs to the society's health. HIA finds out health impacts and in order to minimize the negative impacts, gathers sectors with an integrated planning approach. General HIA model consists of inquiry, content determination, risk evaluation, reporting, decision-making, and monitoring and evaluation steps. As HIA is based on a detailed health model, it pays attention to social, environmental, economic, and cultural aspects with the issue of how they affect people's life (Küçükyumuk, M.[2] 2007, 4, 18). Therefore, it can be said that HIA is a more comprehensive study than Environment Impact Assessment. Turkey is responsible for 'HIA in Touristic and Recreational Waters' study package of EU and Aydın is chosen as the project's implementation region (Aydın Municipality and ADU[2] 2005, 92).

Aydın Municipality has prepared a project about 'Solid Waste and Medical Waste Storage' within the context of Aydın City Health Studies and this is a 'Health Impact Assessment' study that has been actualized in Turkey for the first time (Küçükyumuk, M.[2] 2007, 18).

a. Reference to Sustainability

a.1. Main Idea of Sustainable Development

The ***vision*** of Aydın City Health Development Plan (ACHDP) is to create **Modern**

& Active Aydın, to manage this in a permanent way and to make Aydın one of the viable, healthy cities of not Turkey but the World. In the Plan, it is emphasized many times that in order to achieve the *sustainability* of this vision, it is important to ensure 'local development', and to develop city economy, in a *sustainable* ecological system; to rise the welfare level of citizens and prevent migration of qualified people. It is said that it is important to create a society in which decisions are made in equality and fairness (Aydın Municipality and ADU[2] 2005, 41-47; Küçükyumuk, M.[1] 2007, 2).

Besides, the mission of the Plan is firstly, to make 'human beings' the *Focal point* of each study, to implement participatory, sharing, transparent, controllable, active and ethic *governance* as an administration method and finally, to rise the life quality of citizens continuously.

a.2. Three Dimensions of Sustainable Development

With these mission and vision, Aydın Municipality would like to make Aydın 'a world city' that will succeed *sustainable* economic development in *physical, social, cultural, environmental, economic,* and *political* aspects (Aydın Municipality and ADU[2] 2005, 41; Küçükyumuk, M.[1] 2007, 2).

Moreover, there are some principles of the plan that promotes sustainability or sustainable development. These are;

- Sustainability, quality, usefulness and satisfaction in all services,
- To provide integration of local factors in local development, and to ensure sustainable development that is supported with cooperation, coordination and governance principles,
- To create a participatory mechanism with *common mind* that is formed by whole non-governmental organizations and citizens in Aydın and that will strengthen the local democracy in Aydın,
- Openness and transparency in decision-making and implementation (Aydın Municipality and ADU[2] 2005, 43).

Therefore, it can be said that there are some phrases regarding the three dimensions of sustainable development: *environmental, economic, and social.*

a.3. Social-Economic-Ecological Objectives

There are also some aims of the Plan that are shown in *'Aims and General Policies In Administration'* Part. One of the aims is 'Environment Consciousness'. The aim is in order to implement a balanced and sustainable ecologic system in a clean, viable, reliable physical environment; to create a green Aydın that is

- not disregarding ecological balances,
- compatible with nature, and
- using scientific methods.

For this aim, it is proposed to organize some projects in cooperation with all public and civil institutions to minimize water, soil, and air pollution, and to encourage healthy urbanization with scientific methods (Aydın Municipality and ADU[2] 2005, 54).

Another aim is 'Local Development'. This aim has been mentioned above and it is said in the Plan that, for this aim to be succeeded, the local actors' capacities should be developed. The policies that will be followed are:

- to insure the development of capacity and abilities of local entrepreneurs,
- to provide reshaping the local development mentality of city plans,
- to rise the qualification of the labour (Aydın Municipality and ADU[2] 2005, 47).

In addition, as an example to the social dimension of sustainability, another aim is 'Social Governing Municipality'. The objective is to try to solve communal problems and to produce some projects with taking social responsibility in the social topics such as social welfare, health, environment, culture, education, art and sport. The policies that will be followed are:

- to deal fairly to society,
- to preserve social values (Aydın Municipality and ADU[2] 2005, 51).

Lastly, the main ideas of Health Impact Assessment, that has been implemented by Aydın Municipality, are; democracy, equality, and sustainable development . Hence, HIA supports sustainable development with its ideas (Küçükyumuk, M.[2] 2007, 7).

Table 8.6: ACHDP's Policies for Sustainability

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)		ACHDP
(a) Reference to Sustainability	(a1) Main Idea of Sustainable Development	✓
	(a2) Three Dimensions of Sustainable Development	✓
	(a3) Social-Economic-Ecological Objectives	✓

b. Macro-Scale Urban Planning Policies

As this plan is a city health plan, it does not have a spatial dimension. Aydın Municipality Action Plan and Aydın Municipality Strategic Plan do not have spatial development proposals either. Currently, the city does not have planning strategies at the upper scales that can be analyzed with reference to macro-scale urban forms. Erdoğmuş and Küçükyumuk stated that there is now a 1/100 000 scaled Denizli-Aydın-Muğla Territorial Development Plan which has been submitted for approval recently. They also stated that there are some objections against this plan and they will improve and revise their previous 1/1000 and 1/5000 plans according to this upper-scaled territorial development plan when it is approved. This 1/100 000 scaled Denizli-Aydın-Muğla Territorial Development Plan could not be obtained as it has not been approved yet (Erdoğmuş and Küçükyumuk 2007, 6 December).

c. Micro-scale urban planning measures

It is analyzed whether there are *micro-scale urban planning measures*, and only references to layout measures have been found out.

c.6. Layout

High-Quality Pedestrian and Cycling Paths

For pedestrian's safety and comfort, it is proposed to construct overpasses with escalators for people to use easily. There are overpass studies (with escalators/lifts) in three main junctions in Aydın. Besides, to reorganize the existing overpasses is another policy (Küçükyumuk 2007, 6 December, Aydın Municipality and ADU[2] 2005, 81). Pedestrian bridges and overpasses are not necessarily the most pedestrian-friendly solutions for creating easy and direct access for pedestrians; however, in addition to them, in year 2006, there have been investments for creating and improving walking and running paths (Aydın Municipality 2007).

In the Action Plan (2006), it is said that, in year 2006, 6 km of cycling routes were built and Küçükyumuk says that in year 2008, there will be an additional 50 km bicycle route. Some more bicycle routes will be designed in order to encourage a transfer from motorized vehicles to bicycles and priority in traffic will be provided for cyclists (Aydın Municipality and ADU [2] 2005, 84). Active Life and Physical Activity Group has made a deal with 'Bicycle Federation and Bicycle Lovers Association' about the campaigns and activities in order to encourage bicycle usage (Aydın Municipality 2007, Küçükyumuk 2007, 6 December).

In addition, Healthy City Planning studies offer some urban design projects in order to facilitate the citizens' life and create a city vision supporting the city image (Aydın Municipality and ADU [2] 2005, 91).

Pedestrianization

Firstly, in order to enable a safer and healthier transport system in the city center, the

interurban traffic is planned to be taken out of the city with new expressways surrounding Aydın (Aydın Municipality and ADU [2] 2005, 81). In addition, there are many pedestrianized roads in the city center and some streets are open only for service vehicles (Küçükyumuk 2007, 6 December).

Parking Policies and Other Policies to Discourage Car Use

The heavy-duty and large vehicles' entrance to the city center is restricted. There are some car park projects in the city center (Erdoğmuş and Küçükyumuk 2007, 6 December). Such projects are not likely to discourage car usage however.

Table 8.7: ACHDP's Micro-Scale Policies (At Neighbourhood level)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			ACHDP
(c) Micro-Scale Policies (At Neighbourhood Level)	(c5) Density	Higher Population & Devl. Density	X
	(c6) Layout	High-Quality	✓
		Pedestrianization	✓
		Parking Policies	X

8.1.3. Urla Revision of Master Development Plan (2007)

Urla Revision of Master Development Plan (URMDP) has been prepared in 2007. Urla Revision of Master Development Plan has been divided into four parts according to main transport axis and natural thresholds. The studies started from the city center. For example, the first part's borders are drawn according to the Izmir-Çeşme motorway's Urla connection in the west and the North part's border is formed by Izmir-Çeşme highway (URMDP). This Plan will be discussed together with Urla Municipality's planning strategies. Besides, Urla is included in the 50 km radius of Greater Izmir Municipality and hence Urla Municipality is included in the 1/25 000 scaled Izmir City Region Master Development Plan. The evaluation below

is based on the interviews with planners, although it is important to note that their opinions and approaches are also shaped by the Izmir City Region Master Development Plan.

a. Reference to Sustainability

a.1- a.2- a.3. Main Idea of Sustainable Development; Three Dimensions of Sustainable Development; Social-Economic-Ecological Objectives

There are some strategies of URMDP that can be thought as supporting sustainable development in environmental and social terms. For example, conservation of agricultural lands is taken into consideration in many parts of the plan and discouraging low-density development is another important strategy (These issues will be discussed in detail). However, these cannot be considered as policies resulting from a particular emphasis on the concept and strategy of sustainability. The term sustainability is not cited in the plan; while agricultural land protection is one of the policies, this is not introduced as part of the three dimensions of sustainability, nor as an environmental sustainability strategy.

Table 8.8: URMDP's Policies for Sustainability

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)		URMDP
(a) Reference to Sustainability	(a1) Main Idea of Sustainable Development	**X**
	(a2) Three Dimensions of Sustainable Development	**X**
	(a3) Social-Economic-Ecological Objectives	**X**

b. Macro-Scale Urban Planning Policies

The current urban form does not enable sustainable transport in the city, because, in Urla, **low-density** and **dispersed** urban form model are seen. While rural population is settled in eleven districts in the city center; the middle or high-income groups,

which live in or around Izmir city center, choose the nine peripheral districts at the coastal area for their summerhouses or weekend houses. These peripheral districts are disconnected from the city center and are the places where secondary housing is intensified (EGEPLAN 2007, Section I.5.1 & I.6).

In detail, in Izmir City Region Master Development Plan, it is also emphasized as a problem (See Section 8.1.1.1) that the spatial development in Western Urban Development Sub-region, which is defined mainly by Urla-Seferihisar settlements, is characterized by the fringing and dispersion of Izmir city center. According to ICRMDP and URMDP, this is because with Izmir-Urla highway and opening of Izmir-Çeşme motorway, the comfort of private car usage and high accessibility caused a rise in housing constructions. While in the past, Urla was being preferred only for secondary housing, through time, people has chosen there for weekend housing. Hence, the people that are living in Izmir and choose Urla due to the decreasing traveling time have preferred Urla settlement area as a second center alternative to the central city (or a suburban alternative housing area). Besides, Urla's touristic values have been the causes of preference (IzGM 2006, 70, 386; EGEPLAN 2007, Section I.1 & I.6).

On the other hand, this preference has transformed some of the existing secondary housing developments into continuously used houses and this can be defined as a positive change. However, this change has caused destruction in the natural environment as it has also started faster housing developments (EGEPLAN 2007, Section I.1 & I.6).

Moreover, some of the summer population and the secondary housing developers that favoured the coastal area to settle in the municipality borders of Urla have changed their behaviour in the last years. As there is a rising intensification in these coastal areas, they intended to settle in agricultural lands, olive grove areas and just around forest areas with a scattered dispersion. Hence, in these areas, low-density secondary housing developments have started. While some high-income level prefers to live far from the sea in these low-density areas (in farmhouse), some middle-high income level prefers to use the old summerhouses in the coastal areas. It is said in the plan that there appeared three types of social groups and due to these,

three types of physical environments in Urla (EGEPLAN 2007, Section I.6).

b.1. Strategies Regarding Sustainable Urban Form / Model

Corridor and Multi-Centered

In fact, as a necessity of Law No. 5216, the land-use planning decisions are generally defined by Greater Izmir Municipality at every scale between 1/5000 and 1/25000 (ICRMDP) and Urla Municipality should implement these plans' decisions and revise its 1/1000 scaled development plans according to them (See Section 8.1.2).

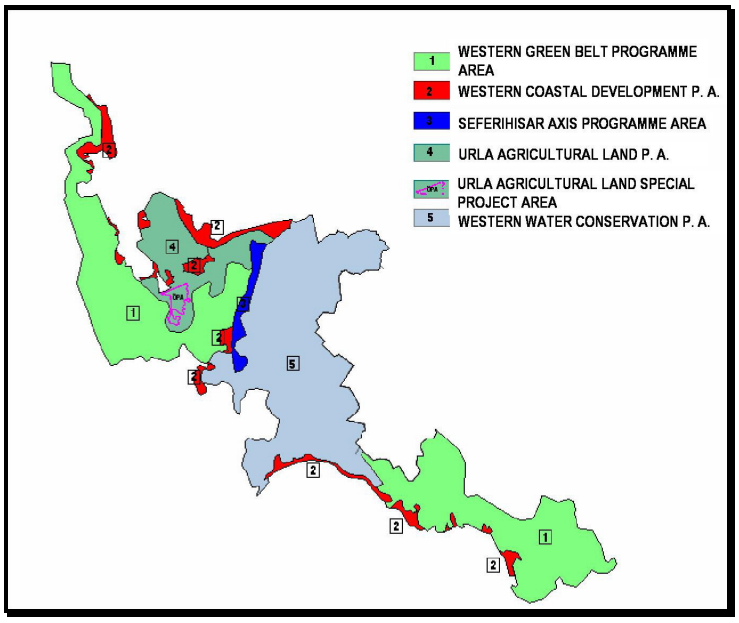


Figure 8.5 Western Sub-Region Plan Schema
(Source: Izmir Greater Municipality 2006, 404)

In ICRMDP, in Western Urban Development Sub-Region (WUDSR), there are proposals for western green belt programme areas in order to prevent Izmir City Region's western oriented leapfrogging. In this region, agriculture and forest sectors are planned to be developed and in Urla, agriculture, housing, tourism and recreation for the day sectors will be developed. 'Urla Agricultural Land Programme Area' is

given a role as a low-density living center and a touristic zone where agricultural recreation is improved. In order to preserve Urla's high quality agricultural lands, secondary housing growth in these lands will be prevented and in the coastal areas of Urla, land is to be developed for daily touristic activities. The plan defined 'Protected Agricultural Lands' and some settlement and building conditions (for daily tourism facilities) in these areas (IzGM 2006, 405-411). Therefore, in ICRMDP, in the coastal areas, urban sprawl and consumption of land is tried to be prevented with some restrictions on new constructions and tourism-based activities.

In URMDP, it is also emphasized that the conservation of Urla's agricultural lands should be ensured and that in the development plan of Urla, the limitation decisions in agricultural lands should be determined in accordance with scientific data (soil studies, etc.). However, the existing plan decisions allow construction in the ratio of 7 % on 1st and 2nd degree agricultural lands. This damages these fertile lands and cause low-density growth. In URMDP, it is also said that the city has a divided and differentiating urban form model. While as the habitants of the city concentrated in the city center, there appears a requirement for the housing area in the Urla city center; there is excess housing area in the coastal areas. When the development plan and the implemented development plans were examined, it was seen that the urban development areas in Urla city center proposed in these plans had been almost completely filled and new housing demand appeared in and around Urla city center before the end of plan period (EGEPLAN 2007).

Therefore, Urla has an intensified city center but also a rapid dispersal and consumption of land as coastal areas. However, there are some restrictions such as the inadequacy of the areas around Urla city center, efficient agricultural lands just adjacent to the west of the city and the motorway. Hence, there is no possibility of settling the increasing population in or just around the city center. URMDP proposes to encourage this new population to settle in the coastal or peripheral districts that are disconnected from the center and where mostly summerhouses are located. Some part of the population will be settled in vacant lands in some urban settlement areas or development areas and some will be settled into new housing areas. The new development areas will be proposed in the south of Urla in the region between the motorway and the city and in the lands that are not fertile for agricultural purposes

(EGEPLAN 2007).

In summary, it can be said that with the impacts of some natural (forest areas, agricultural lands) and unnatural thresholds (motorway), the new development areas are planned away from the concentrated Urla city center in peripheral lands or along motorway or along coastal areas. Nevertheless, of course, the proposals should be compatible with ICRMDP's agricultural land programme areas and coastal land preservation principles (touristic daily facilities). This type of planning approach can be said to encourage multi-centered development model with its offering new development nodes (sub-centers) away from center and corridor development with its offering growth along motorway. It also helps to prevent sprawl in coastal areas.

b.2. Prevent Urban Sprawl

It has been stated above that there are some policies (Programme areas, recreation projects, etc.) for preventing urban sprawl, preventing consumption of agricultural lands and discouraging low-density development in Urla both in ICRMDP and URMDP. It is also said in URMDP that on the lands that are efficient for agriculture, there will be no new investments except for transport infrastructure. Moreover, in URMDP, it is also stressed that in the agricultural lands, with the pressure of wealthy groups living in Izmir, some farmhouse developments have been experienced with partial implementation plans that were not integrated into upper scale and more comprehensive master plans. If this type of land use model is not prevented, low-density housing areas will reveal in which there are no transport network system, except houses' own paths, and no technical or social infrastructural facilities (EGEPLAN 2007).

b.3. Prevent Agglomeration In City Center

As it has been expressed above, since the city center has become intensified, new development areas have been encouraged to settle in the peripheral districts far from the city center where summerhouse development is experienced. This is expected to help increase the density of summerhouse settlement areas too, and make them become more self-sufficient settlements.

Table 8.9: URMDP's Macro-Scale Policies

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			URMDP
(b) Macro-Scale Policies	(b1) Strategies Regarding Sustainable Urban Form/Model	Compact	
		Corridor	✓
		Multi-centered	✓
	(b2) Prevent Urban Sprawl		✓
	(b3) Prevent Agglomeration In City Center		✓

c. Micro-Scale Urban Planning Measures

c.1. Location

The new development areas are proposed in low-density areas disconnected from the city center because of the intensified city center and some other thresholds that hinder settling around the center. Therefore, proximity to the urban center cannot be considered. Besides, in the low-density areas, there is no transport network scheme yet but URMDP proposes to improve the social and technical infrastructure in these peripheral areas (EGEPLAN 2007).

c.2. Structure

Although there is no transport system in the proper sense yet, a system is proposed by URMDP, because it can be inferenced from the plan that a compact city center and some sub-centers are tried to be created and it is thought that there will be a need for a new transport system in such an urban form model (EGEPLAN 2007). The Plan, here, tries to explain that there is no road hierarchy, which can be qualified as a good transport system.

c.3. Land-Use

Job-Housing Balance and Balanced Communities

In URMDP, it is stressed that there is an increasing home-work relationship between Urla and Izmir and this situation has caused an important revival in the transport sector. In addition to increasing number of people that are living in Urla and working in Izmir each day, the new location choices for new developments (like Izmir High Technology Institute) have encouraged the improvement in transportation sector. URMDP expresses that now there is mobility in both directions. Moreover, the areas under the control of the University (Izmir Institute of Technology) is planned to be allocated for public institutions, which need large areas to settle, by Greater Izmir Municipality, because the existing light rail system, coming from the city center, is being extended to Narlıdere by Greater Izmir Municipality (See Section 8.2.2) and the accessibility to the university campus area will be increased. According to Yüksel, the motorway and the light rail proposal have increased commuting opportunities in Urla and Urla has become a suburb (commuting town) (Yüksel 2007, 3 December).

URMDP argues that the transport connections should be improved in the dispersed city, Urla. For instance, some new public office development areas are proposed along motorway both by URMDP and by ICRMDP. As stated before, URMDP also attempts to create some nodes (sub-centers) with improving the social and technical infrastructure in the low-density areas where new development will take place (EGEPLAN 2007). Therefore, there is an awareness of the importance of job-housing balances and balanced communities in Urla; but URMDP also discusses that there should be more strategies.

In fact, it can be seen that there is no exact strategy for creating job-housing balances in Urla by URMDP and instead, it is emphasized many times in URMDP that Urla is an alternative housing development district. Besides, the proposals of Greater Izmir Municipality for Urla (creating new public office developments along motorway in university campus area) show that it is intended to create some new job opportunities in this alternative housing district, Urla by IzGM. This strategy of IzGM can be

referred as an intention to create job-housing balance and balanced communities in Urla. On the other hand, IzGM also proposes a railway project that will increase the accessibility between Urla and Izmir city center. From this perspective, this policy can discourage creating job-housing balance in Urla; because people can prefer to work or training in Urla and live in Izmir. Then, IzGM's decisions can be thought as discouraging sustainable urban form model; but they can also be regarded as encouraging city-region formation.

Table 8.10: URMDP's Micro-Scale Policies (At Strategic level)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			URMDP
(c) Micro-Scale Policies (At Strategic Level)	(c1) Location	Proximity to Urban Center	x
		Proximity to Public Trans. Routes	x
	(c2) Structure		✓
	(c3) Land-Use	Job-Housing Balance & Balanced Community	(✓)

c.4. Clustering

Locality

In the development areas, especially in agricultural lands that are far from the center, the deficiency of some regional and urban social and technical infrastructure is defined as one of the main problems of URMDP. It is planned to make some new organizations for improving the peripheral areas' transport connections, social infrastructure, etc. Therefore, it can be said that in some nodes, there will be locally-based facilities (EGEPLAN 2007). However, there appears to be no policies for creating mix-use land use development or pedestrian and transit-oriented design.

Table 8.11: URMDP's Micro-Scale Policies (At Local level)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			URMDP
(c) Micro-Scale Policies (At Local Level)	(c4) Clustering	Locality	✓
		Land-Use Mix	x
		Design	x

c.6. Layout

High-Quality Pedestrian and Cycling Facilities

'Ağaçlı Yol' between the Pier and the city center is qualified as an important vehicle and pedestrian road that is one of the most important elements of city image and that has an aesthetic value by URMDP. Yüksel says that Urla Municipality has a pedestrian-friendly approach with its bicycle routes, coastal arrangements and recreational areas.

Pedestrianization

There is a 'public square' project in the city center that proposes pedestrianization in the center with an underground car park and that will be implemented by UKOME[53]. However, there are some legal problems about this project.

Parking Policies and Other Policies to Discourage Car Use

There are some restrictions on parking in the city center, but these are not stated in detail by Yüksel or the URMDP (Yüksel 2007, 3 December).

[53] UKOME: Transport Coordination Center

Table 8.12: URMDP's Micro-Scale Policies (At Neighbourhood level)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			URMDP
(c) Micro-Scale Policies (At Neighbourhood Level)	(c5) Density	Higher Population & Devl. Density	X
	(c6) Layout	High-Quality	✓
		Pedestrianization	✓
		Parking Policies	✓

8.1.4. Manisa Municipality's Land-Use Planning Strategies (2007)

The Manisa Municipality's land-use and transport planning strategies will be discussed according to the interviews done with Veral (city planner) and Dürgen (employee from Transport Services Directorate), and Manisa Municipality Strategic Plan (2006-2010). Manisa is not legally included in the 50 km radius of Greater Izmir Municipality, however, as Dayangaç has emphasized, the master development plan analysis studies were done in the city region with 90 km radius at a 1/100 000 scale by the municipality authorities and Manisa was considered in the east corridor (See Section 8.1.1.1).

a. Reference to Sustainability

a.1. Main Idea of Sustainable Development

In the Manisa Municipality Strategic Plan (2006-2010) (MMSP), it is stated that Manisa Municipality is responsible for meeting today's needs together without conceding the chance of the future generations to meet their own needs; for sustaining the sensitivity for the nature and the environment, and for ensuring a living area where people can live in security, comfort, and peace. The Plan also stresses the importance of healthy urbanization of Manisa with participation of the citizens as the principles of the Plan (Manisa Municipality 2006, 8-9).

a.2. Three Dimensions of Sustainable Development

The vision of the Municipality is said as, *"transparent, participatory, changing, and improving municipality"*. The principles of the Manisa Municipality's Strategic Plan can be thought as encouraging environmental, economic and social aspects of sustainability. These are, sustainable urbanization, equity and justice in services, participatory administration, efficient use of municipality resources, preservation of historical and cultural heritage, developing the consciousness of being a part of city, and green city (Manisa Municipality 2006, 8-15)

a.3. Social-Economic-Ecological Objectives

There is a 1/100 000 scaled Izmir-Manisa-Kutahya Territorial Development Plan and Manisa Municipality planned to make some revision studies in its 1/5000 and 1/1000 scaled development plans in order to make conservation of agricultural lands. This can be considered as supporting sustainable transport in ecological terms (Veral 2007, 5 December).

Table 8.13: Manisa's Policies for Sustainability

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)		MANISA
(a) Reference to Sustainability	(a1) Main Idea of Sustainable Development	✓
	(a2) Three Dimensions of Sustainable Development	✓
	(a3) Social-Economic-Ecological Objectives	✓

b. Macro-Scale Urban Planning Policies

The city planner, Veral, emphasizes that Manisa city center has a compact urban form and an intensified character, to a large extend, and it is too difficult to find a vacant land to settle in the center, because, the city is under the pressure of

thresholds. In the south of the city, there is Spil Mountain; in the north, there are agricultural areas; and in the west, there is Manisa Organized Industrial Zone.

b.1. Strategies Regarding Sustainable Urban Form / Model

Multi-Centered

The city planner, Veral, says that new development areas are mainly proposed far from the city center at the north, as there is lack of space in the city center. Besides, it has been considered to raise the density with increasing floor numbers of the buildings in the center, but as Manisa's geographical position is in earthquake zone, this density policy has not been adopted. Some of the buildings like the Law Court and the Police Office have been planned to be transferred out of the city center to sub-centers. In addition, some housing development areas are planned out of the city as satellite city.

b.2. Prevent Urban Sprawl

The invasion of agricultural areas by illegal settlements is thought to be prevented with some 1/1000 and 1/5000 scaled development plan studies by Manisa Municipality. Moreover, there has been done a conservation development plan by Manisa Municipality in order to ensure environmental protection (Veral 2007, 5 December).

b.3. Prevent Agglomeration In City Center

Manisa Municipality proposal for creating some sub-centers as new development areas and transfer of some important buildings, which are settled in the city center, to these sub-centers can be interpreted as relaxation of agglomerated city center (Veral 2007, 5 December).

Table 8.14: Manisa's Macro-Scale Policies

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			MANISA
(b) Macro-Scale Policies	(b1) Strategies Regarding Sustainable Urban Form/Model	Compact	
		Corridor	
		Multi-centered	✓
	(b2) Prevent Urban Sprawl		✓
	(b3) Prevent Agglomeration In City Center		✓

c. Micro-Scale Urban Planning Measures

c.1. Location

Proximity to Urban Center

As it has been mentioned above, the new development areas are planned far from the city due to the thresholds and over-intensified city center (Veral 2007, 5 December).

Proximity to Public Transport Routes

According to the new development areas, the public transport routes are extended or reshaped (Veral 2007, 5 December).

c.2. Structure

There is no policy on the structure (size and shape) of new development areas that can influence the range of public transport services.

c.3. Land-Use

Job-Housing Balance and Balanced Communities

There is a high capacity Organized Industrial Zone in Manisa. This obviously helps the job-housing balance in Manisa by providing job opportunities for the residents of Manisa. However, it is also true that most employees (particularly qualified employees) in this industrial zone commute from Izmir. OIZ provides buses to its employees and Veral stresses that these buses create too much traffic in the city center. With the high-speed railway project, this problem is thought to be solved (See Section 8.2.5).

As it has been said, there is an attempt of Manisa Municipality to create some sub-centers of Manisa city center with a range of facilities. The missing facilities will be provided to the new development areas (Veral 2007, 5 December).

Table 8.15: Manisa's Micro-Scale Policies (At Strategic level)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			MANISA
(c) Micro-Scale Policies (At Strategic Level)	(c1) Location	Proximity to Urban Center	X
		Proximity to Public Trans. Routes	✓
	(c2) Structure		X
	(c3) Land-Use	Job-Housing Balance & Balanced Community	✓

c.4. Clustering

There is no clustering policy of Manisa Municipality.

Table 8.16: Manisa's Micro-Scale Policies (At Local level)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			MANISA
(c) Micro-Scale Policies (At Local Level)	(c4) Clustering	Locality	X
		Land-Use Mix	X
		Design	X

c.5. Density

As it has been stated, it has been considered to raise the density with increasing floor numbers of the buildings in the center, but as Manisa's geographical position is in earthquake zone, this density policy has not been adopted.

c.6. Layout

High-Quality Pedestrian and Cycling Facilities

In some main streets, the roads have been narrowed and shifted into one-lane (one-way) roads in order to widen pedestrian pavements (Veral 2007, 5 December). Besides, one of the strategies of MMSP for recreational areas is to design high quality lighting elements, to use functional city furniture, and to ensure maintenance of parks and gardens with continuous repairs (Manisa Municipality 2006, 20-21).

Pedestrianization

There are some pedestrianization studies in the city center. One of the strategic aims of MMSP is to improve pedestrianization and make some overpasses for security of pedestrians (Veral 2007, 5 December; Manisa Municipality 2006, 18-19). While overpasses are not necessarily pedestrian friendly solutions, it is important to note

the municipality has plans to improve existing pedestrian areas.

Parking Policies and Other Policies to Discourage Car Use

In the city center, there has been limitation on car parking. Car parking in the city center necessitates a payment. Veral says that Manisa Municipality made a Transport Study one year ago and saw that the road capacities were adequate and the traffic problems in the center were due to the car parks. However, there are some underground car parks in order to solve traffic problems in the city center (Veral and Dürgen 2007, 5 December). This is likely to encourage car usage rather than limit and restrict it.

Table 8.17: Manisa's Micro-Scale Policies (At Neighbourhood level)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			MANISA
(c) Micro-Scale Policies (At Neighbourhood Level)	(c5) Density	Higher Population & Devl. Density	
	(c6) Layout	High-Quality	✓
		Pedestrianization	✓
		Parking Policies	x

8.1.5. Torbalı Municipality's Land-Use Planning Strategies (2007)

The Torbalı Municipality's land-use and transport planning strategies will be discussed according to the interviews done with Doğan (Map Technician). Torbalı is included in the 50 km radius of Greater Izmir Municipality in the south axis and hence Torbalı Municipality is regarded to 1/25 000 Izmir City Region Master Development Plan.

The evaluation below is based on the interviews with planners, although it is important to note that their opinions and approaches are also shaped by the Izmir City Region Master Development Plan.

a. Reference to Sustainability

There are no references to sustainability of Torbalı Municipality.

Table 8.18 : Torbalı's Policies for Sustainability

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)		TORBALI
(a) Reference to Sustainability	(a1) Main Idea of Sustainable Development	X
	(a2) Three Dimensions of Sustainable Development	X
	(a3) Social-Economic-Ecological Objectives	X

b. Macro-Scale Urban Planning Policies

b.1. Strategies Regarding Sustainable Urban Form / Model

Multi-Centered

Torbalı has a multi-centered urban form to a certain extent, with some satellite cities that act like a sub-center. These satellite cities, Ayrancılar, Yazıbaşı, Çaybaşı, take place out of the city center and Doğan says that they are open for development. For example, Ayrancilar has developed by Ege-Koop that is a mass housing development constructed by Housing Development Administration of Turkey (TOKI). In fact, this type of development in Torbalı can be a result of its agricultural industry capacity. On the other hand, these settlements are also dependent on Torbalı city center for some facilities Doğan says that the multi-centered urban form model of Torbalı is encouraged by Torbalı Municipality (Doğan 2007, 6 December).

b.2. Prevent Urban Sprawl

There is no policy of Torbalı Municipality for prevention of agricultural lands, etc.

On the contrary, there are negative decisions of the municipality from a sustainable point of view. In 1 / 100000 scaled Manisa-Kütahya-Izmir Planning Region Territorial Development Plan, new development area of Torbalı that has been defined by Torbalı Municipality in the west of the city where agricultural lands exist, has been defined as the area where agricultural quality will be preserved. Doğan has said that Torbalı Municipality had applied to administrative courts objecting this Plan's conservation decision (Doğan 2007, 6 December).

Table 8.19: Torbalı's Macro-Scale Policies

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			TORBALI
(b) Macro-Scale Policies	(b1) Strategies Regarding Sustainable Urban Form/Model	Compact	
		Corridor	
		Multi-centered	✓
	(b2) Prevent Urban Sprawl		X
	(b3) Prevent Agglomeration In City Center		

c. Micro-Scale Urban Planning Measures

There are no policies of Torbalı Municipality on *c.1, c.2, c.3, c.4, c.5* options. It is stated in the interviews that such policies are to be determined by the ICRMDP as the upper-scale plan. However, it can be said that the ICRMDP formulate policies specific for Torbalı only in some of these planning strategies at strategic and local level, not for all (density, design, etc.). For example, for ensuring a more balanced and self-sufficient settlement, ICRMDP has some land-use policies for Torbalı. As Torbalı is in very close distance to Izmir city center, the financial and health services are not developed so much, and ICRMDP aims to supply infrastructural, social, and cultural services in this area (IzGM 2006, 355-356). Therefore, it can be said that ICRMDP helps to promote mixed-use development at the local level, which can help reduce the need to travel to the Izmir metropolitan core from the other settlements of

the city-region (See Table 8.30).

c.6. Layout

High-Quality Pedestrian and Cycling Facilities

The pedestrianized roads' pattern has been paved with rough cobblestone pavement in the city center by Torbalı Municipality. Besides, the pavements along vehicle roads are designed very largely where people can walk in comfort and security. There are also some landscaping studies in the city center (Doğan 2007, 6 December).

Pedestrianization

There are some streets that are closed to traffic in the city center in order to encourage non-motorized modes (walking and cycling) of transport (Doğan 2007, 6 December).

Parking Policies and Other Policies to Discourage Car Use

There are some parking limits for certain time periods in the city center. Besides some solutions are sought for car parking in gardens or ground floor of buildings (Doğan 2007, 6 December).

Table 8.20: Torbalı's Micro-Scale Policies (At Neighbourhood level)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			TORBALI
(c) Micro-Scale Policies (At Neighbourhood Level)	(c5) Density	Higher Population & Devl. Density	
	(c6) Layout	High-Quality	✓
		Pedestrianization	✓
		Parking Policies	✓

8.1.6. Menemen Municipality's Land-Use Planning Strategies (2007)

The Menemen Municipality's land-use and transport planning strategies will be discussed according to the interviews done with Kuyucu (Director of Municipal Department of Technical Services). Menemen is included in the 50 km radius of Greater Izmir Municipality in the north axis and hence this Municipality is included in the 1 / 25 000 scaled Izmir City Region Master Development Plan. The evaluation below is based on the interviews with planners, although it is important to note that their opinions and approaches are also shaped by the Izmir City Region Master Development Plan

a. Reference to Sustainability

There are no references to sustainability by Menemen Municipality.

Table 8.21 : Menemen's Policies for Sustainability

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)		MENEMEN
(a) Reference to Sustainability	(a1) Main Idea of Sustainable Development	X
	(a2) Three Dimensions of Sustainable Development	X
	(a3) Social-Economic-Ecological Objectives	X

b. Macro-Scale Urban Planning Policies

The current urban development form is corridor development with the effect of the Izmir-Aliağa Highway and the railway (Kuyucu 2007, 5 December).

b.1. Strategies Regarding Sustainable Urban Form / Model

Corridor and Multi-centered

Kuyucu says that the new development areas will be developed in the settlements, Harmandalı, Ulukent, Koyundere, and Asarlık, along the railway route. Therefore, the existing corridor development with nodes will be continued with improving nodes especially at railway stations (Kuyucu 2007, 5 December). In fact these land-use planning policies come from the upper-scaled ICRMDP. As a policy of ICRMDP, in order to limit growth, to create an attraction towards the sub-centers and to prevent the development in Izmir city center, along Menemen-Çiğli axis, the west of Çanakkale Expressway has been defined as new potential housing development area according to threshold studies (Dayangaç 2007, 4 December) Therefore, the development along corridors is encouraged (See Table 8.30).

b.2. Prevent Urban Sprawl

Kuyucu says that Menemen Municipality tries to prevent development in agricultural lands with various restrictions (Kuyucu 2007, 5 December).

Table 8.22: Menemen's Macro-Scale Policies

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			MENEMEN
(b) Macro-Scale Policies	(b1) Strategies Regarding Sustainable Urban Form/Model	Compact	
		Corridor	(✓)
		Multi-centered	(✓)
	(b2) Prevent Urban Sprawl		✓
	(b3) Prevent Agglomeration In City Center		

c. Micro-scale urban planning measures

There are no micro-scale policies at strategic, local and neighbourhood level. It is stated in the interviews that such policies are to be determined by the ICRMDP as the upper-scale plan. However, the policies at the neighbourhood level should also be decided by Menemen Municipality.

Table 8.23: Menemen's Micro-Scale Policies (At Neighbourhood level)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			MENEMEN
(c) Micro-Scale Policies (At Neighbourhood Level)	(c5) Density	Higher Population & Devl. Density	X
	(c6) Layout	High-Quality	X
		Pedestrianization	X
		Parking Policies	X

8.1.7. Aliağa Municipality's Land-Use Planning Strategies (2007)

The Aliağa Municipality's land-use and transport planning strategies will be discussed according to the interviews done with Uyanıktürk (City Planner) and Geg (Environment Technician from Environmental Conservation and Control Department). Aliağa is partailly included in the 50 km radius of Greater Izmir Municipality in the north axis and hence this Municipality is included in the 1 / 25 000-scaled Izmir City Region Master Development Plan. The evaluation below is based on the interviews with planners, although it is important to note that their opinions and approaches are also shaped by the Izmir City Region Master Development Plan

a. Reference to Sustainability

a.1-a.2-a.3. Main Idea of Sustainable Development; Three Dimensions of Sustainable Development; Social-Economic-Ecological Objectives

Aliağa Municipality has some policies that can be considered as encouraging environmental sustainability. Environmental Conservation and Control Department controls all the factories in Aliağa to ensure that they obey environmental rules and standards. For instance, to use filter system is an obligation for firms. For the newly settled factories, Environment Impact Assessment has to be carried out. Besides, Aliağa Municipality implements some sanctions for passing to a natural gas system

(Geg 2007, 5 December). However, from the interviews, there can be learned no policies of Aliağa Municipality for social or economic sustainability.

Table 8.24: Aliağa's Policies for Sustainability

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)		ALIAGA
(a) Reference to Sustainability	(a1) Main Idea of Sustainable Development	
	(a2) Three Dimensions of Sustainable Development	
	(a3) Social-Economic-Ecological Objectives	✓

b. Macro-Scale Urban Planning Policies

b.1. Strategies Regarding Sustainable Urban Form / Model

Corridor Form

Uyanıktürk emphasizes that the new development area is planned along the proposed rail corridors, especially close to the stations. Therefore, corridor development can be thought to be supported (Uyanıktürk 2007, 5 December).

Table 8.25: Aliağa's Macro-Scale Policies

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			ALIAGA
(b) Macro-Scale Policies	(b1) Strategies Regarding Sustainable Urban Form/Model	Compact	
		Corridor	✓
		Multi-centered	
	(b2) Prevent Urban Sprawl		
	(b3) Prevent Agglomeration In City Center		

c. Micro-Scale Urban Planning Measures

c.1. Location

Proximity to Public Transport Routes

The new development areas are planned close to the proposed rail lines. For example, a mass housing project has been completed with considering the railway station's location (Uyanıktürk 2007, 5 December).

There are no policies of Aliağa Municipality on *c.2, c.3, c.4, c.5* options. It is stated in the interviews that such policies are to be determined by the ICRMDP as the upper-scale plan. However, it can be said that the ICRMDP formulate policies specific for Aliağa only in some of these planning strategies at strategic and local level, not for all (density, land-use mix, design, etc.). For example, for ensuring a more balanced and self-sufficient settlement, ICRMDP has some land-use policies for Aliağa that will create new job opportunities in Aliağa. Aliağa is defined as a node where industry-intensive production and transfers are to take place and more organized new industrial functions are given to Aliağa.

Table 8.26: Aliağa's Micro-Scale Policies (At Strategic level)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			ALIAGA
(c) Micro-Scale Policies (At Strategic Level)	(c1) Location	Proximity to Urban Center	
		Proximity to Public Trans. Routes	✓
	(c2) Structure		
	(c3) Land-Use	Job-Housing Balance & Balanced Community	(✓)

c.6. Layout

Pedestrianization

Sevgi Yolu Project in the city center of Aliağa is given as a successful example to pedestrian pathways by Uyanıktürk (Uyanıktürk 2007, 5 December).

Parking Policies and Other Policies to Discourage Car Use

The parking problem is thought to be solved with an underground car park project in the city center (Uyanıktürk 2007, 5 December). This does not limit parking or discourage car usage however.

Table 8.27: Aliağa's Micro-Scale Policies (At Neighbourhood level)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			ALIAGA
(c) Micro-Scale Policies (At Neighbourhood Level)	(c5) Density	Higher Population & Devl. Density	
	(c6) Layout	High-Quality	
		Pedestrianization	✓
		Parking Policies	X

8.1.8. Selçuk Municipality's Land-Use Planning Strategies (2007)

The Selçuk Municipality's land-use and transport planning strategies will be discussed according to the interviews done with Aksoy (Public Works Directorate). Selçuk is partially included in the 50 km radius of Greater Izmir Municipality in the south axis and hence Selçuk Municipality is **not** regarded to 1/25 000 Izmir City Region Master Development Plan now. Therefore, as Aksoy states, 1 / 100000 scaled Manisa-Kütahya-Izmir Planning Region Territorial Development Plan's decisions should be implemented in lower scales. For example, 1/25000 scaled plan will be prepared according to the 1/100000 scaled plan and will be approved by

Governorship. Selçuk Muicipality is responsible for making and approving 1/5000 and 1/1000 scaled plans.

a. Reference to sustainability

a.1-a.2-a.3. Main Idea of Sustainable Development; Three Dimensions of Sustainable Development; Social-Economic-Ecological Objectives

There are some urban design projects with the participation of the citizens of Selçuk Municipality, which consider human-scale planning approaches and create high-quality environment for people that can be thought as sustainable development strategies.

Table 8.28: Selçuk's Policies for Sustainability

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)		SELCUK
(a) Reference to Sustainability	(a1) Main Idea of Sustainable Development	
	(a2) Three Dimensions of Sustainable Development	
	(a3) Social-Economic-Ecological Objectives	✓

c. Micro-Scale Urban Planning Measures

There are no policies of Selçuk Municipality on *c.1, c.2, c.3, c.4, c.5* options. It was stated in the interviews that Selçuk Municipality has to implement 1 / 100000 scaled Manisa-Kütahya-Izmir Planning Region Territorial Development Plan and that these issues are determined by this upper scale plan. Nevertheless, it is possible to claim that currently the municipality has a rather limited approach in these aspects.

c.6. Layout

There has been a project of Selçuk Municipality, called 'Selçuk Urban Renewal &

Regeneration Studies'. In this project, there have been urban design projects with the participation of the citizens. The project's aim is to meet the technical and social infrastructural needs, the restoration of historical buildings, and to increase the quality of physical environment. It aims to create high-qualified pedestrian paths with a human-priority point of view. It also aims to make some pedestrianization studies in the city (Aksoy 2007, 6 December).

Table 8.29: Selçuk's Micro-Scale Policies (At Neighbourhood level)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			SELCUK
(c) Micro-Scale Policies (At Neighbourhood Level)	(c5) Density	Higher Population & Devl. Density	
	(c6) Layout	High-Quality	✓
		Pedestrianization	✓
		Parking Policies	

8.1.9. Çeşme Municipality's Land-Use Planning Strategies (2007)

Çeşme is not legally included in the 50 km radius of Greater Izmir Municipality, however, as Dayangaç has emphasized, the master development plan analysis studies were done in the city region with 90 km radius at a 1/100 000 scale by the municipality authorities and Çeşme was considered in the west corridor (See Section 8.1.1).

According to the interviews with the employees in Public Works Directorate, as Çeşme is now out of the Greater Izmir Municipality borders, Çeşme Municipality has many problems about making land-use decisions for Çeşme. Çeşme Municipality is under the control of Central Authority in Ankara and there is a top-down administration system for Çeşme. For instance, 1/100 000 scaled Manisa-Kütahya-Izmir Planning Region Territorial Development Plan decisions are implemented without considering Çeşme Municipality's decisions. Besides, a harbour has been

planned to be made in Çeşme but the studies have been made independently from Çeşme Municipality. Moreover, there are some sites that are defined as tourism areas by Ministry of Tourism and Culture. In these areas, Çeşme Municipality has no decision making power (Çesme Directorate of Housing 2007, 3 December).

Therefore, from the interviews with the Municipality employees, no detailed information can be obtained. It has been learned that, Çeşme Municipality has been rather negatively affected from not being included in the Izmir Greater City area defined by the Law No. 5216.

8.1.10. Concluding Remarks

In summary, in this section, in the observed settlements, the awareness of sustainability in urban planning has been evaluated. When the Table 8.30, which shows the sum of all the assessments made for each settlement, is examined, it can be seen that among the municipalities, Izmir Greater Municipality has a high awareness about the importance of sustainability principles in land-use planning. Then, Manisa is distinguished as the second municipality that has high awareness with its references to sustainability and policies at macro and micro scales that encourages sustainable development patterns. This can be due to the fact that Manisa has become a very important center of industry with its large Organized Industrial Zone in Izmir City Region. Besides, Manisa is in close proximity with Izmir city center and there is a high amount of interactions, especially in terms of commuting, economic relations, and services, between these two settlements. Although Manisa, as a province, is not included in the administrative borders of Izmir; as Manisa is under the 'sphere of influence' of Izmir city center, it is included in Izmir City Region in this study and also included in the 90 km radius area that is used in the analysis of Greater Izmir Municipality for ICRMDP (See Section 8.1.1, Part b).

On the other hand, Aydın, as a province, has a lower level of awareness for sustainable urban planning, especially at macro-scale policies, when compared to Manisa. Actually, Aydın gives much more importance to sustainability as a 'concept', because it has been included in the 'Healthy Cities Project', which was

initiated by World Health Organization (WHO). Due to this international project, Aydın Municipality have carried out many projects, which are coordinated by its 'City Health Center', and published many reports in this context. However, these studies were mostly for creating a 'healthy city' with projects for upgrading the existing environmental conditions (recreational parks, sports area, etc.), social and cultural facilities, public health (Health Impact Assessment' study) and so on. Although these attempts for creating a healthy city with a general concept of sustainability in all projects can be considered as a positive attitude towards sustainable urban development, as these attempts are not considered in spatial planning projects, Aydın is said to be less aware of sustainability in planning. In other words, it was seen that there are no policies considering macro and micro scale planning approaches in land-use planning in Aydın Municipality. Therefore, Aydın is not distinguished in the Table 8.30 as much as Manisa.

Among the other 6 settlements, Urla is seen as having the highest awareness in sustainable urban planning approaches. However, it should be noted that Urla is in close proximity to Izmir and therefore featuring very much in the ICRMDP, as an upper-scaled plan covering all the city-region (New Izmir Metropolitan Area), according to Law no.5216. Hence it is possible that some of the policies for Urla are direct consequences of the policies and development strategies identified in ICRMDP.

It can be seen in the summary table (Table 8.30) that sustainability focus and awareness appear more in terms of macro-scale policies when compared to micro-scale policies. It is possible to interpret this finding as the positive impact of ICRMDP on macro-scale policies throughout the city-region, which is the main focus and scale of this plan, as opposed to more micro-scale approaches, which are not really covered by this plan. That is to say that, macro-scale policies, such as urban form/model and urban sprawl (and even structure and job-housing balance as strategic level policies) receive significant emphasis in ICRMDP and this probably helped to shape such upper-scale policies of other settlements too (such as Urla, Manisa, Menemen and Aliağa). On the other hand, ICRMDP did not formulate many policies for some of the micro-scale measures (for example the importance of creating higher-density development and transit oriented or pedestrian friendly

design). Other settlements in the city-region do not have such policies either. It is possible to claim that ICRMDP is a regional scale and more general plan, and hence such urban design policies may be too detailed for the scope of this plan. Nevertheless, such approaches could be expected to be mentioned as general principles that can shape urban design approaches for local plans. It can be concluded that neither the ICRMDP as the strategic plan for the city-region nor the local plans and approaches of other settlements in the city-region have a sufficient level of awareness in terms of some of the micro-scale policies, i.e. land-use mix and diversity, transit-oriented design, high-density development strategies to help reduce the need to travel and hence attain a more sustainable transport system.

Creating job-housing balance, as one of the micro scale policies, appears to be a particularly critical issue in Izmir City Region. For instance, IzGM proposes some light rail and commuter railway projects that will increase the accessibility between settlements and Izmir city center. From this perspective, this policy can discourage creating job-housing balance in small settlements; because people can prefer working or training in other settlements and live in Izmir or vice versa due to high accessibility throughout the region. On the other hand, IzGM also proposes some new fuctions, *job opportunities, services, etc.,* in these settlements to make them more self-sufficient to be able to establish competitive and complementary relationships with other settlements in the city-region. From this perspective, this policy encourages creating job-housing balances in these settlements. Therefore, while IzGM's decisions can be thought as discouraging sustainable urban form model; they can also be regarded as encouraging city-region formation.

As a last remark, it is important to emphasize that it is learned through interviews that Selçuk and Çeşme are negatively affected from not being included in the Izmir Greater City area defined by the Law No. 5216. These settlements experienced some troubles as they are directly under the control of central governmental authorities. It is seen that there is a dominant top-down approach towards these settlements.

Table 8.30: Awareness of Sustainability In Urban Planning (2nd Objective) in Observed Settlements in Izmir City Region

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			OBSERVED SETTLEMENTS								
			ICRMDP	ACHDP	URDMP	MANISA	TORBALI	MENEMEN	ALİAĞA	SELÇUK	ÇEŞME
(a) Reference to Sustainability	(a1) Main Idea of Sustainable Development		✓	✓	X	✓	X	X			
	(a2) Three Dimensions of Sustainable Development		✓	✓	X	✓	X	X			
	(a3) Social-Economic-Ecological Objectives		✓	✓	X	✓	X	X	✓	✓	
(b) Macro-Scale Policies	(b1) Strategies Regarding Sustainable Urban Form/Model	Compact									
		Corridor	✓		✓			(✓)	✓		
		Multi-centered	✓		✓	✓	✓	(✓)			
	(b2) Prevent Urban Sprawl		✓		✓	✓	X	✓			
	(b3) Prevent Agglomeration In City Center		✓		✓	✓					

Note: Although the macro-scale policies can be thought as to be decided by IzGM at the city-region level, in this thesis study, also the small municipalities' relevant planning approaches have been evaluated.

Table 8.30 (Continued)

AWARENESS OF SUSTAINABILITY IN URBAN PLANNING (2ND OBJECTIVE)			OBSERVED SETTLEMENTS								
			ICRMDP	ACHDP	URDMP	MANISA	TORBALI	MENEMEN	ALİAĞA	SELÇUK	ÇEŞME
(c) Micro-Scale Policies (At Strategic Level)	(c1) Location	Proximity to Urban Center	✓		X	X					
		Proximity to Public Trans. Routes	✓		X	✓			✓		
	(c2) Structure		✓		✓	X					
	(c3) Land-Use	Job-Housing Balance & Balanced Community	✓		(✓)	✓	(✓)		(✓)		
(c) Micro-Scale Policies (At Local Level)	(c4) Clustering	Locality	✓		✓	X	(✓)				
		Land-Use Mix	✓		X	X	(✓)				
		Design	X		X	X					
(c) Micro-Scale Policies (At Neighbourhood Level)	(c5) Density	Higher Population & Devl. Density	X	X	X			X			
	(c6) Layout	High-Quality	✓	✓	✓	✓	✓	X		✓	
		Pedestrianize	✓	✓	✓	✓	✓	X	✓	✓	
		Parking Policies	X	X	✓	X	✓	X	X		

8.2. Awareness of Sustainability in Transport Strategies

8.2.1. 1 / 25000 - scaled Izmir City Region Master Development Plan (2006)

As Greater Izmir Municipality has been preparing **a new transport master plan** and has a separate department for making this plan, transport strategies of the municipality will be discussed in Section 8.2. However, as the new transport master plan has been being prepared according to ICRMDP's transport strategies as ICRMDP (IzGM 2006) has already been completed. Hence, both of the plans' transport decisions overlap and complement each other.

8.2.2. Greater Izmir Municipalities' Transport Strategies (2007)

In this section, Greater Izmir Municipality's transport strategies will be discussed on the basis of the presentation of Ali Rıza Gülerman's on 'IzGM's Transport Strategies 2007' at Izmir Agenda 21 City Council: Transport Group Meeting for 'Transportation in Izmir from Past to Future' on May 2007 and the New Transport Master Plan Intermediary Reports that has been prepared by the Transport Master Plan Office (IzGM 2007) It should be acknowledged that the new transport master plan has not been approved yet during the preparation of this study. Transport Master Plan Office is connected to UKOME. Main responsibilities of the department, UKOME, in Greater Izmir Municipality are to regulate the public transport issues (security of the passengers, quality of drivers); to coordinate each kind of transportation services on land, sea and railway; to define the routes, frequency, etc. of commercial vehicles (taxi, minibuses) (Official Website of IzGM: http://www.izmir.bel.tr, Last accessed date: January 3, 2008).

In order to determine the existing transport schema and its problems, create a new transport model, establish urgent activity project in short and long ranges, and develop transport alternatives for the target year in the New Izmir Metropolitan Area, the municipality decided that there should be **a new transport master plan** (Gülerman, 2007). In fact, this new transport master plan has become a responsibility of Greater Izmir Municipality that was brought by Law No. 5216. The

Law commissioned the greater municipality to make and implement the Metropolitan Transport Master Plan, to plan and enable coordination among transport and public transport services, and make traffic arrangements (Law No.5216 and Gülerman 2007). Besides, the last transport study was made in year 1992 and has become insufficient for New Izmir City Region borders.

The New Izmir Transport Master Plan's main aims are,

- to make analysis, synthesis and to execute data-collection systems related to transport and traffic,
- to create coordination among related public authorities,
- to search for the socio-economic structure of Izmir and to confirm the mobility of the citizens in order to determine the transport demands of people
- to create a control mechanism where the connections between ICRMDP's land-use decisions and transport systems are taken into account (See Table ?, Question 3)
- to define and make cost analysis of the transport-infrastructure projects (IzGM 2007).

Moreover, Greater Izmir Municipality's visions for transportation in Izmir City Region are:

- ✓ Giving priority to human not to vehicle;
- ✓ Using all the requirements of modern technology and being open to developments,
- ✓ Having different transport modes that are appropriate for Izmir's specific structure, and integrated with each other,
- ✓ Accessible, fair and secure for each parts of the city
- ✓ Sensitive to inhabitants' hopes and to environment (Gülerman 2007)

As it can be seen in the following sections, that Greater Izmir Municipality has been a very active municipality in terms of making projects for improving public transport and decreasing the usage of private cars especially in the Izmir City Center.

a. Policies For Improving Public Transport Modes

Public transport is a tool for achieving sustainable urban development and transport. In order to improve public transport; rail-based systems, bus routes and services, and community vehicles should be developed (See Chapter 4). Greater Izmir Municipality also has some plans and projects in order to improve rail systems, sea transport, bus transport and ensure the integration among these different transport modes (Gülerman 2007). In fact, the municipality has a high awareness of the significance of public transport.

a.1. Rail Systems - Izmir Urban and Regional Rail Systems Development

Rail-based systems are shown as having the highest capacity and least environmental impact among the other modes although it is the least flexible and most costly urban public transport mode. Metros, suburban (commuter) railways, and light rail transit systems are given as examples of R-MRT. In Izmir City Region, there are existing railways, light rail systems and commuter railways. These will be improved or extended with new projects.

LRT Systems - Izmir Light Rail Systems Development Project

One of the projects on the agenda of Greater Izmir Municipality is to complete Izmir Light Rail System Project. Project's stages are:

- 2nd Stage Completion Construction (Üçyol – F. Altay)

- 3rd Stage Construction (Bornova Center and Bus Station)

- 4th Stage Construction (F. Altay – Narlıdere)

- 5th Stage Project and Construction (Üçyol – Buca Dokuz Eylul University Campus) (Gülerman 2007)

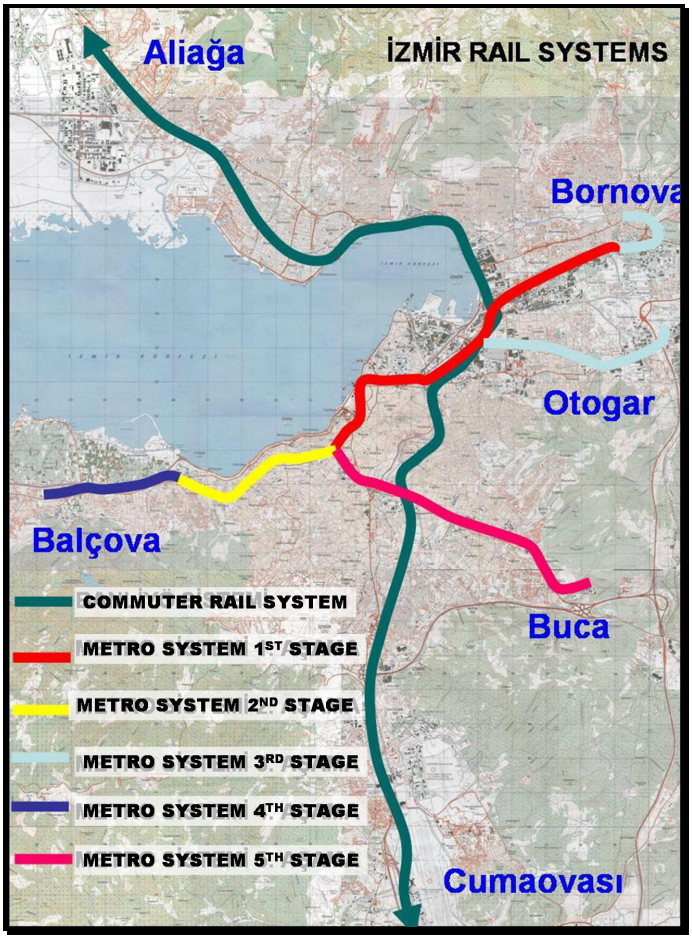


Figure 8.6 Izmir Rail Systems
(Source: Gülerman 2007)

Commuter Rail Systems - Izmir Commuter Rail System Development Project

Along the North-South axis of Izmir, there have been continuing electrification studies and station constructions of the commuter rail project between Aliağa-Menderes. This project is formed of two rail lines that end in Alsancak Station and that form the spine of the city. After these lines are integrated with Halkapınar Station, there will be a transfer but much faster travel in this axis (IzGM 2006, 196).

In Aliağa-Menderes Commuter Rail System Project, totally 550 000 passenger/day capacity has been envisaged (. The project has eight construction stages. The **North Line (Aliağa-Alsancak),** which is 57 km in length, has a 60-minutes operation time

and 20 stations. **The South Line (Alsancak-Cumaovası),** which is 22 km in length, has a 26-minutes operation time and 10 stations. The 10 stations between Aliağa-Menemen and in Cumaovası will be controlled by Turkish State Railways (TCDD) as they are out of municipality borders. In this project, 550 000 passengers per day and 165 000 000 passengers per year are planned (IzGM 2006,196 and IzGM 2007).

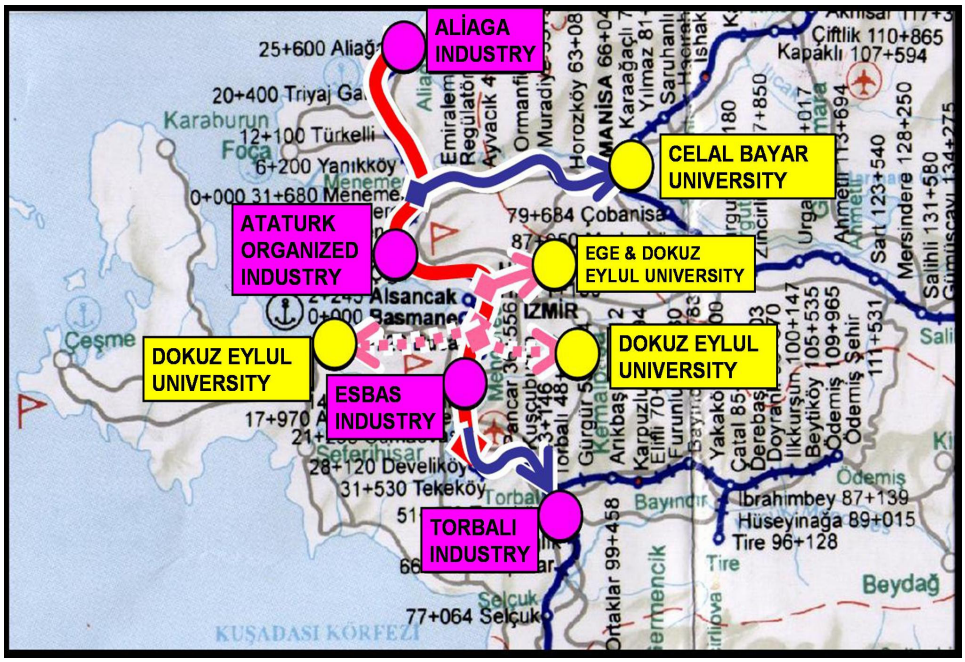


Figure 8.7 Izmir Commuter Rail System Development Project's Service Area
(Source: Izmir Greater Municipality 2007)

Figure 8.8 Izmir Commuter Rail System and Stations
(Source: Izmir Greater Municipality 2007)

Actually, as it was told before in the macro-scale policies section, the plan tries to strengthen the connections among corridors in different sub-regions. As it can be seen in the map, the Project area covers many important service areas like Aliağa Industrial Areas, University Campuses, etc. The plan also brings some new functions to the settlements in these corridors along the railway systems. For instance, in the long range, a harbour is planned in Çandarlı and therefore, the railway is thought to be extended to Çandarlı. Dayangaç stresses that in the plan, it has been tried to make decisions in land-use planning in an integrated way with transport planning. This can be interpreted as that transportation and land-use decisions are being considered together.

Heavy Rail Systems

There are also some proposals for improving railways in some routes. For example, the light rail system that extends to Bus Station will be continued as railway until Kemalpaşa (Dayangaç 2007, 4 December). The blue routes in the Figure 8.7 above shows the heavy rail systems that will be improved in Izmir City Region.

a.2. Bus Transport

Renewal of Bus Fleet

The proposals for the development of bus transport are the renewal of bus fleet (buying 100 busses annually), developing vehicle following system, and improving a transfer ticket system (IzGM 2007).

Improve Bus Services

There is a proposal to create a 'Transport Control Center' that will follow the buses simultaneously. Therefore, the buses will be checked whether they are coming at the exact time on the timetables (IzGM 2007).

a.3. Sea Transport

The proposals of Greater Izmir Municipality for the sea transport are in the inner gulf, development of passenger and vehicle transportation with new supply of passenger ships and public ferries, renewal of existing ship stock and improvement of piers. Besides, in the outer gulf, to supply sea busses and improve piers are the policies (IzGM 2007).

a.4. Integration of Modes

Greater Izmir Municipality prepared a project called the "Transformation in Transportation Project", to integrate bus, sea transport, commuter rail and light-rail systems. In order to improve the performance of the system, the project consisted of

physical developments; reestablishing the routes, services, and fare systems of all transport modes. For obtaining an integrated public transport system, the project was planned in three stages. The first stage began with the introduction of the electronic fare collection system, Kentkart, to buses and with its usage in the ferry system. The second stage consisted of the introduction of metro system and the integration of metro, buses, and ferries completely. The third stage consisted of the improvements that will be applied after the opening of the Ucyol-Uckuyular part of the metro (Öncü, 69-70).

The project that started in year 2000 has caused permanent changes in Izmir city transport. For example, with this project, in year 2000, firstly bus lines and routes were rearranged to enable integration with maritime transport and secondly, with introduction of feeder bus services, distance based staged fare system (transfer ticket system) was implemented in order to encourage transfers between ferries and buses (Öncü, 92, 95; IzGM^2 2007). There are also designed some car parks in the transfer centers (integration points) for people to park and ride (IzGM 2007).

Afterwards, with the implementation of the transformation project, Izmir's public transport patronage has changed. As it can be seen from the Figure 8.9, total public transport usage has increased significantly since 2001. Öncü explains that this increase is due to the rise in metro and ferry usage and not the bus usage. On the other hand, the reducing patronage trend in buses was reversed after the project. Before the integration project, bus system had the largest passenger share among all modes but with a decreasing trend, because passengers had preferred using their private cars (Öncü, 95-97). Besides, in ICRMDP (IzGM 2006, 200-201), to improve the quality, accessibility, speed and integration among modes in public transport is shown as a target.

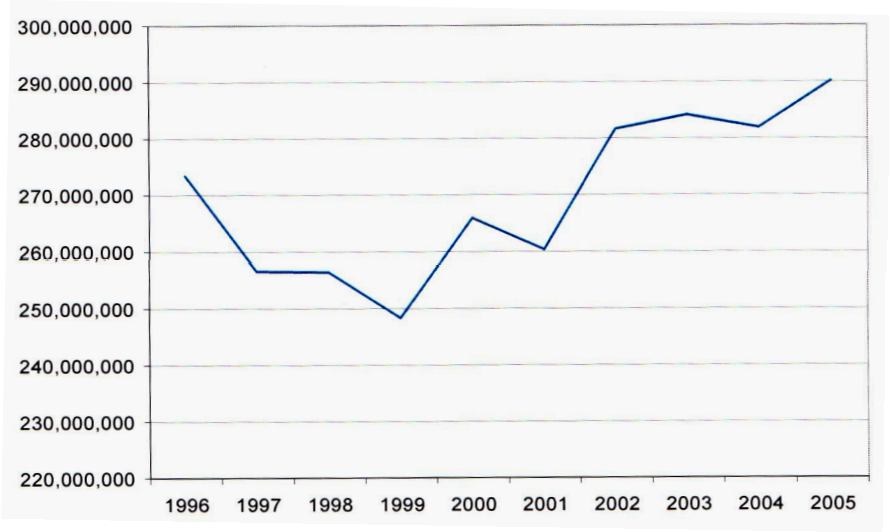


Figure 8.9 Total Public Transport Usages in Izmir between 1995 and 2005
(Source: ESHOT, IZDENIZ, Metro Inc 2007 cited in Öncü 2007, 97)

Although integration between sea transport and underground system is tried to be provided in Izmir, city buses are the main component of public transport. ESHOT and IZULAS are institutions that operate city buses. Moreover, there are minibuses that function among counties and neighborhoods without entering the city center (IzGM 2006, 197). Hence, Greater Izmir Municipality would like to increase the usage of railway systems (See Table 8.31).

Table 8.31 Target Usage Rates of Public Transport In Izmir Metropolis City

In Urban Public Transportation Share of Transport Modes In Daily Trips			
Modes	**Before 1999**	**Year 2004**	**Aim**
Motorway (Bus)	**% 99** *(ESHOT+İZULAŞ)*	**% 85** *(ESHOT+İZULAŞ)*	**% 55**
Seaway	**% 0,5** *(TDİ)*	**% 4,9** *(İZDENİZ)*	**% 5**
Railway System	**% 0,5** *(TCDD)*	**% 10** *(IZMIR METRO)* **% 0,1** *(TCDD)*	**% 40**

Note: Average: Number of trips per day / Total trip number.

(Source: Izmir Greater Municipality 2006, 197 and Gülerman, 2007)

Consequently, all of these policies aim to increase the usage all of the public transport modes and this is very important for ensuring sustainable transport. Therefore, IzGM has a high awareness of the importance of public transport. Besides, the proposed rail lines are mainly related with **five growth corridors** defined in 1/25000 scaled ICRMDP (IzGM 2006). This is a positive feature of Greater Izmir Municipality's transport approaches and of the new Transport Master Plan that encourages integration between land-use and transport planning policies.

Table 8.32: ICRMDP's and ITMP's Policies for Improving Public Transport

AWARENESS OF SUSTAINABILITY IN TRANSPORT STRATEGIES (2ND OBJECTIVE)			ICRMDP	ITMP
(a) Policies for improving public transport modes	(a1) Rail Systems	LRT Systems	✓	✓
		Commuter Rail Systems	✓	✓
		Heavy Rail Systems	✓	✓
	(a2) Bus Transport	Renewal of Bus Fleet	✓	✓
		Improve Bus Services	✓	✓
	(c) Sea Transport	(c.1) New Supply	✓	✓
		(c.2) Renewal of Ship Stock	✓	✓
		(c.3) New Piers	✓	✓
	(d) Integration of Modes		✓	✓
			✓	✓
			✓	✓

b. Policies For Improving Non-Motorized Transport Modes

In fact, as land-use planning and transport strategies are planned together in a sense by Greater Izmir Municipality authorities, the policies? of ICRMDP and the transport strategies are complementary.

b.1. High-Quality Pedestrian and Cycling Facilities

Areas where inadequate pavement width, unorganized pavement heights exist, or insufficient pavement capacity exists are proposed to be determined. The places where the pedestrian security of children, old or disabled people does not exist will be distinguished. Besides, the areas where intense pedestrian traffic and intense vehicle traffic operate together will be found out. New strategies will be defined in order to increase the quality of pedestrian routes in the new transport master plan (IzGM 2007).

b.2. Pedestrianization

It is planned to develop new pedestrianization studies, especially in Kemeraltı and Alsancak regions in the new transport master plan (Arkon and Batkan 2007, 4 December).

b.3. Parking Policies and Other Policies to Discourage Car Use

Based on the interviews with Arkon and Batkan, there have been limitations on the availability of parking in some main routes (Mithatpasa, and Girne Boulevards…etc.) and especially in the city center in order to discourage private car usage. Besides, in the roads that have insufficient physical capacity, there is also some limitations on parking. There will be some additional policies about parking and new car parks in the new transport plan.

Table 8.33: ICRMDP's and ITMP's Policies for Improving Non-Motorized Modes

AWARENESS OF SUSTAINABILITY IN TRANSPORT STRATEGIES (2ND OBJECTIVE)		ICRMDP	ITMP
(b) Policies for improving non-motorized transport modes	(b1) High-Quality	✓	✓
	(b2) Pedestrianization	✓	✓
	(b3) Parking Policies	x	✓

8.2.3. Aydin City Health Development Plan (2005)

First of all, in the Plan, it is emphasized that a Transport Master Plan will be made in order to improve public transport in the city. The Plan's main transport objectives are;

- to supply a transport system that a healthy city necessitates,
- together with the existing city, to create a new transport model that will meet the needs of the growing city, and
- to provide whole the citizens to access transport facilities easily (Aydın Municipality and ADU[2] 2005, 80).

a. Policies For Improving Public Transport Modes

a.1. Rail Systems – Aydın's Urban and Regional Rail Systems Development

With considering **Healthy City Planning Group's** studies, it is planned to make a 'transport master plan' that proposes improvement of a railway system in order to facilitate the citizen's life (Aydın Municipality and ADU[2] 2005, 80, 91).

LRT Systems

There is a "Street Tramway Railway System Project" that is seen as a result of giving importance to public transport and some environmental, social, and cultural aims (ACHDP, p. 81). The existing heavy rail line that passes through the city will be transformed into light rail system (Erdoğmuş and Küçükyumuk 2007, 6 December).

Heavy Rail Systems

The railway that passes through the city in the Izmir-Afyon-Ankara direction will be rehabilitated and its surrounding will be afforested (Aydın Municipality and ADU[2] 2005, 81).

a.2. Bus Transport

Renewal of Bus Fleet-Improve Bus Services

Küçükyumuk stresses that there are 160 minibuses in Aydın and these create traffic in the city center. Therefore, the municipality has planned to give one bus to each minibus owner, who have three minibuses. This strategy will relax the traffic, increase public transport vehicle capacity and is expected to raise the usage of buses (Küçükyumuk 2007, 6 December)

Table 8.34: ACHDP's Policies for Improving Public Transport

AWARENESS OF SUSTAINABILITY IN TRANSPORT STRATEGIES (2ND OBJECTIVE)			ACHDP
(a) Policies for improving public transport modes	(a1) Rail Systems	LRT Systems	✓
		Commuter Rail Systems	
		Heavy Rail Systems	✓
	(a2) Bus Transport	Renewal of Bus Fleet	✓
		Improve Bus Services	✓

b. Policies For Improving Non-Motorized Transport Modes

These policies were explained in Section 8.1.2 (See Table 8.7).

8.2.4. Urla Revision of Master Development Plan (2007)

URMDP does not have policies for improving public transport.

b. Policies For Improving Non-Motorized Transport Modes

These policies were explained in Section 8.1.3 (See Table 8.12).

8.2.5. Manisa Municipality's Transport Planning Strategies (2007)

a. Policies For Improving Public Transport Modes

a.1. Rail Systems

LRT Systems

The city planner, Veral, says that with the demand of authorities from Ankara, revision of the development plan has been done. That is because, a high-speed rail line has been planned on the Izmir-Manisa-Ankara route. The existing railway connection between Muradiye and Menemen, in the west of Manisa, will be improved and this high-speed rail line will integrate into the light rail system of Izmir, which has been in construction, coming from Aliağa. This railway will solve traffic problems that have been caused by service vehicles of Manisa Organized Industrial Zone, because, with this railway, the workers of the OIZ will not have to use motorized road vehicles.

Heavy Rail Systems

It has been planned to develop a railway connection between Manisa Organized Industrial Zone and Izmir Harbour. This will be constructed by Manisa Organized Industrial Zone and the route has not been determined yet, but it is decided that it will integrate into the heavy rail line, coming from Aliağa towards Izmir, passing through Muradiye. This project has been carried out with Manisa Organized Industrial Zone. The city planner, Veral, emphasizes that with this project, the amount of heavy vehicle (trucks) traffic especially between Menemen and Muradiye and between Manisa and Izmir will fall.

a.2. Bus Transport

Improve Bus Services

Dürgen, from the Transport Services Directorate, says that there have been public

transport controls by the Directorate to regulate the minibuses' stopping along their routes, letting passengers within their capacity, etc. The minibuses that are coming from out of the city are not allowed to enter the city center. They are stopped at the vehicle park out of the city center.

Table 8.35: Manisa's Policies for Improving Public Transport

AWARENESS OF SUSTAINABILITY IN TRANSPORT STRATEGIES (2ND OBJECTIVE)			MANISA
(a) Policies for improving public transport modes	(a1) Rail Systems	LRT Systems	✓
		Commuter Rail Systems	
		Heavy Rail Systems	✓
	(a2) Bus Transport	Renewal of Bus Fleet	
		Improve Bus Services	✓

b. Policies For Improving Non-Motorized Transport Modes

These policies were explained in Section 8.1.4. (See Table 8.17).

8.2.6. Torbalı Municipality's Transport Planning Strategies (2007)

a. Policies For Improving Public Transport Modes

a.1. Rail Systems

Heavy Rail Systems

As it is explained in Section 8.2.2., there is a heavy railway project on existing rail lines by Greater Izmir Municipality that passes in close proximity to Torbalı with considering Torbalı industry in Aydın direction; but this is not a policy of Torbalı Municipality.

a.2. Bus Transport

Renewal of Bus Fleet

As Torbalı is in the 50 km radius of Greater Izmir Municipality, the transport services between Izmir city center and Torbalı is provided by Greater Izmir Municipality (IZULAS and ESHOT). Besides, Torbalı Municipality has bought 20 private minibuses that have been being under control of Torbalı Municipality.

Table 8.36 Torbalı's Policies for Improving Public Transport

AWARENESS OF SUSTAINABILITY IN TRANSPORT STRATEGIES (2ND OBJECTIVE)			TORBALI
(a) Policies for improving public transport modes	(a1) Rail Systems	LRT Systems	
		Commuter Rail Systems	
		Heavy Rail Systems	(✓)
	(a2) Bus Transport	Renewal of Bus Fleet	✓
		Improve Bus Services	x

b. Policies For Improving Non-Motorized Transport Modes

These policies were explained in Section 8.1.5. (See Table 8.20).

8.2.7. Menemen Municipality's Transport Planning Strategies (2007)

a. Policies For Improving Public Transport Modes

a.1. Rail Systems

Commuter Rail Systems

There is a commuter railway project (Aliağa-Menderes) (See Section 8.2.2) using the existing rail lines together with Greater Izmir Municipality, but it is mainly under the control of IzGM (Aksoy 2007, 6 December).

a.2. Bus Transport

Currently, Menemen does not have any public transport strategy. Kuyucu has stated that it has been very close in distance to the metropolitan core of Izmir City Region, and that accessibility level is very high. He also mentioned that the bus transport facilities are provided by Greater Izmir Municipality as it is in the other 19 county municipalities of IzGM (See Section 6.4.1.1) (Kuyucu, 2007, 5 December).

Table 8.37: Menemen's Policies for Improving Public Transport

AWARENESS OF SUSTAINABILITY IN TRANSPORT STRATEGIES (2ND OBJECTIVE)			MENEMEN
(a) Policies for improving public transport modes	(a1) Rail Systems	LRT Systems	
		Commuter Rail Systems	(✓)
		Heavy Rail Systems	
	(a2) Bus Transport	Renewal of Bus Fleet	x
		Improve Bus Services	x

b. Policies For Improving Non-Motorized Transport Modes

These policies were explained in Section 8.1.7. (See Table 8.24).

8.2.8. Aliağa Municipality's Transport Planning Strategies (2007)

a. Policies For Improving Public Transport Modes

a.1. Rail Systems

Commuter Rail Systems

There is a commuter railway project (Aliağa-Menderes) (See Section 8.2.2) using the existing rail lines together with Greater Izmir Municipality, but it is mainly under the control of IzGM (Aksoy 2007, 6 December).

a.2. Bus Transport

Improve Bus Services

Uyanıktürk says that Aliağa Municipality has been planning a minibus system at specific points as a transport strategy (Uyanıktürk 2007, 5 December).

Table 8.38: Aliağa's Policies for Improving Public Transport

AWARENESS OF SUSTAINABILITY IN TRANSPORT STRATEGIES (2ND OBJECTIVE)			ALIAGA
(a) Policies for improving public transport modes	(a1) Rail Systems	LRT Systems	
		Commuter Rail Systems	(✓)
		Heavy Rail Systems	
	(a2) Bus Transport	Renewal of Bus Fleet	
		Improve Bus Services	✓

b. Policies For Improving Non-Motorized Transport Modes

These policies were explained in Section 8.1.7. (See Table 8.28).

8.2.9. Selçuk Municipality's Transport Planning Strategies (2007)

a. Policies For Improving Public Transport Modes

a.1. Rail Systems

LRT Systems

There is a high-speed railway project using the existing rail lines together with Greater Izmir Municipality, but there are no investment plans yet (Aksoy 2007, 6 December).

a.2. Bus Transport

Aksoy says that there is no public transport strategy in the city center, because the center is too small and accessibility is very high. However, there are minibuses going to the settlements (villages) out of the center (Aksoy 2007, 6 December).

Table 8.39: Selçuk's Policies for Improving Public Transport

AWARENESS OF SUSTAINABILITY IN TRANSPORT STRATEGIES (2ND OBJECTIVE)			SELCUK
(a) Policies for improving public transport modes	(a1) Rail Systems	LRT Systems	✓
		Commuter Rail Systems	
		Heavy Rail Systems	
	(a2) Bus Transport	Renewal of Bus Fleet	X
		Improve Bus Services	X

b. Policies For Improving Non-Motorized Transport Modes

These policies were explained in Section 8.1.8. (See Table 8.30).

8.2.10. Concluding Remarks

In summary, in this section, in the observed settlements, the level of awareness for sustainability in transport policies has been evaluated. When Table 8.40, which shows the sum of all the assessments made for each settlement, is examined, it can be seen that among the municipalities, once again Izmir Greater Municipality has the highest awareness about the importance of sustainability principles in transport planning. Izmir Greater Municipality has a department, Transport Master Plan Office, which is responsible only for transport planning and preparing New Transport Master Plan. This new transport plan and public transport policies decided in ICRMDP, propose many new public transport projects that cover many settlements along the main corridors of Izmir City Region. Then, Aydın and Manisa are distinguished as giving more importance to improve green modes of transport, public transport and non-motorized modes of transport, among other settlements in Izmir City Region. Manisa has some light rail and heavy rail projects that will also affect some other settlements in Izmir City Region.

It is important to note that in Table 8.40, the lack of rail investments for certain settlements should not bee seen as a negative outcome for these settlements. That is because it cannot be expected for small settlements to make investments for such high-capacity public transport systems. Therefore lack of such projects in small municipalities cannot be evaluated as a negative or positive strategy of the municipality. It should be considered as a positive attitude if these municipalities have any policies for improving the public transport and non-motorized transport modes in their settlements. From this perspective, it is important to note that Izmir, Aydin, Manisa, Torbalı and Aliağa have plans to improve their public transport systems through rail or bus improvement projects, whereas in Menemen, Selçuk and Çeşme there is no emphasis on such public transport improvement policies and projects.

Table 8.40: Awareness of Sustainability In Transport Strategies (2nd Objective) in Observed Settlements in Izmir City Region

AWARENESS OF SUSTAINABILITY IN TRANSPORT STRATEGIES (2ND OBJECTIVE)			OBSERVED REPORTS									
			ICRMDP	ITMP	ACHDP	URDMP	MANISA	TORBALI	MENEMEN	ALİAĞA	SELÇUK	CESME
(a) Policies for improving public transport modes	(a1) Rail Systems	LRT Systems	✓	✓	✓		✓				✓	
		Commuter Rail Systems	✓	✓					(✓)	(✓)		
		Heavy Rail Systems	✓	✓	✓		✓	(✓)				
	(a2) Bus Transport	Renewal of Bus Fleet	✓	✓	✓			✓	X		X	
		Improve Bus Services	✓	✓	✓		✓	X	X	✓	X	
	(c) Sea Transport	(c.1) New Supply	✓	✓								
		(c.2) Renewal of Ship Stock	✓	✓								
		(c.3) New Piers	✓	✓								
	(d) Integration of Modes	(d.1) Transfer Ticket Syst.	✓	✓								
		(d.2) Reestabl. Routes	✓	✓								
		(d.3) Park&Ride	✓	✓								
(b) Policies for improving non-motorized transport modes	(b1) High-Quality		✓	✓	✓	✓	✓	✓	X		✓	
	(b2) Pedestrianization		✓	✓	✓	✓	✓	✓	X	✓	✓	
	(b3) Parking Policies		X	✓	X	✓	X	✓	X	X		

8.3. Conclusion

When Tables 8.30 and 8.40 are observed, it can be seen that Izmir City Region with its 1/25000 scaled Izmir City Region Master Development Plan and Izmir Transport Master Plan (being prepared) responds almost all the questions related with them positively in terms of sustainable development and transport terms. Thus, it can be deducted that Greater Izmir Municipality has an extremely high awareness about the importance of sustainability principles, whereas other 8 settlements, with which interviews were made in Izmir City Region the awareness level is found to be relatively lower.

When ICRMDP (IzGM 2006) and ITMP (IzGM 2007) are summarized, it can be said that there are many points that can be associated with the literature review on sustainable development and transport. First of all, as it has been mentioned in Section 6.4.2, Izmir City Region has been developing along five main corridors. These corridors are formed through settlements some of which are referred as sub-centers in ICRMDP: Menemen, Aliağa in the north corridor; Kemalpaşa, Turgutlu, Manisa in the east corridor; Torbalı, Bayındır, Tire in the southeast corridor; Seferihisar, Menderes in the south corridor; and Urla, Çeşme, Karaburun in the west corridor. In fact, these corridors are mainly shaped through five different transport axes that radiate from the Izmir city center. In the north, there is Menemen-Aliağa divided road; in the northeast, Izmir-Manisa road; in the east, Kemalpaşa-Turgutlu-Salihli; in the south, there is Torbalı-Selçuk partly divided road, and in the west, there are Izmir-Çeşme and Izmir-Karaburun roads.

However, Izmir City Region not only has a corridor form, but also shows a polycentric or multi-nodal development form. ICRMDP emphasizes that Izmir City Region has many sub-centers, which have developed along the corridors, and the aim of the ICRMDP is with increasing the *multi-functional land-uses* in these settlements, to make them self-sufficient sub-centers in the city-region. As it has been discussed in Section 7.2.2, in fact, the polycentric or multi-nodal form in Izmir City Region is a consequence of the transition period from metropolis to post metropolis that changed the monocentric focus in the metropolitan region (Soja 2005). As Priemus and Hall (2004) stated, through time in urban areas, more centers

and sub-centers have been developed, which have also been functioning as nodes in transport infrastructures and ICT-networks. In Izmir City Region, this situation can be seen when the figures drawn in Chapter 7 are observed. Priemus and Hall (2004) also indicate that while there was a spatial separation of functions like *housing, employment, recreation, and transport* in the industrialization period, now there is a shift towards *a multifunctional area* development. ICRMDP encourages this new development trends by proposing sub-centers and enforcing them with planning new functions in these nodes.

Secondly, with the New Izmir Transport Master Plan, there are light rail and commuter rail systems proposed, both new systems and as extensions of existing public transport routes. When the Figure 8.6 is observed, it can be seen that the existing railroads were developed along important service areas (industrial zones, universities, etc.) and also new functions were developed along these routes in order to increase the accessibility. Now, the proposed railway projects are considered along important functional areas. Besides, the integration among modes are tried to be ensured with some policies. In ICRMDP, it is stressed that the areas that do not coincide with thresholds have been chosen as new development areas and the Plan aims to strengthen the corridors with giving specific functions to the nodes along these growth patterns. Therefore, in one perspective, the land-use and transport decisions are determined in a coordinated way, as it will be discussed in the following chapter. These approaches cannot be resemled to transit-oriented development (TOD) policies, which is a way of integrating land-use and transportation policies, with organizing on a regional level to be compact and supportive of public transport. In TODs, commercial development, housing, jobs, parks, and other uses are placed within a walking distance of transit stops (Quinn 2006, IBI Group 2004).

It is possible to claim that this is a regional scale and more general plan, and hence such urban design policies may be too detailed for the scope of this plan. Nevertheless, such approaches are not even mentioned as general principles that can shape urban design approaches.

In summary, an in-depth analysis of the plans of settlements (when available) was

made and interview results were evaluated in the context of the second part of the hypothesis. The second part of the hypothesis was about the possible area of conflict between city-region debates and sustainable debates that is whether economic objectives for city-regions, where the major goal is to become a global player in economy, surpass and hinder environmental sustainability objectives and awareness for environmental sustainability. (Hence, whether the economic functioning of various nodes are to be more important than creating self-sufficient nodes to reduce traffic). It can be seen that the findings from the Izmir City-Region case does not support the second part of the hypothesis since it can be said that there is a high level of awareness of the importance of sustainability in land-use and transport planning, and various policies exist for creating urban forms/models for sustainable transport.

CHAPTER 9

EVALUATION OF POLICY COORDINATION IN IZMIR CITY REGION

In city-regions, there is the **fragmentation of governments**, which may act as an important barrier for attaining policy coordination between different settlements that form the city-region and between land-use planning and transport planning authorities. It will be remembered that, the sustainable transport literature relies heavily on the need to coordinate and integrate urban and transport planning policy with each other, which are often carried out by different authorities. Therefore, the third main question of the thesis was formulated as follows:

> Is there a policy-coordination among different planning authorities for ensuring sustainability and effective implementation of policies in the selected city-region?

Thus, the aim of this section is to find answers to the questions of the third objective, which is defined based on the third main question above and which assesses the policy-coordination among different participants in the selected city-region's planning process. Then, the administrative structure in Izmir City Region will be analyzed to assess whether there is *policy-coordination* between different bodies and whether there is an awareness regarding the importance of policy coordination, which is a requirement for enabling sustainable urban development and transport in city-regions. Before, it is important to show the changes introduced by Law No.5216.

According to Law No.5216, Greater Municipality Law, the greater municipalities were commissioned to ensure the coordination among the municipalities in the greater municipality borders. One of the greater municipalities' duties, responsibilities, and powers is to make the strategic plan and to define annual targets, investment programmes, and the budget with taking the county and first-degree

municipalities' opinions. Another one is, with the necessity to conform to the related Territorial Development Plan, to make, have it made, and to implement master development plans at scales between 1/5000 and 1/25000 in the greater municipality and adjacent area (*mücavir alan*) boundaries. The municipalities in the metropolitan area should prepare implementation plans according to the main development plan and the greater municipality should accept or change, approve the changes and then control whether the changes in these plans, in their parcellation plans, and in their improvement plans are applied (Official Website of TBMM: http://www.tbmm.gov.tr/kanunlar/k5216.html, Last accessed date: January 15, 2008)

Therefore, Izmir City Region Master Development Plan (ICRMDP) should be adopted by the other municipalities in Izmir City Region and all the municipalities should make necessary changes in their own development plans at 1/1000 scale. Besides, the Law determines that while ICRMDP is being prepared, there should be coordination with all the settlements in the city-region. As a necessity of the Law No. 5216, Greater Izmir Municipality is responsible for making land-use plans, transport plans, and infrastructural plans for all settlements in the city-region by studying with the municipalities in coordination for data and view sharing. According to Karaca, this principal has been implemented in Greater Izmir Municipality (Karaca 2007, 14 May).

In summary, in this section, with an evaluation of the plans (when available) and particularly with an evaluation of all the interviews made with 9 municipalities; firstly, it is assessed whether the coordination among municipalities could really be achieved during the preparation of ICRMDP with also considering the Law No. 5216; secondly, it is discussed whether municipalities have integration between their land-use and transport planning authorities. It is important to note that the 'Izmir City Region' mentioned in ICRMDP, which consists of 19 municipalities and is also referred as 'Izmir New Metropolitan Area' should not be mistaken with the 'Izmir City Region', which is used specific to this study and consists of 46 settlements.

9.1. Izmir Greater Municipality

In ICRMDP, it is emphasized that while developing a **vision** for the whole city-region, three important points have been considered. First point is to synthesize the actors' interests, informing the society, and to comprise the public in defining the problems. Second point is to make the society almost a part of the team. Last point is that to create synergy by ensuring participation is one of the most important issues in developing a vision (IzGM 2006, 76-77). Therefore, ICRMDP has defined its vision concerning these points and so it can be said that there exists a **'shared vision'** (See Section 8.1.1, Part a.3) of all 19 settlements, which are defined by Law no.5216, in the Izmir City Region (See Section 6.4.1.1).

In the Preface of the Plan, it is told that Izmir City Region Main Development Plan has been prepared in a democratic atmosphere where the knowledge is shared regularly and always in interaction with *local authorities, academic institutions, professional vocation chambers, public authorities, and sectorial representatives*. In the '*Introduction'* part, it is emphasized that in order to ensure the **sustainability** of the urbanization process, in the planning region, the upper-scaled plans, which will supply data to the lower-scaled plans, should be planned with participation and cooperation among institutions. In addition, after the plans are obtained, these plans should be adopted, applicable and controlled (IzGM 2006). Then the Plan can be said to be aware of the importance of governance and the participatory planning that are one of the **four pillars** of sustainable urban transportation (See Section 4.3). As it has been discussed in Section 4.3.2, there should be effective governance and hence effective bodies for integration between land-use and transport planning that are also known as 'smart growth'.

However, it is stated in ICRMDP that in Izmir City Region, there were spatial changes that were planned by different decision-makers and Izmir was deprived of a *'holistic'* planning approach. In 1985, with Law No.3194 Development Plan, many local authorities in Izmir City Region gained the power of approving the plans. However, this power was used without any limits due to the deficiency of an upper-scaled plan and so the wealthy geography of Izmir has been destroyed (IzGM 2006, 69-70). This shows that there was a **fragmentation** problem among the central and

local municipalities in Izmir metropolitan area (See Section 4.3.3).

On the other hand, it is claimed in the Plan document by IzGM (2006) that ICRMDP is different from classical development plans with its way of defining the problems and solving them. First, it has many authorities and many settlements. Second, it does not specify a target year and it is open-ended. Therefore, it is claimed that the plan is always open to democratic negotiations and that it is flexible enough to respond to all possible changes. Third, it has developed a language that has a high representation capability as a necessity for the ambiance of multi actors (IzGM 2006, 72-75). In other words, the plan has been prepared with considering many actors.

It is also stated in the plan document that the plan has been prepared through a ***bottom-up, clear, participatory, and active planning*** process. In the data collection period, besides local authorities, non-governmental organizations, universities, civil society; many central institutions such as Greater Izmir Municipality, General Directorate of Highways, Ministry of Transport, Ministry of Tourism, Turkey Electric Corporate Company, Petroleum Pipeline Corporation, etc. This has been one of the visions of the ICRMDP (IzGM 2006, 43, 78).

Moreover, in ICRMDP, it is expressed that in the city region, there is the necessity for the plans to operate under many authorities that have new legal status and different powers and this situation diversifies the share of the power, raises the coordination problems, and creates power conflicts. IzGM (2006) emphasizes that with the changes in the competition world, variation in the authority pattern, and the change in legal status makes the Plan to define three principles related to content. The first one is the **'integration'** principle that refers to the use of the city region's resources efficiently. ICRMDP's green belt strategy is an integration principle that concerns many settlements and collects them to make decisions together. Second one is **'locality'** principle, that is based on the understanding that each settlement in the city region has its own/specific capacity and risks or benefits are shared with justice. Third one is **'flexibility'** principle that is related to working capacity of many authorities together. ICRMDP's implementation process is claimed to be beyond the dominance of one authority and that ***power sharing*** will be realised (IzGM 2006, 80-83).

Firstly, when the ICRMDP is evaluated from the *'policy coordination'* point of view, it can be concluded that, IzGM has paid attention to ensuring policy coordination among different authorities, *local authorities, academic institutions, etc.,* while preparing the 1/25000 scaled Izmir City Region Master Development Plan. However, although this plan document encourages policy coordination and emphasizes its importance as a policy, in order to realize whether these arguments have actually been managed, it will be rational to evaluate the results of the interviews.

From the interviews, it is understood that the cooperation among actors was not only for *data sharing*. Dayangaç argues that the acquisition of the plan and then the healthy management of it have been dependent on the operation of the democratic negotiation processes among actors and this plan can also be referred as 'an agreement plan' (Dayangaç 2007, 4 December). It is also stated in the Plan that the plan accepts the planning practice as an oriel that opens over the world where democratic governance, participation, and practical decision-making exist (IzGM 2006, 72). Interviewees expressed that during analyzing, synthesizing, and generating the plan, many meetings have been done in order to share data, knowledge, view, etc. From the interviews, it is realized that as one of the most important issues of the governance, civil society has also taken place in the all processes and their thoughts have been considered through meetings usually organized per week. There have been meetings for introducing and discussing the plan with every actor (Dayangaç and Özer 2007, 4 December). Another feature of the plan that supports these meetings is that, its content follows the hierarchy of the policy-plan-programme-project from macro to micro level (IzGM 2006, 72-74).

As an example for showing the coordination between IzGM's and central governmental transport and land-use planning authorities, Dayangaç says that General Directorate of Highways has proposed a route for Çanakkale highway but that route threatens some agricultural land. Therefore, in ICRMDP, this road has been proposed through a mountainous area. Moreover, Özer says that there were some projects of the Plan that could not be implemented because of its cost. At that time, interviews were made with the General Directorate of Highways or Railways for more applicable projects (Dayangaç and Özer 2007, 4 December).

During the interview with Karaca, it was learned that there are also many common projects (on land-use, transport or infrastructure planning) done with some other local municipalities, particularly with Aliağa and Menemen (Karaca 2007, 4 December).

It is stated by Gülerman (2007) that there is a department in the Izmir Greater Municipality, which is specialized only in transport planning. For making the New Transport Master Plan (ITMP), a new department has been set up as Transport Master Plan Office that is connected to UKOME. It is expressed that this Transport Master Plan Office has a planning committee that is comprised of city planners, civil engineers, architects, and consultants from some universities (Gülerman 2007, IzGM 2007). Batkan states that this Office have been studying with many authorities such as districts' municipalities, ESHOT, IZULAS, IZDENIZ, EBSO, IZTO, General Directorate of Highways, some industrial institutions, etc. for data and view sharing. He also says that Greater Izmir Municipality takes consultancy services from universities (Batkan 2007, 4 December).

Therefore, the results of interviews confirm that ICRMDP and ITMP, as upper-scaled plans, try to consider and ensure participation of all the municipalities in the New Izmir Metropolitan Area in both the planning and implementation processes. Interviews support that there is coordination among different participants during the preparation of these plans and as it is mentioned in ICRMDP, there is a 'shared vision' among 19 settlements in the Izmir City Region. In the next sections, with discussing the results of the interviews done with other 8 municipalities, the views of other municipalities about policy coordination and having a shared vision in the city-region will be seen.

Secondly, when the ICRMDP and IzGM's attitude is evaluated according to interviews with considering *'land-use and transport planning integration',* it can be seen that there is integration between land-use and transport planning authorities of IzGM.

Dayangaç mentions that the new transport master plan is being prepared currently, and the transport projects of Izmir City Region have been defined before this plan in

ICRMDP. In ICRMDP, the transport issue was studied in an integrated way with the Plan decisions. Therefore, the new transport master plan is being prepared according to ICRMDP's proposals. In addition, transport decisions in ICRMDP have also been made by UKOME and AYKOME[54] and the Transport Coordination Department Headship that coordinates the studies of UKOME and AYKOME. Hence, it can be said that there is a certain level of integration between transport planning departments and land-use planning departments. The departments related with land-use planning issues make some proposals and the departments related with transport planning implement those proposals or suggest some changes for them (Dayangaç and Batkan 2007, 4 December; Official Website of IzGM: http://www.izmir.bel.tr, Last accessed date: January 3, 2008).

The city planner, Önder Batkan, from the Transport Master Plan Office, also stresses that the new transport master plan have been prepared according to plan decisions of the Environment Plan and ICRMDP. Batkan states that the five development corridors defined in ICRMDP overlaps with existing and proposed railway routes and with ICRMDP's plan decisions, some settlements along corridors have become important nodes (attraction points) that will create new transport schemes among settlements. He gives as an example that the development of new harbour, piers, etc in the North axis, improvement of the agricultural and industrial functions in the West and South axis show that there will be a circulation between North-South and North-West due to passenger and load transfer (among Manisa-Çandarlı-Kemalpaşa-Torbalı nodes).

Besides, Gülerman (2007) and particularly Batkan express that ICRMDP proposes some new public transport strategies such as, the new transport plan aims to find out how ICRMDP's land-use decisions will change the traffic volumes and public transport usage schemas (bus, sea, or railway transport) in the main transport corridors with simple modeling approaches (questionnaires, statistical methods, etc.) (Batkan 2007, 4 December; Gülerman 2007). Hence, it can be said again that there is integration between ICRMDP (land-use planning authorities) and new transport master plan (transport planning authorities) in Izmir. However, it is also important to note that this integration is probably due to the current planning approaches and leadership in Izmir Greater Municipality, and not necessarily an outcome of the

[54] AYKOME: Infrastructure Coordination Center

government structure. In other words, in spite of numerous local governments involved and separate transport departments, the current planning approach aimed at overcoming possible problems of coordination and plan integration that may have arised from this fragmented structure.

9.2. Aydin Municipality

It is said in the Aydın City Health Development Plan (ACHDP) (2005) that for Aydın Municipality, one of the healthy city's properties is to find out new governance models that enable each parts of the society's participation voluntarily and to obtain a transparent, controllable, active and ethic administration identity. As an example, one of the targets of the City Planning is said to ensure public participation with sustainable tourism and sustainable conservation approach (Aydın Municipality and ADU^2 2005, 84, 88). Besides, it is also said that the projects that are made for city's development have been chosen according to the discussions with citizens, mukhtars, and non-governmental organizations in the introduction meetings of projects (Aydın Municipality and ADU^2 2005, 79).

It is also expressed in ACHDP and Aydın Municipality Action Plan Summary Report (AMAPSR) that there have been various local governance meetings at neighbourhoods of Aydın each week, called as 'neighbourhood meetings'. In these meetings, civil society and local authorities gather at the same platform and discuss the problems of the neighbourhoods. With these meetings, the problems are seen and solved onsite (Aydın Municipality and ADU^2 2005, 17; Aydın Municipality 2007). This is an example of community's participation in solving problems of the city at the neighbourhood level. In addition, in AMAPSR, it is mentioned that a system was established called the 'Clever Automation City System'. With this system, the mukhtars are included in the system directly (Aydın Municipality, 2007).

Firstly, when the reports of ACHDP and AMAPSR are evaluated from the *'policy coordination'* point of view, it can be concluded that Aydın Municipality pays much attention to ensuring policy coordination among different authorities, *local authorities, citizens, non-governmental organizations, etc.* while making projects.

Aydın Municipality also takes consideration of public participation very much. However, it will be rational to evaluate the results of the interviews in order to realize whether these arguments have actually been managed.

Küçükyumuk emphasizes that Aydın City Council is the first example in Turkey that is formed by several academicians from Adnan Menderes University and 14 working groups. This council is defined as trying mainly to actualize city vision, sustainable development, social solidarity, and participation principles fairly. Küçükyumuk states that this council gives much more importance to ensuring participation during the preparation of projects in Aydın Municipality (Küçükyumuk 2007, 6 December; Küçükyumuk, M.[3] 2007, 2-3). Therefore, the results of the interview support the statements of the plans and it can be said that Aydın Municipality has policy coordination among various actors in Aydın. However, this policy coordination is at the city level and does not consider the city-region level. This may be because Aydın is not included in New Izmir Metropolitan Area's legal borders and not directly related with Izmir Greater Municipality in this respect. Nevertheless the interview results reveal that there are no plans or urban projects in Aydın that are carried out in integration and coordination with other settlements in the City Region..

Secondly, with depending mainly on ACHDP, AMAPSR and Aydın Municipality Strategic Plan (AMSP), whether there is *'land-use and transport planning integration'* in Aydın will be evaluated.

In ACHDP, it is stated that today, in Aydın, in order to support city plans and solve the city's general problems, Aydın Municipality makes the physical plans according to the studies that are made from the 'healthy city planning' point of view. These physical plans are development plan for conservation, **transport master plan**, revision development plan, and urban design projects. For instance, with the development plan for conservation, the historical pattern is intended to be sustained for the future generations. In addition, it is stated that the **transport master plan** will be made for reducing the traffic density and air pollution that has been caused by urban growth and population rise (Aydın Municipality and ADU[2] 2005, 91).

AMSP (2006-2010) comprises almost the same properties with Aydın City Health

Development Plan. The Strategic Plan was prepared by the City Health Center and by a working group that was formed by this Center. In both of the plans, the mission, vision, and principles are entirely same. Both of the plans encourage a governance system for creating modern Aydın (Aydın Municipality, 2007).

Hence, it can be said that there is integration between land-use planning and several types of plans (also the transport planning). This originates from the principle of Aydın Municipality which depends on 'healthy city planning' strategies while making the physical plans.

9.3. Urla Municipality

It is stated in the Urla Revision of Main Development Plan (URMDP) (2007) that before starting the studies, there had been a negotiation process with related institutions about the area. Then the collected views and obtained data were gathered and evaluated in the research report. Lastly, decisions were made that would guide planning in the planning phase. Therefore, it can be said that there is a participation of several actors in the planning process (EGEPLAN 2007).

Yüksel states that during the preparation of Izmir City Region Main Development Plan, there was a negotiation process between Urla Municipality and Izmir Greater Municipality. Yüksel emphasized that this negotiation process was not only for data sharing. There was an exchange of knowledge and thoughts between Greater Izmir Municipality and Urla Municipality about what the deficiencies of Urla are, what is needed in Urla in terms of infrastructure, services, job opportunities, housing developments, etc., where new development areas can be improved in Urla, and so on. Yüksel also expressed that they should continue to make development plans at 1/5000 and 1/1000 scaled with considering the 'shared vision' defined in ICRMDP as a starting point (Yüksel 2007, 3 December).

9.4. Manisa Municipality

In Manisa Municipality, Transport Services Directorate is responsible for traffic issues, but not for transport planning issue; whereas Zoning and City Planning Directorate and Plan and Project Directorate are responsible for making land-use plans. Veral says that there is not a strong integration between land-use and transport departments (Dürgen and Veral 2007, 5 December). On the other hand, as Veral states, there are some integrated projects and hence some shared visions with other municipalities. Veral gives as an example that in the context of European Union Projects, a Tourism Master Plan was made together with Karsıyaka and Bornova Municipalities. He also says that there have been studies in coordination with Karsıyaka Municipality about earthquake issues in planning (Veral 2007, 5 December). Therefore, it can be concluded from the interview that, while there is limited integration between land-use and planning departments, Manisa Municipality is coordinating with other municipalities in Izmir City Region.

9.5. Torbalı Municipality

From the interview, it was learned that for Izmir City Region Main Development Plan, there were studies together with Greater Izmir Municipality for data sharing. However, there are some problems between two municipalities because of Torbalı's development plans. Greater Izmir Municipality requires significant changes in Torbalı's urban development plans. Some plan changes were made in 1/1000 scaled plans of Torbalı according to the ICRMDP's decisions but there are still more changes required by ICRMDP to be made in Torablı's plans. Doğan states that Torbalı Municipality has resorted to court for rejecting the ICRMDP's decisions for Torbalı (Doğan 2007, 6 December). Therefore, it can be said that due to the conflicts between the two municipalities' planning approaches, policy coordination does not currently exist between Torbalı and IzGM. It is also important to state Doğan's emphasize on that Torbalı Municipality do not need to make cooperation with other municipalities.

9.6. Menemen Municipality

From the interview, it was learned that for Izmir City Region Main Development Plan, studies were made with Greater Izmir Municipality for data sharing. Besides, for Aliağa-Menderes Commuter Rail System Project, there have been studies with Transport Master Plan Office and UKOME (Kuyucu 2007, 5 December). Apart from this regional rail project, however, there are no plans or projects that are carried out in coordination with other settlements in the city-region.

9.7. Aliağa Municipality

Uyanıkturk says that, as it has been explained before, Greater Izmir Municipality is the authority to make and approve plans in Izmir City Region defined with 50 km radius by Law No.5216 and Aliağa Municipality should make or revise 1/1000 scaled development plans according to ICRMDP's decisions. Uyanıkturk emphasizes that at the preparation of the 1/5000 or 1/1000 scaled plans, there is a continual coordination and negotiation process between Aliağa and Greater Izmir Municipalities in order to prevent disapproval of the proposed plans of Aliağa Municipality (Uyanıktürk 2007, 5 December).

Uyanıktürk also states that Aliağa's Directorate of Municipal Department of Technical Services has been working in coordination with IzGM's Directorate of Municipal Department of Technical Services (Uyanıktürk 2007, 5 December). Therefore, it can be said that there is a policy coordination between IzGM and Aliağa Municipality; however, this is a vertical integration required by the plan-making scales rather than a horizontal integration that should be expected in a city region. In other words, Aliağa Municipality coordinates with IzGM to make sure that its local plans comply with the upper scale plan; however, there are no plans or urban projects in Aliağa that are carried out in integration with other municipalities and settlements in the city region.

9.8. Selçuk Municipality

It was learned from the interview that there are some integrated projects of Selçuk Municipality with Kuşadası and Özdere (Aksoy 2007, 6 December). These settlements are in close proximity to Selçuk and therefore such coordination is probably not related with the requirements of increased interactions within the city region.

9.9. Çeşme Municipality

As it has been mentioned in Section 8.1.9, according to the interviews with the employees in Public Works Directorate, as Çeşme is now out of the Greater Izmir Municipality borders, Çeşme Municipality has many problems about making land-use decisions for Çeşme. Çeşme Municipality is under the control of Central Authority in Ankara and there is a top-down administration system for Çeşme. Hence, from the interviews with the Municipality employees, no detailed information can be obtained. It has been learned that, Çeşme Municipality has been rather negatively affected from not being included in the Izmir Greater City area defined by the Law No. 5216 (Çesme Directorate of Housing 2007, 3 December).

9.10. Conclusion

Effective governance of land-use and transportation is very important. However, as it has been said in Section 5.3.1, there appears to be a fragmentation problem in expanding city-regions due to increasing number of authorities with rising self-sufficient nodes. As an effective system, in Section 4.3.2, urban governance of Dutch system, which is dependent both on a highly regulated hierarchical structure with land-use controls of central government and on a cooperative management system has been shown. That cooperative management system is obtained with an obligation from government to the public and private sector (Kennedy *et al.* 2005). Through such a system, there develops ‘shared visions’. Greater Izmir Municipality also tries to achieve ‘shared visions’ through its planning approach by managing such a

collective and horizontal system that covers all municipalities, non-governmental organizations, private sector, other public authorities, and the civil society.

Firstly, with an evaluation of the plans and particularly of all the interviews made with 9 municipalities, it has been searched whether the coordination among municipalities could really be achieved during the preparation of ICRMDP. When the ICRMDP is evaluated from the *'policy coordination'* point of view, it can be concluded that, IzGM has paid attention to ensuring policy coordination among different authorities, *local authorities, academic institutions, etc.,* while preparing the 1/25000 scaled Izmir City Region Master Development Plan. However, although this plan document encourages policy coordination and emphasizes its importance as a policy, in order to realize whether these arguments have actually been managed, the results of the interviews have also been evaluated.

From the interviews, it is learned that during analyzing, synthesizing, and generating the plan, many meetings have been done in order to share data, knowledge, view, etc. Although, the Law No.5216 necessitates all the municipalities in the metropolitan area to be dependent on the Greater Izmir Municipality's decisions and implement them, Greater Izmir Municipality have gathered all the participants (also the civil society) each week and took their decisions, exchange knowledge and information during the preparation of ICRMDP. Therefore, a negotiation process and horizontal relationships have been managed for ICRMDP and it has been being done for ITMP. It is realized that as one of the most important issues of the governance, civil society has also taken place in the all processes of ICRMDP. Besides, the results of interviews confirm that both ICRMDP and ITMP, as upper-scaled plans, try to consider and ensure participation of all the municipalities in the New Izmir Metropolitan Area in both the planning and implementation processes.

Moreover, as it is determined in ICRMDP, there is a 'shared vision' obtained among 19 settlements in the Izmir City Region. Among the results of the interviews made with other 4 municipalities that are in the New Metropolitan Area, 3 of them (Urla, Menemen, Aliağa) support that there is a shared vision among settlements and other municipalities and one of them (Torbalı), where certain conflicts with the Izmir Greater Municipality were described above, rejects it.

On the other hand, there are two missing points in this planning system. One is that Greater Izmir Municipalities' new administrative borders covers only the settlements in 50 km radius area. However, the excluded settlements should be considered in Izmir City Region, as it is included in this thesis study, because interviews have revealed that the ignored settlements (like Çeşme) have many difficulties due to this segmentation. They are directly under the control of many central government authorities and the top down hierarchy does not allow a democratic atmosphere for planning the cities. Second is that although Aydın and Manisa are distinct provinces from Izmir in legal terms, actually they are spatially in close proximity with Izmir city center and they, particularly Manisa, have many interactions, especially in terms of commuting, economic relations, and services, with Izmir.

Aydın Municipality has also policy coordination among its different authorities, *local authorities, citizens, non-governmental organizations, etc.* while making projects. However, this policy coordination is at the city level and does not consider the city-region level. This may be because Aydın is not included in New Izmir Metropolitan Area's legal borders and not directly related with Izmir Greater Municipality in this respect. On the other hand, the finding points out to a deficiency in policy coordination in the city-region, where an important city like Aydın does not have any plans and projects that are carried out in coordination with any other settlements. In contrast, it was found that Manisa Municipality has projects carried out with other settlements, showing that the municipality is coordinating with other municipalities in Izmir City Region.

In spite of some municipalities coordinating with others in certain projects, the analysis revealed that policy coordination is generally a vertical one, that is to ensure that local plans comply with upper-scale plans. In other words, most municipalities are in coordination with the Izmir Greater Municipality, but not with each other. This lack of horizontal coordination indicates that planning integration and policy coordination is limited in the Izmir City Region.

When searching for land-use and transport planning integration, Greater Izmir Municipality is seen as giving the most importance to the issue. UKOME and AYKOME and the Transport Coordination Department Headship that coordinates

the studies of UKOME and AYKOME have made transport decisions in ICRMDP. Besides, the new transport master plan is being prepared according to ICRMDP's proposals and the new transport plan aims to find out how ICRMDP's land-use decisions will affect transport in Izmir. It is also learned that ICRMDP will be changed according to the new transport plan, when it is seen as necessary. Hence, it can be said that there is a certain level of integration between transport planning department and land-use planning department in the case of Izmir Greater Municipality. For the other settlements, however, findings do not indicate a particularly strong integration of transport and land-use policies.

As a result, the third main part of the hypothesis, which was about the fragmentation of governments, acting as an important barrier for attaining policy coordination between different settlements that form the city-region and between land-use planning and transport planning authorities, have been discussed. It was seen that the current planning approach of Izmir Greater Municipality aims at overcoming this barrier and that a significant level of coordination has been attained between different settlements during the preparation of the Izmir City Region Master Development Plan. On the other hand, there is no evidence suggesting that this coordination is to be sustained; or that there is coordination between each and every settlement in the city region. It was seen that policy coordination exists to ensure that local plans comply with the upper-scale ICRMDP, hence indicating a vertical rather than a horizontal coordination. Number of munipalities that had coordinated or integrated projects with other settlements in the Izmir City Region is extremely limited. It can be concluded that the findings from the Izmir City Region case supports the third part of the hypothesis, that fragmentation of governments is a barrier for policy coordination, to a certain extent. However, it is also important to note that this barrier can be overcome with effective management of the planning process, as was the case in Izmir Greater Municipality during the preparation of ICRMDP Plan.

CHAPTER 10

CONCLUSION AND RECOMMENDATIONS

10.1. Summary of The Study

This research aimed at bringing together two important areas of debate in the planning literature: urban planning for sustainable transport and city regions. It was intended to provide a better understanding of obstacles as well as potentials for a sustainable transport system in city-regions.

For this purpose a comprehensive review of the literature was made in order to analyze whether these two different urban trends can co-exist, whether their policies comply with and complement each other, and whether it is possible to attain transport sustainability in city-regions.

The literature review on transport sustainability revealed two extremely effective policies, namely *land-use planning policies* and *transport policies,* for achieving sustainable transport. These two policies, which can also be defined as 'planning to reduce the need to travel' and 'promoting green modes of transport', were identified to be the most effective ones with their highest potential to solve current transport problems associated with the exyensive and unsustainable usage of the car. The literature review also revealed that the integration between these two policies is very crucial. Thus, land-use planning and transport planning tools have been chosen as ways of achieving sustainable transport and analysis has been done in this context.

Land-use planning approaches and urban development patterns have been analyzed with a special focus, since there is increasing emphasis in the literature on these aspects as factors that can help attain sustainability in transport. These urban planning approaches are classified under two scales: *macro and micro*. The literature research on land-use planning has been done according to these two levels. While

three sustainable urban form models have been examined as macro-scale planning approaches, land-use planning measures, such as density, land-use mix, clustering, have been examined as micro-scale planning approaches.

As the second item, the ways of improving alternatives to automobile have been discussed. Regarding this, policies for improving public transport and non-motorized transport modes have been expressed. Besides, in this section, as one of the four pillars of sustainable urban transportation, importance of effective governance to integrate land use and transportation policies has been mentioned.

In the city-region chapter, while expressing the historical background of the city-regions; some definitions, its changing meaning and scale, and the new regionalism have been described. Then, after defining the administrative structure of city-regions, their polycentric structure in spatial terms has been discussed. In this chapter, parallel to the aim of the thesis, a discussion on the spatial and administrative structures of city-regions in the context of sustainable transport has been made. Besides, three mega-city region case studies, which have been trying to achieve sustainability objectives, have been discussed and main challenges have been reviewed for these cases.

In this thesis, it has been intended to examine whether the current city-region development tendencies impose significant threats for realizing a sustainable transport system, in terms of spatial organization, planning approaches, and policy-coordination. Three aspects have been determined as 'threats' for the attainment of sustainable transport and land-use development in city-region: 1. Increase in need to travel and car dependency due to increase in interactions and longer distances in city-regions, 2. Economic objectives for city-regions contradicting with objectives of sustainable transport, and 3. Difficulty in ensuring policy coordination for an integrated approach to sustainability due to fragmentation of governments.

In order to understand how real and severe these threats are; and to search, whether they can be overcome in city-regions, an analysis and a synthesis of experiences have been done in a selected case study area. Izmir City Region has been selected as the case study in this thesis because, this city-region has been analyzed and

examined by many academic studies (Eraydın 2005, METU 2005, METU 2006) before, and those studies have already defined that Izmir, with its surrounding settlements, have been constituting a city-region in many aspects. Hence, in this thesis, without the need for studying the process about how this region has become a city-region, it has been mainly intended to concentrate on the effects of this process and its implications for sustainability in transport.

In the case study part, the analysis and the synthesis of findings have been divided into three parts, as the main hypothesis is comprised of three parts regarding the three fields of threats and as for answering the main research questions following this main hypothesis, three objectives have been determined. Hence, further research questions, which are defined according to these objectives, have been answered for Izmir City Region case in three sections: 1. Evaluation of transport network in Izmir City Region, 2. Evaluation of transport and land-use planning approaches in Izmir City Region, and 3. Evaluation of policy coordination in Izmir City Region. In the following sections, the main findings of these three parts of case study analysis are demonstrated.

10.2. Main Findings of The Research and Assessment of The Hypothesis

10.2.1. Evaluation of transport network in Izmir City Region

In this section, the change in traffic values in Izmir City Region has been assessed. The comparison of volumes of motor vehicle types in each year, changes in volumes of each motor vehicle between 1990 and 2006 and the changes in car and motor vehicle ownership in time (1994-2006) have been analyzed. First of all, it has been realized that the following features of Izmir City Region should be acknowledged to understand the results of traffic analysis:

- ✓ Due to the significant economic changes that have been experienced in Izmir City Region since the 1990s, there have been significant increases in interactions among settlements and it may be said that the 'sphere of influence' of Izmir City Region has become enlarged.

- ✓ Together with economic growth, rising industrial estates, increasing interactions and so the traffic flows between settlements, some sub-regions with some sub-centers have emerged.

- ✓ Izmir's urban form has started to transform from being a monocentric form with a powerful center into a polycentric urban form with the development of many self-sustaining and multi-functional cities, which has its reflections in the traffic volumes in the region.

The findings of traffic analysis reveal this polycentric urban form showing that corridors between the main nodes of the city-region experienced significant growth in traffic. The main findings are as follows:

- Traffic volumes are intensified significantly along corridors at some sub-centers (nodes) within this polycentric form and these, which can also be referred as transport nodes, can be identified generally as Aliağa, Menemen, Manisa, Kemalpaşa, Turgutlu, Menderes, Torbalı, Aydın, Söke, Urla, and Çeşme, while Izmir city center remains as the metropolitan core (See Figure 7.11).

- It has been found that these transport nodes are also the points where industrial activities are gathered (See Figure 7.17, 7.18).

- It has also been realized that the five corridors along which spatial effects of many industrial, economic, financial, service, and social sectors, etc. have been concentrated (See Section 6.4.2) overlap with the five different transport axes emanating from Izmir city center (See Section 7.1.3.1) and analysis have revealed that traffic is increasing significantly along these certain corridors between the main nodes of the city-region.

- Among the traffic values for different years, the figures for 2000 and 2006 clearly show the corridors of interaction (or functioning) between the settlements of Izmir City Region: Izmir-Torbalı-Selçuk-Aydın corridor in the south and southeast reveal an important corridor with high amounts of traffic. Izmir-

Manisa-Akhisar in the northeast and Izmir-Menemen-Aliağa in the north also have significant volumes of traffic. Izmir-Urla section in the west, although representing a more urban link, reveals an important corridor of interaction and traffic.

- It has been revealed that in the past ten years (from 1995 to 2006), traffic volumes increased by almost 50 % in many of the corridors mentioned above, representing significant traffic growth in the city-region. This increase is not due to normal traffic growth since the traffic levels did not increase in other links. Hence the significant increase in traffic in these corridors are due to increased interactions between the settlements and nodes of the city region.

- It has been seen that from year 1990 to 2006, the biggest component of the traffic in the corridors of Izmir City Region has been the automobile. The usage of car, which is can be considered an *urban* transport mode, has been spreading and increasing to the regional extent.

- Among the other modes of vehicles, especially the small truck and truck numbers show rise in traffic after 2003.

- The fact that traffic volumes fall sharply after a certain point (nodes) in all these corridors (out of the city-region), almost to the levels of 1990 traffic volumes, is thought to be a proof that the increase in traffic in these corridors is not merely a result of normal growth in traffic (due to increase in vehicle ownership and usage). It is considered to be a result of the city-region development and its inevitably increased interactions between nodes.

While increased interaction and mobility can have positive aspects in terms of economic functioning of city-regions, it was stated in this study that they are likely to result in increased motor traffic and emissions, increased travel distances and increased car usage. In addition to the increased motor traffic levels in Izmir City Region, the traffic volume maps indicate significantly longer distances, as well as a vast increase in car usage. It may be deducted from the results of this section that in Izmir City Region, there may be a tendency towards unsustainable transport.

Therefore, the first part of the hypothesis of this study is supported to a certain extent.

10.2.2. Evaluation of transport and land-use planning approaches in Izmir City Region

It is important to note that, the planning and decision-making authorities' attitudes towards a sustainable development with sustainable transport priorities are even more crucial since the first part of the hypothesis is verified. The following two sections have been based on mainly plans (when available) and interviews that searches for the views and attitudes of decision-making authorities for transport and land-use planning in the observed municipalities in Izmir City Region.

In this section, firstly the awareness of sustainability in urban planning in Izmir City Region has been evaluated (See Table 8.30). The main findings are as follows:

- It has been found that among the municipalities, Izmir Greater Municipality has a high awareness about the importance of sustainability principles in land-use planning.

- Manisa has been distinguished as the second municipality that has high awareness with its references to sustainability and policies at macro and micro scales that encourage sustainable development. This may be due to the fact that Manisa, as a very important center of industry, is in close proximity with Izmir city center and there is a high amount of interactions, especially in terms of commuting, economic relations, and services, between these two settlements (As Manisa is under the 'sphere of influence' of Izmir city center, it is included in Izmir City Region in this study).

- Aydın, as a province, has a lower level of awareness of sustainable urban planning, especially at macro-scale policies, when compared to Manisa. Actually, Aydın gives much more importance to sustainability as a 'concept', because it has been included in the international 'Healthy Cities Project'. Although Aydın

Municipality have carried out many projects with a focus on sustainability and this can be considered as a positive attitude towards sustainable urban development, these attempts do not cover any spatial planning projects, and therefore Aydın is said to have a relatively lower level of awareness of sustainability in urban and transport planning.

- Among the other 6 settlements, Urla has been found as having the highest awareness level in sustainable urban planning approaches.

- The analysis revealed two important deficiencies in this planning system.

  - First is that is that Greater Izmir Municipalities' new administrative borders covers only the settlements in 50 km radius area. However, the excluded settlements should be considered in Izmir City Region, as it is included in this thesis study, because interviews have revealed that the excluded settlements (Çeşme and Selçuk) have been negatively affected from this segmentation and from not being included in ICRMDP.

  - Secondly, is that although Aydın and Manisa are distinct provinces from Izmir in legal terms, it has been acknowledged that they should be included in the planning system at a regional scale.

It should be remembered that according to Law No. 5216 Izmir City Region Master Development Plan (ICRMDP) has be adopted by the other municipalities in Izmir City Region and all the municipalities should make necessary changes in their own development plans at 1/1000 scale. Perhaps because of this, many settlements in the city region were found to have adopted the policies of ICRMDP, particularly its "macro-scale" policies. It is possible to interpret this finding as the positive impact of ICRMDP on macro-scale policies throughout the city-region, which is the main focus and scale of this plan, as opposed to more micro-scale approaches, which are not really covered by this plan. That is to say that, macro-scale policies, such as urban form/model and urban sprawl (and even structure and job-housing balance as strategic level policies) receive significant emphasis in ICRMDP and this probably helped to shape such upper-scale policies of other settlements too (such as Urla,

Manisa, Menemen and Aliağa).

On the other hand, ICRMDP did not formulate many policies for some of the micro-scale measures (for example the importance of creating higher-density development and transit oriented or pedestrian friendly design). Other settlements in the city-region do not have such policies either. It is possible to claim that ICRMDP is a regional scale and more general plan, and hence such urban design policies may be too detailed for the scope of this plan. Nevertheless, such approaches could be expected to be mentioned as general principles that can shape urban design approaches for local plans. It can be concluded that neither the ICRMDP as the strategic plan for the city-region nor the local plans and approaches of other settlements in the city-region have a sufficient level of awareness in terms of some of the micro-scale policies, i.e. land-use mix and diversity, transit-oriented design, high-density development strategies to help reduce the need to travel and hence attain a more sustainable transport system.

In this section, secondly the awareness of sustainability in transport strategies in Izmir City Region has been evaluated (See table 8.40). The main findings are as follows:

- It has been found that among the municipalities, Izmir Greater Municipality has the highest awareness about the importance of sustainability principles in transport planning.

- It has been realized that Transport Master Plan Office of IzGM has been preparing a New Transport Master Plan and this Plan with ICRMDP proposes many new public transport projects that cover many settlements along the main corridors of Izmir City Region.

- Aydın and Manisa are distinguished as giving more importance to improve green modes of transport, public transport and non-motorized modes of transport, among other settlements in Izmir City Region. Manisa has some light rail and heavy rail projects that will also affect some other settlements in Izmir City Region.

- It has also been distinguished that although in the ICRMDP, the land-use and transport decisions are determined in a coordinated way, these approaches cannot be resembled to transit-oriented development (TOD) policies, which are a way of integrating land-use and transportation policies, with organizing on a regional level to be compact and supportive of public transport. When the Figure 8.7 is observed, it can be seen that the existing railroads were developed along important service areas (industrial zones, universities, etc.) and also new functions were developed along these routes in order to increase the accessibility. Now, the proposed railway projects are considered along important functional areas. In ICRMDP, it is stressed that the areas that do not coincide with thresholds have been chosen as new development areas and the Plan aims to strengthen the corridors with giving specific functions to the nodes along these growth patterns. Therefore, in one perspective, the land-use and transport decisions are determined in a coordinated way, as it will be discussed in the following chapter. However, in TODs; commercial development, housing, jobs, parks, and other uses are placed within a walking distance of transit stops (Quinn 2006, IBI Group 2004). It is possible to claim that ICRMDP is a regional scale and more general plan, and hence such urban design policies may be too detailed for the scope of this plan. Nevertheless, such approaches are not even mentioned as general principles that can shape urban design approaches.

In the analysis, lack of rail investments in certain settlements were not evaluated to be negative outcomes for these settlements. That is because it cannot be expected for small settlements to make investments for such high-capacity public transport systems. It should be considered as a positive attitude if these municipalities have any policies for improving the public transport and non-motorized transport modes in their settlements. From this perspective, it was seen that Izmir, Aydin, Manisa, Torbalı and Aliağa have plans to improve their public transport systems through rail or bus improvement projects, whereas in Menemen, Selçuk and Çeşme there is no emphasis on such public transport improvement policies and projects.

As a result, there has been an in-depth analysis of the plans of settlements (when available) and interview results within the context of the second part of the hypothesis. As the analysis can be said to reveal a high level of awareness of

sustainability in urban planning and transport strategies, the findings does not support the second part of the hypothesis.

10.2.3. Evaluation of Policy Coordination In Izmir City Region

Policy coordination among different actors and integration between land-use and transport planning in Izmir City Region has been assessed with an evaluation of the plans (when available) and particularly the interviews made with 9 municipalities. It has been searched whether the coordination among municipalities could really be achieved during the preparation of ICRMDP. The main findings are as follows:

- When the ICRMDP has been evaluated from the *'policy coordination'* point of view, it can be concluded that, IzGM has paid attention to ensuring policy coordination among different authorities, *local authorities, academic institutions, etc.,* while preparing the 1/25000 scaled Izmir City Region Master Development Plan.

- It has been found that although, the Law No.5216 necessitates all the municipalities in the metropolitan area to be dependent on the Greater Izmir Municipality's decisions and implement them, Greater Izmir Municipality have managed a negotiation process and horizontal relationships during preparation of ICRMDP and it has been done for ITMP.

- It is realized that as one of the most important issues of the governance, civil society has also taken place in the all processes of ICRMDP.

- The results of interviews have confirmed that both ICRMDP and ITMP, as upper-scaled plans, try to consider and ensure participation of the observed municipalities in the New Izmir Metropolitan Area in both the planning and implementation processes.

- The results of the interviews done with other 4 municipalities, except Torbalı, that are in the New Metropolitan Area have also shown that there is a shared

vision among settlements and other municipalities coming from ICRMDP.

- It has been discovered that Aydın Municipality has also policy coordination among different authorities but at the city level and does not consider the city-region level. This may be because Aydın is not included in New Izmir Metropolitan Area's legal borders. On the other hand, the finding points out to a deficiency in policy coordination in the city-region, where an important city like Aydın does not have any plans and projects that are carried out in coordination with any other settlements.

- In contrast, it was found that Manisa Municipality has projects carried out with other settlements, showing that the municipality is coordinating with other municipalities in Izmir City Region.

- In spite of some municipalities coordinating with others in certain projects, the analysis revealed that policy coordination is generally a vertical one, that is to ensure that local plans comply with upper-scale plans. In other words, most municipalities are in coordination with the Izmir Greater Municipality, but not with each other. This lack of horizontal coordination indicates that planning integration and policy coordination is limited in the Izmir City Region.

- When searching for land-use and transport planning integration, Greater Izmir Municipality was found to be giving the most importance to the issue. It can be said that there is a certain level of integration between transport planning department and land-use planning department in the case of Izmir Greater Municipality. For the other settlements, however, findings do not indicate a particularly strong integration of transport and land-use policies.

As a result, the third part of the hypothesis, which was about the fragmentation of governments, acting as an important barrier for attaining policy coordination between different settlements that form the city-region and between land-use planning and transport planning authorities, have been discussed. It was seen that the current planning approach of Izmir Greater Municipality aims at overcoming this barrier and that a significant level of coordination has been attained between

different settlements during the preparation of the Izmir City Region Master Development Plan. On the other hand, there is no evidence suggesting that this coordination is to be sustained; or that there is coordination between each and every settlement in the city region. It was seen that policy coordination exists to ensure that local plans comply with the upper-scale ICRMDP plan, hence indicating a vertical rather than a horizontal coordination. Number of munipalities that had coordinated or integrated projects with other settlements in the Izmir City Region is extremely limited. It can be concluded that the third part of the hypothesis, that fragmentation of governments is a barrier for policy coordination, is supported by the findings of Izmir City Rgeion to a certain extent. However, it is also important to note that this barrier can be overcome with effective management of the planning process, as was the case in Izmir Greater Municipality during the preparation of ICRMDP Plan.

10.3. Comparison with Previous Research

When the case study of Izmir City Region is compared with the literature review, first of all it can be seen that Izmir has been living an *urban restructuring* process which has been explained in detail in Section 5.2.2. There has been an exploding city limits with scale and scope - outward to a **global scale -** and the metropolitan hinterland is no more defined only by nearest boundaries of daily commutes or residential identities (Soja, 2005). As Dickinson (1964) stated, regional associations of a city changed due to improving transport facilities, trade relations, etc. and specialization of functions by place (See also Introduction of Chapter 8)

Izmir City Region has many common issues with London, South-East England Mega-City Region Case. Although the scales of these two city-regions are very different, it can be said that Izmir City Region's polycentric urban form resembles South-East England Mega-City Region (See Section 5.5.1). As it has been discussed in detail in Section 8.1.1, Izmir City Region can be given as an example to regional polycentricity with a strongly developed 'sphere of influence' that exists around Izmir city center and covers 46 settlements, some of which are defined as sub-centers or nodes along corridors radiating from the center. London's development is also given as an example to regional polycentricity with a dominant metropolitan

core. It is indicated that there are intra-regional linkages with London, as a center, and the quantitative analysis of inter-urban commuting and business linkages shows that there is a wide curve of dense connectivity with city center (See Section 5.5.1). It is also concluded in the studies by METU (2006) that there is an agglomeration mainly in the city center and the complementarities among settlements in different subgroups to provide a commuting network in Izmir City Region. While the commuting network in South East England MCR was shown in Section 5.5.1 with Figure 5.4; the commuting network that has been developed with a centrality analysis[55] in Izmir City Region can be seen in Appendix C.

Moreover, London case reveals the same threats with the thesis in developing city-regions. First of all, Izmir metropolitan core might have a similar fate with London in terms of traffic intensity, because the traffic analysis reveal results that resemble the problems experienced in South-East England Mega-City Region. The vast growth in traffic, centering around the metropolitan core of Izmir, is clearly a problematic trend in terms of transport sustainability, resembling transport/traffic problems of South-East England Mega-City Region with its dominant metropolitan core, London, suffering severely from traffic congestion and emissions intensified in it. Secondly, the London case study supports the previous arguments of the thesis on the difficulty of planning coordination posed by fragmented governments in city-regions.

Solutions to the problems of Izmir City Region can also be resembled to London case. The case of London shows that, first of all, there is an important focus on the need to attain sustainability in transport; and secondly, possible problems arising from increased interaction between nodes (particularly the core and other nodes) are intended to be tackled through the improvement of more environmentally sustainable rail network, as well as demand management approaches for the regional transport system. This shows that, traffic and transport problems may indeed be severe in

[55] In the analysis process, the functions between different variables and the relations between those variables (dependent and independent) was determined with regression analysis in SPSS. Then, with applying the network analysis in UCINET Programme, different kinds of networks were defined by setting the 'centrality analysis' and 'factions analysis' (METU 2006).

polycentric city-regions between their various nodes and that public transport improvement policies (as discussed in Chapter 4) may be extremely important.

Actually, Izmir City Region has shown both corridor development and multi-centered development. ICRMDP also emphasizes that Izmir City Region has many sub-centers, which have developed along the corridors, and the aim of the ICRMDP is by increasing the *multi-functional land-uses* in these settlements, to make them self-sufficient sub-centers in the city-region. This polycentric or multi-nodal form in Izmir City Region is a consequence of the transition period from metropolis to post metropolis that changed the monocentric focus in the metropolitan region, as Soja (2005) mentions (See Section 5.2.2). As Priemus and Hall (2004) told, through time in urban areas, more centers and sub-centers have been developed, which have also been functioning as nodes in transport infrastructures. In Izmir City Region, this situation can be seen when the traffic figures in Chapter 7 are observed. Priemus and Hall (2004) also indicate that while there was a spatial separation of functions like *housing, employment, recreation, and transport* in the industrialization period, now there is a shift towards *a multifunctional area* development. ICRMDP encourages these new development trends by proposing sub-centers and enforcing them with planning new functions in these nodes.

As another aspect, as it has been said in Section 5.3.1, effective governance of land-use and transportation is very significant and there appears to be a fragmentation problem in expanding city-regions due to increasing number of authorities with rising self-sufficient nodes. It was seen that Izmir City-Region Main Development Plan is aware of such a fragmentation problem among the central and local municipalities in New Izmir Metropolitan Area. Among many problems, Plan expresses that with Law No.3194 Development Plan (1985), many local authorities in Izmir City Region gained the power of approving the plans and this power was used without any limits due to the deficiency of an upper-scaled plan and now there is the necessity for the plans to operate under many authorities that have new legal status (Law no. 5216) and different powers and this situation diversifies the share of the power, raises the coordination problems, and creates power conflicts (See Section 9.1).

This shows that there was a **fragmentation** problem among the central and local municipalities in Izmir metropolitan area (See Section 4.3.3). It was concluded that Greater Izmir Municipality can be said to be aware of the importance of governance and the participatory planning that are one of the **four pillars** of sustainable urban transportation (See Section 4.3). As an effective system, in Section 4.3.2, urban governance of Dutch system, which is dependent both on a highly regulated hierarchical structure with land-use controls of central government and on a cooperative management system has been discussed. That cooperative management system is obtained with an obligation from government to the public and private sector (Kennedy *et al.* 2005). Through such a system, there developed 'shared visions'. Greater Izmir Municipality also tries to achieve 'shared visions' through managing such a collective and horizontal system that covers all municipalities, non-governmental organizations, private sector, other public authorities, and the civil society (See Section 9.1).

10.4. Concluding Remarks and Recommendations

It was found in this study that in city-regions, and particularly those that have a metropolitan core like the Izmir and London case, increased interactions between nodes and particularly between the core and the nodes are likely to result in severe traffic problems and eventually an unsustainable transport system. Therefore, it is crucial that in city-regions, planning authorities and planning documents give special emphasis on creating sustainable transport and traffic system.

The study also found that this was the case in Izmir and that the Izmir Greater Municipality placed significant emphasis, in its planning documents, on encouraging sustainable urban development patterns and creating sustainable transport and traffic outcomes. Hence, Izmir City Region was found to have a high awareness of sustainability in both urban planning and transport planning. This is considered a very significant and positive outcome. During the thesis study, it was also learned that Izmir was chosen as one of the sustainable cities in the world with its sustainable urbanization planning approaches at the 'Sustainable Urbanization in the Information Age' Conference at 23-24th of April 2008 in New York. The conference was jointly

organized by the Global Alliance for ICT and Development of the United Nations Department of Economic and Social Affairs.

On the other hand, it was also found that although the Izmir City-Region Master Development Plan, as a regional-scaled plan, had many policies to shape the urban form and development patterns at the macro scale, more micro scale policies, as described comprehensively in this study, were limited. Although such micro scale policies may not be within the scope and scale of the Izmir City Region Master Development Plan, it has been discussed in this thesis that adopting these policies at the regional scale can help shape planning and design approaches in local plans: for example, planning for high density and transit-oriented developments and creating a mix of land-uses were discussed as effective policies that can promote more sustainable environs at every scale, including the city-region scale.

The study also revealed that Izmir Greater Municipality had a high awareness of the importance of policy coordination among various actors in the city-region and an awareness of the importance of integration of land-use and transport planning. Some of the other settlements in the city-region were also found to have some projects carried out in coordination with each other; however, such integrated projects in the city region were rather limited. This finding of the thesis is also supported by Eraydın *et. al.*(2007):

"The study on Izmir city region revealed that there are considerable numbers of relations between municipalities, public administration units and NGOs, most of which are focused on building common policies and strategies, exchange of ideas and the dissemination of knowledge. Still, the number of networks formed for concrete projects are less, due to slow improvement of cooperative behaviour in the region. The study also showed that even there has been no efficient institutional system, these networks can be quite important for the economic performance of cities" (Eraydın *et. al.*, 2007)

The above study (Eraydın et. Al. 2007) also emphasizes policy networks and collaborations between local authorities, NGOs etc. in the Izmir City Region; however it is important to note that this study here did not carry out such an in-depth

analysis of policy coordination. The main outcome of the interview with planners on whether they had plans and projects with other municipalities in the city region, revealed that these were limited.

Based on the literature survey, particularly South East England Mega City Region case, and the explanations by Eraydın *et. al.* (2007), it can be concluded that in order to ensure policy coordination and participation of several authorities; local governments, NGOs, civil society, etc., a regional decision-making or transportation body is required for the effective management of a sustainable regional transport system in city-regions. Besides, the establishment of effective bodies for integrated land-use transportation planning throughout the whole region is also very crucial. Izmir Regional Development Agency, as a very new phenomenon, can be considered as an important body within this context.

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INTERVIEWS

1. **Işın Karaca,** City Planner, 14 May 2007, Department of Housing and Urban Development, IzGM, Izmir (First Izmir Trip)

2. **Ahmet Özer,** (MSc) City Planner, Coordinator of Department of Housing and Urban Development, and IzGM Agenda 21 General Secretary Facilitator, 4 December 2007, IzGM, Izmir (Second Izmir Trip)

3. **Önder Batkan,** Transport Master Plan Office, Directorate of Transport Coordination, Department of Transportation, 14 May 2007, IzGM, Izmir (First Izmir Trip)

4. **Önder Batkan,** Transport Master Plan Office, Directorate of Transport Coordination, Department of Transportation, 4 December 2007, IzGM, Izmir (Second Izmir Trip)

5. **Hülya Arkon,** Department Manager of Infrastructure Coordination Center, 14 May 2007, IzGM, Izmir (First Izmir Trip)

6. **Hülya Arkon,** Department Manager of Infrastructure Coordination Center, 4 December 2007, IzGM, Izmir (Second Izmir Trip)

7. **Banu Dayangaç,** City Planner, 4 December 2007, Department of Housing and Urban Development, IzGM, Izmir (Second Izmir Trip)

8. **Kadir Efeoruç,** Secretary of Traffic Group, Branch Directorate of Traffic and Control, 4 December 2007, IzGM, Izmir (Second Izmir Trip)

9. **Mehmet Küçükyumuk**, Adviser of Mayor, 6 December 2007, Aydın Municipality, Aydın

10. **Dilşat Erdoğmuş,** City Planner, 6 December 2007, Directorate of Housing and Urban Development, Aydın Municipality, Aydın (Second

Izmir Trip)

11. **Kürşat Varol,** City Planner, 5 December 2007, Department of Housing and Urban Development, Manisa Municipality, Manisa (Second Izmir Trip)

12. **Kenan Dürgen,** Employee of Transport Services Directorate, 5 December 2007, Manisa Municipality, Manisa (Second Izmir Trip)

13. **Çesme Directorate of Housing,** 3 December 2007, Çesme Municipality, Çeşme (Second Izmir Trip)

14. **Ayşegül Yüksel,** City Planner, 3 December 2007, Directorate of Housing, Urla Municipality, Urla (Second Izmir Trip)

15. **Emin Doğan,** Directorate of Housing, 6 December 2007, Torbalı Municipality, Torbalı (Second Izmir Trip)

16. **Nurdan Uyanıktürk,** City Planner, 5 December 2007, Directorate of Housing and Urban Development, Aliağa Municipality, Aliağa (Second Izmir Trip)

17. **Murat Geg,** Directorate of Environment Protection and Control, 5 December 2007, Aliağa Municipality, Aliağa (Second Izmir Trip)

18. **Atilla Aksoy,** Director of Housing Directorate, 6 December 2007, Selcuk Municipality, Selçuk (Second Izmir Trip)

19. **Kürşat Veral,** City Planner, 10 March 2008, Department of Housing and Urban Development, Manisa Municipality, Manisa (Interview on phone)

20. **Kürşat Veral,** City Planner, 5 December 2008, Department of Housing and Urban Development, Manisa Municipality, Manisa (Second Izmir Trip)

21. **Yalçın Kuyucu,** Director of Science Affairs Directorate, 5 December 2007, Menemen Municipality (Second Izmir Trip)

APPENDIX A

INTERVIEW QUESTIONS

Note: *In this interview, some questions were developed referring to some interview questions which were studied by METU 2006.*

GÖRÜŞME SORULARI:

Görüşme yapılan kişi:

Adı-Soyadı :…….
Görevi :……..
Telefonu :…….
E-posta adresi:…….

Görüşmenin yapıldığı tarih/saat:

Tarih: …. /12/2007
Saat : …. : ….

Görüşme yapılan belediye:…….....

1. Kent planlarınızda ilgili yasaya göre sadece belediye veya mücavir alan sınırları içinde yetkili olduğunuzu biliyorum; ancak konumunuz itibariyle …. Belediyesi olarak; İzmir, Aydın, Manisa, Aliağa, Menemen veya başka belediyelerle işbirliği yapma (beraber plan yapma, karar alma) durumunuz oluyor mu?

☐ Hayır
- Ortak çalışmaların gerekli/yararlı olduğunu düşünmüyoruz.
- İşbirliği kurmamıza gerek olmuyor.
- Diğer:……..

☐ Evet, ihtiyaç duyuyoruz; ama imkan yok.
- İşbirliği yapmak istediğimiz kurumlarla siyasi açıdan anlaşamıyoruz.
- Ortak çalışmalar için yeterli finansal kaynak bulamıyoruz.
- Bürokratik işlemler işbirliği kurulmasını yavaşlatıyor.
- Diğer:……

☐ Evet, belediyelerle beraber çalışıyoruz.

- Özellikle hangileri? ……
- Hangi projelerde?

Proje Konusu	Proje Adı	İşbirliği Yapılan Belediye
Kent Planlama (Konut geliştirme, sanayi geliştirme, turizm altyapı projeleri, rekreasyon alanı geliştirme)		
Ulaşım Planlama		
Altyapı Projeleri (atık/ kanalizasyon/su/ çevre konularında)		
Diğer		

2. 1 nolu soruya cevap olarak 2. seçeneği seçerse;

Başka belediyelerle işbirliği / koordinasyon yapmadan plan ve proje yapılması yeterli oluyor mu; yoksa koordinasyon yapılmasının özellikle önemli/gerekli olduğu belediyeler var mı?

- Hangi belediyelerle?.....

- Koordinasyon yapılmasının özellikle önemli/gerekli olduğu projeler/konular var mı?

3. Belediyenizde, kent planı ve ulaşım plan/projeleri arasında yeterli eşgüdüm (koordinasyon) / entegrasyon sağlanabiliyor mu?

- Kurumsal yapı nasıl?

  - Kent planı yapan birim nedir?.....
  - Ulaşım planı, trafik planı ve projelerini yapan birim nadir? .....
  - Bunların plan/projelerinin uyumlu olmasını garanti altına alan bir önlem/ düzenleme /organizasyon… vs. var mıdır? .....

4. Kent planlamada belediyeniz için en önemli/en öncelikli konular nelerdir?

- Ulaşım
- Çevre koruma
- Kentsel dönüşüm
- Yeni konut alanları geliştirme
- Tarihi koruma alanları

5. Ulaşım planlamada belediyeniz için en önemli/en öncelikli konular nelerdir?

- Metro/tramvay türü sistem yapılması
- Trafik sıkışıklığı
- Trafik güvenliği
- Yaya güvenliği
- Trafikten kaynaklanan emisyon/kirlilik sorunu

6. Sürdürülebilir kent, sürdürülebilir gelişme, sürdürülebilir ulaşım gibi konular, plan veya projelerinizde kapsanıyor mu?

- Hangi plan/projelerde ve nasıl kapsanıyor?

- Böyle bir politika önceliği veya amaç var mı?

  - Düzeyi: Yüksek ☐ Orta ☐ Düşük ☐

7. Belediyenizde toplu taşım kullanımını arttırmaya yönelik çalışma, proje, plan… var mı?

- Bu projeler neler? (Çeşitli ulaşım modları arası ve toplu taşım araçları arası entegrasyonunun sağlanması, sık seferler, doğru güzergah seçimi, konforlu ve güvenli yolculuk sunulması…vs.)

8. Belediyenizde yaya alanlarını iyileştirme, arttırma çalışmalarınız var mı? (Yayalaştırılmış sokak, bisiklet yolu, uzun yürüyüş yolları,..)

9. Belediyenizde özel araç kullanımını azaltmaya yönelik proje, çalışma…vs. var mı?

- Ana yollarda park edilmesini önleme
- Kent merkezinde park edilmesini önleme
- Toplu taşım entegrasyonunun sağlanması
- Toplu taşımın kullanımının çeşitli yöntemlerle arttırılması (sık seferler, doğru güzergah seçimi,
  konforlu ve güvenli yolculuk)
- Diğer:……

10. Belediyenizde katlı kavşak yapımı planları var mı?

- Nerelerde?
- Kentin merkezi alanlarında planlanıyor mu? Kent merkezindeki büyük kavşaklarda, vs?
- Kentin dışında, kent girişlerinde, şehirlerarası trafiğin görüldüğü yerlerde planlanıyor mu?

11. Kentsel gelişmede öncelikli konular nelerdir?

- Kentin yayılmasını önlemek
- Kentin yayılmasıyla elden çıkan tarım/orman alanlarını korumak
- Yukarıdaki nedenlerle yoğun ve kompakt olarak kenti tutmaya çalışmak
- Yeni alt merkezler, yeni yerleşimler önererek kentin tek merkeze bağlı olmasını azaltmak/değiştirmek
- Yeni gelişme koridoru veya koridorları belirlemek; gelişmeyi bu koridorlara kanalize etmek

12. 11 nolu soruya <u>yanıt verilmediyse; seçeneklerin hiçbiri uygun/geçerli bulunmadıysa</u>;

- Mevcut kent lekesinin çevresinde mi gelişme öneriliyor? (Saçaklanma)

- Kent çeperlerinde/kentin mevcut yapısının çevresinde az yoğun konut gelişimi yaşanıyor mu? Bu sizce bir sorun mu?

    - Örneğin, kent arazileri hızla tüketiliyor mu?
    - Örneğin, tarım/orman alanları hızla yok mu ediliyor?
    - Örneğin, bu tür yerleşimlere etkin toplu taşım hizmeti sunmak çok zor oluyor.
    - Örneğin, bu tür gelişmelerde özel araba kullanımı çok artıyor.

13. Yeni gelişme alanlarında, konut alanlarında ikamet edeceklerin gereksiniminlerini karşılamak için ticaret, kültür, sosyal, eğitim ve çalışma alanları gibi konut-dışı kullanımların da gelişmesi sağlanabiliyor mu?

- Yoksa, zaten yeni yerleşim alanlarındakiler genellikle mevcut kent merkezini kullanmayı mı tercih ediyorlar?

14. Kent planında çevre koruma, çevresel değerleri koruma gibi konular öncelikli mi?

- Neler korunuyor?

    - Orman arazileri
    - Tarım arazileri
    - Bitki ve hayvanlar
    - Diğer:……..

- Nasıl?

    - Küçük ölçekli (otomotiv sanayi) ve büyük ölçekli sanayi alanlarının yer seçimi
    - Kurulu sanayi alanlarının şehir dışına tasfiyesi gibi çalışmalarınız var mı?
    - Arıtma tesisleriniz var mı?
    - Belediyenin toplu taşım filosuna temiz enerjili otobüs alımı
    - Kent merkezinde yaya alanları yaratarak, buralarda trafiği/emisyonu azaltmak
    - Raylı sistem yapmak (mevcut sistemi genişletmek)
    - Bisiklet yolları yapmak, kentte bisiklet kullanımını arttırmak
    - Kentlileri özel araçları yerine toplu taşım kullanmaya, yürümeye, bisiklet kullanmaya teşvik etmek
    - Diğer:……..

APPENDIX B

ROAD SEGMENTS

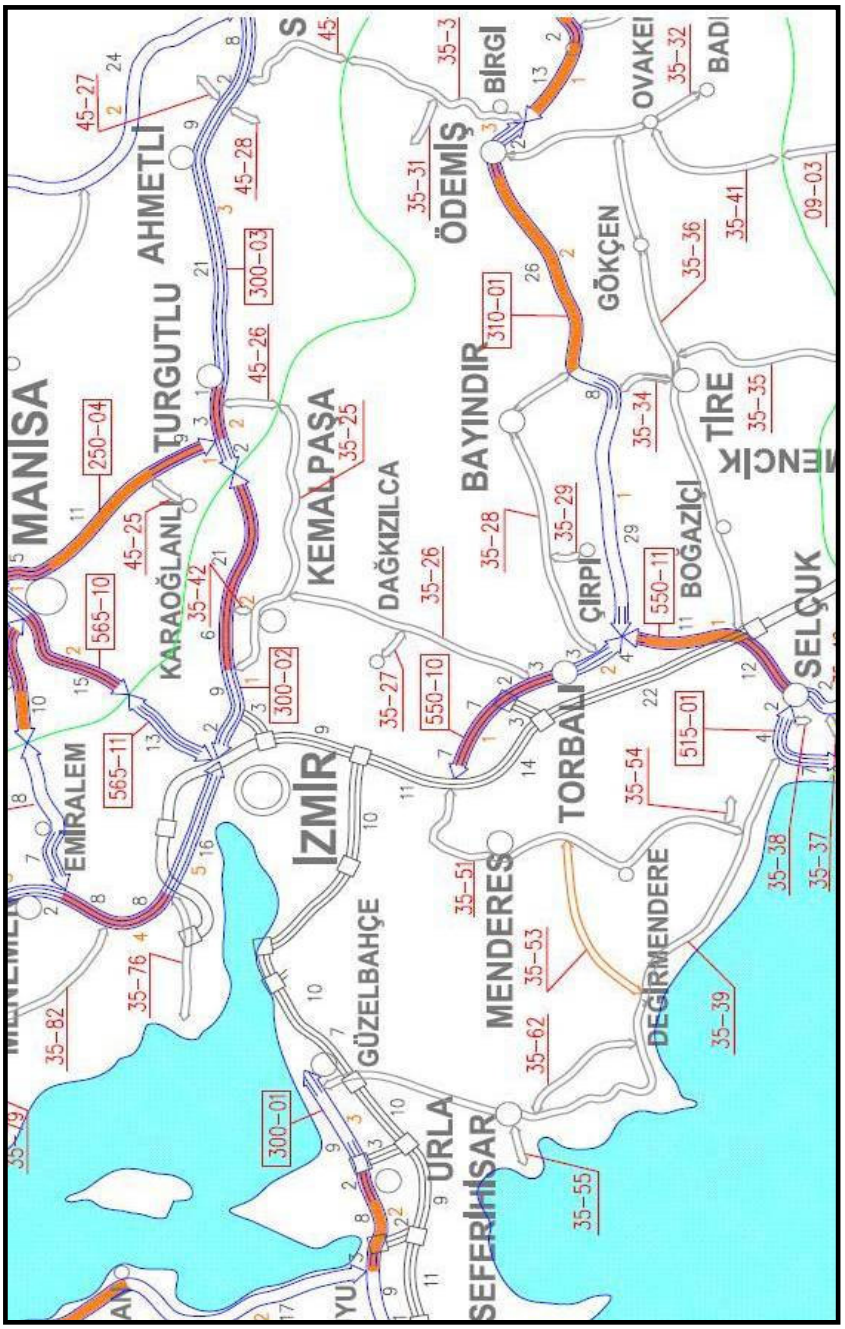

Figure B.1 Road Segments
(Source: KGM 2007)

APPENDIX C

COMMUTING NETWORK IN IZMIR CITY REGION

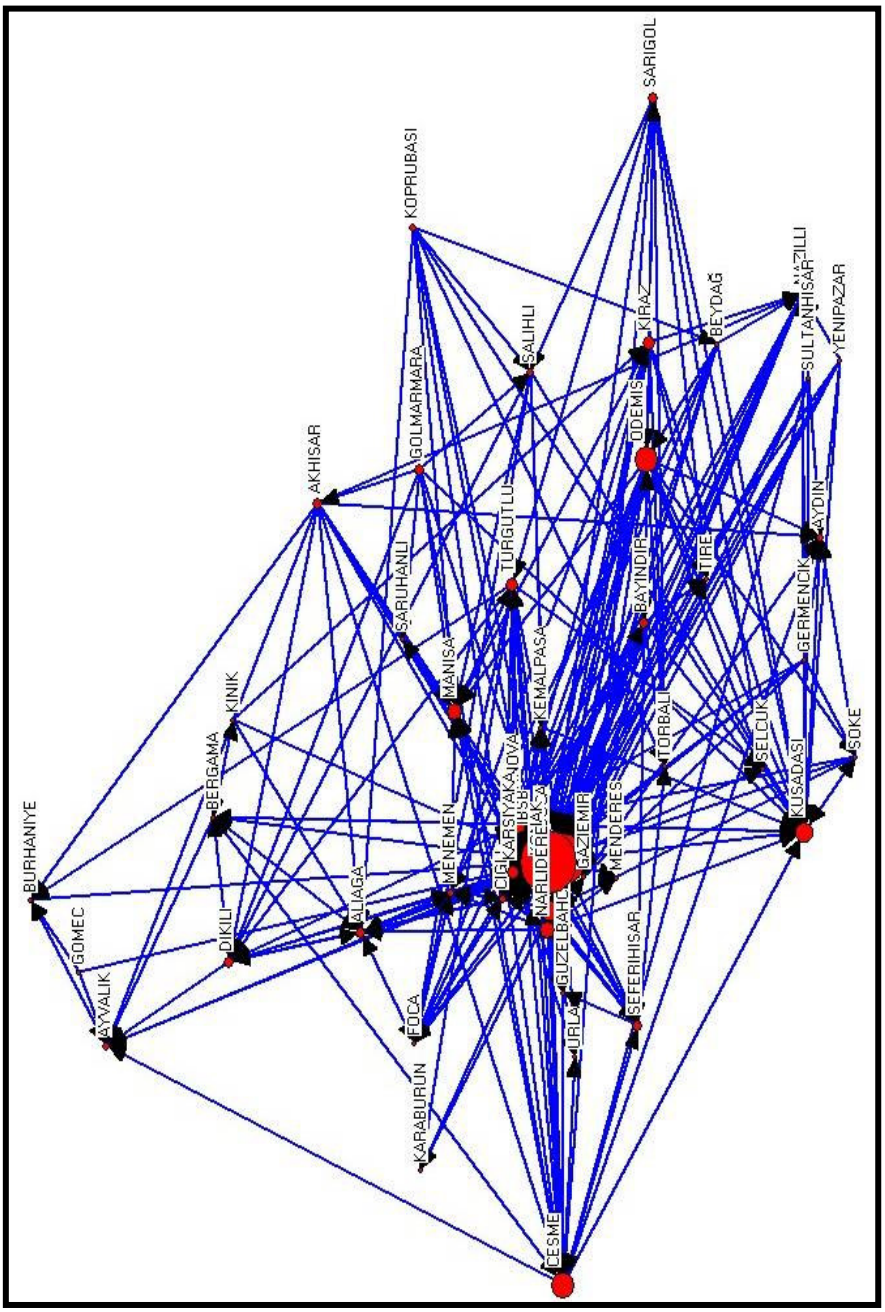

Figure C.1 Commuting Network In Izmir City Region According To Centrality Analysis
(Source: METU 2006)