A CRITICAL REVIEW OF ISTANBUL STRAIT CROSSING POLICIES

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ABSTRACT

The Istanbul Strait (Bosporus Strait) divides Istanbul (a major city of Turkey with 13 million population) into the Asian and European sides and this creates a serious transport bottleneck. Notwithstanding that traffic congestion has been a major urban problem in the region over the past two decades, the Istanbul Strait crossings have always received much social, political and planning attention. Up to the 1970s, the only means of crossing was vehicle and passenger ferries but today two Highway Bridges (constructed in 1974 and 1988) constitute the main form of crossing, and are two busiest road corridors in the city. Both bridges have had a wider impact on the urban form. To come over severe traffic congestion problems, two more infrastructure projects (railway and highway tunnel) are under construction, and the central Government plans to build a third Highway Bridge. This paper reviews the past and current (since 1970s) land-use and transport policies concerning the Istanbul Strait crossing with particular reference to sustainable mobility aims of the government. There are few such transportation bottlenecks across major water crossings in the world that utilizes this many means of transportation. A critical review of such infrastructure development focused policies, and the analysis of land-use policies and developments, is a contribution to the sustainable transport debate.

Keywords: Istanbul strait crossings, sustainable transport policies

INTRODUCTION

Sustainable development aims, and sustainable mobility in cities, have increasingly drawn attention over the past two decades in the wide spectrum of land-use, environment and economy and social studies (Wheeler and Beatley, 2004 Priemus et al., 2001; and Bertolini et al., 2005 Maclaren. 1996). To achieve globally better sustainable mobility, a systematic evaluation of real cases is important. Research studies are needed that explore the complex nature of mobility and sustainable development in different cities and their results should form the basis to disseminate know-how to provide a guidance for policy makers.

This paper is one such case study of Istanbul - included amongst the 20 largest world agglomerations in one of the United Nations reports. Our scope in an analysis of land-use and transport policies is narrowed down to the Istanbul Strait crossings (also called as the Bosporus Strait). Istanbul is strongly marked by the Istanbul Strait that divides the city into two main regions. This special geography forms one of the major urban and global transportation corridors and considerably adds to the already serious mobility problems in the city. The Istanbul Strait crossings is thus a crucial planning element for the planners as it has long been raised as one of the main problems of the metropolitan region.

We start with introducing Istanbul in terms of its land-use and mobility issues then move to a brief history of the Istanbul Strait crossings. This will provide insights, at the aggregate level, into the urban sustainability problems of Istanbul with special reference to the Istanbul Strait. Based on a review of international literature on sustainable mobility, our aim is to examine how past and current policies have served sustainability aims for the city. Although Istanbul constitutes a very specific case with the Istanbul Strait, a major water crossing and metropolitan level bottleneck, the findings of our study discussed later provide valuable elements for the guidance and reinforcement of policy-making in other major cities.

ISTANBUL

Istanbul is highly constrained by geography and topography and accommodates a total population of 13 million. It generates the substantial portion of the national GDP. Ineffective planning could not keep pace with such an economic development and population growth and this has contributed to creating crucial mobility problems. Amongst such problems, the Istanbul Strait crossings have long been one of the most outstanding according to media reports over the last 40 years.

Land use patterns

A general land-use pattern of Istanbul together with the two Istanbul Strait bridges and their expressways is shown in Figure 1. Istanbul is unique in a way that the Istanbul Strait (Bosporus Strait) separates the metropolitan area into two main land areas creating a bottleneck and crucial traffic problems along a very strategic corridor between the two continents, Asia and Europe. The construction of the First Bridge (1973) and the Second

Bridge (1988) and their beltways have highly influenced the travel and spatial development patterns in the city. The historical peninsula is the old CBD where currently no more development is allowed to as to preserve the historical identity of the city (Alpkokin *et al*., 2011).

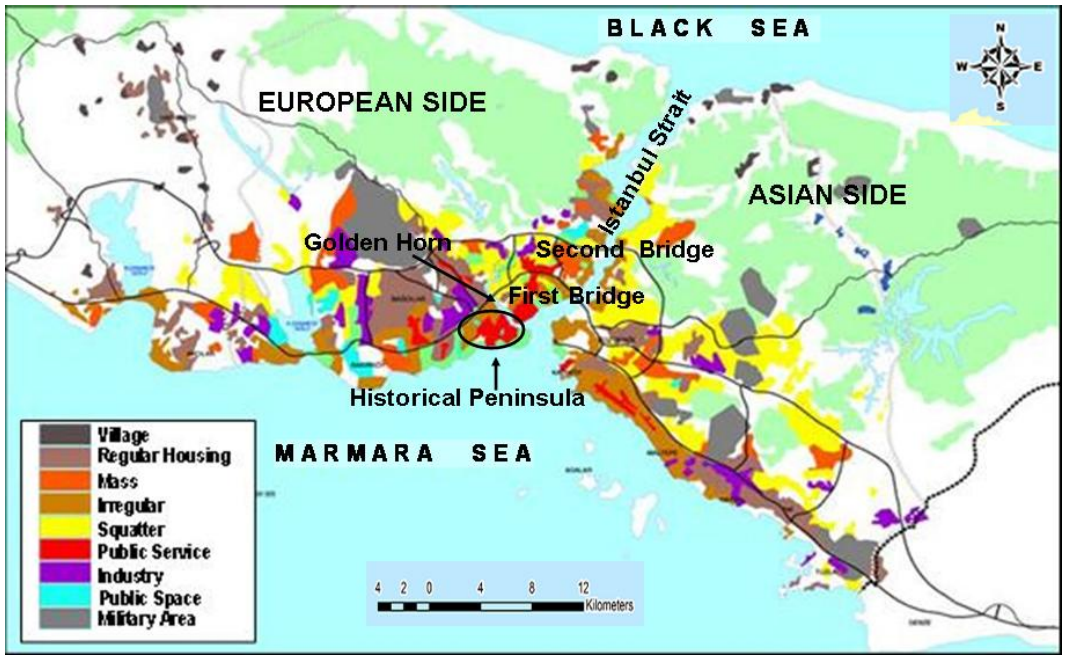

Figure 1 – General Land Use Pattern of Istanbul (Source: JICA[1], IMM[2], 2007)

The initial spatial impact of the Istanbul Bridge was on the distribution of population between two sides of the city. Nearly 80 % of the population was living on the European side before the First Bridge. This dropped to 76 % in 5 years and to 73 % in 10 years as evidence of decentralization towards the west, the Asian side of the city. The Historical Peninsula has continued to steadily loose its CBD dominancy over the last two decades with the decentralization of both industrial and commercial services as well as residences.

The northern part of the city is rural, with some open green space, and is sometimes called "the lungs of the city". However, following the construction of the Second Bridge and expressway (the Trans European Motorway) in 1988, Istanbul has also developed towards the north, destroying some of its important natural features. This was one inevitable and undesirable spatial impact of the Second Bridge. One of the other impacts of the Second Bridge has been the shift of the CBD to rapidly emerging sub-centers close to the Second Bridge expressways on the European side. Consequently, this rapid and extensive growth has changed the macro-form of the city from a mono-centric to a multi centeric one with a number of sub-centres.

[1] Japan International Cooperation Agency (JICA)
[2] Istanbul Metropolitan Municipality (IMM)

Transport patterns

Urban transport has long been shaped by the highway dominant policies to accommodate the rapidly increasing number of vehicles in Istanbul. Today, almost 90 % of the total private and public passenger trips are carried by the highway network which has been quantitatively and qualitatively insufficient. Istanbul Metropolitan Municipality reports that the total length of the highway network is 27,000 km where 63% of it lays on the European side (Figure 2). The two main transportation corridors throughout the metropolitan area and across the Istanbul Strait are the two Bridges and their expressways. Today they mainly serve intra-urban traffic and are severely congested in the peak hours.

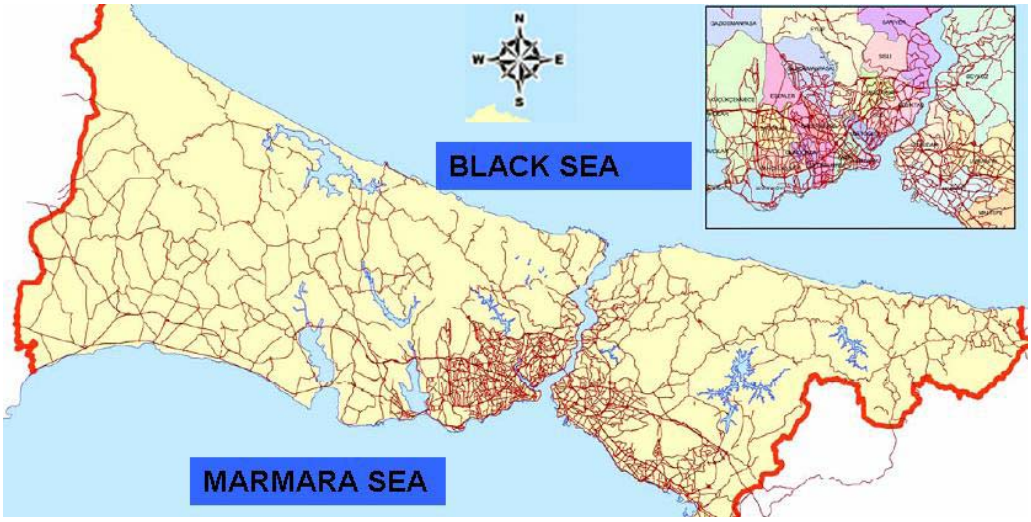

Figure 2 – Highway Network (Source IMM)

On this highway and public transportation network, the main mode choice changes have been observed for the buses / minibuses[3] and the private cars since the 1980s. The car share over the total motorized trips increased from 19 % in 1987 to 27 % in 2007. In the meantime, the share of bus and minibus system dropped from 55 % to 41% - a very clear indication of motorization and a trend away from sustainable mobility.

The public transportation system in Istanbul has always been insufficient to meet the rapidly changing urban dynamics and fast urban and economic growth. The local governments in Istanbul have been late in investing in mass transit systems. Recently, local authorities not only in Istanbul, but in many other cities of Turkey, have shifted much of their development plans to the improvement of public transportation networks. At present, buses and minibuses are the main means of public transportation in Istanbul. The other means of public transportation systems are the railway network and the inland water system which is mostly the ferries. The inland water transportation mainly serves for the Istanbul Strait crossings with ferry lines and seabus lines that carry about 260,000 daily passengers (Alpkokin *et al*., 2013).

[3] An intermediate form of public transport with 14 seats

The railway network is crucially insufficient with a total length of approximately 100 km (Figure 3). The Istanbul Metropolitan Municipality has recognized the need for improving public transport and has initiated a number of rail mass transit projects. The most important of these is the Istanbul Strait railway system which has a 14 km long underground tunnel at the Strait section and a total length of 70 km connecting Asia and Europe. This internationally significant project is also known as the Marmaray Project (Alpkokin *et al*., 2013).

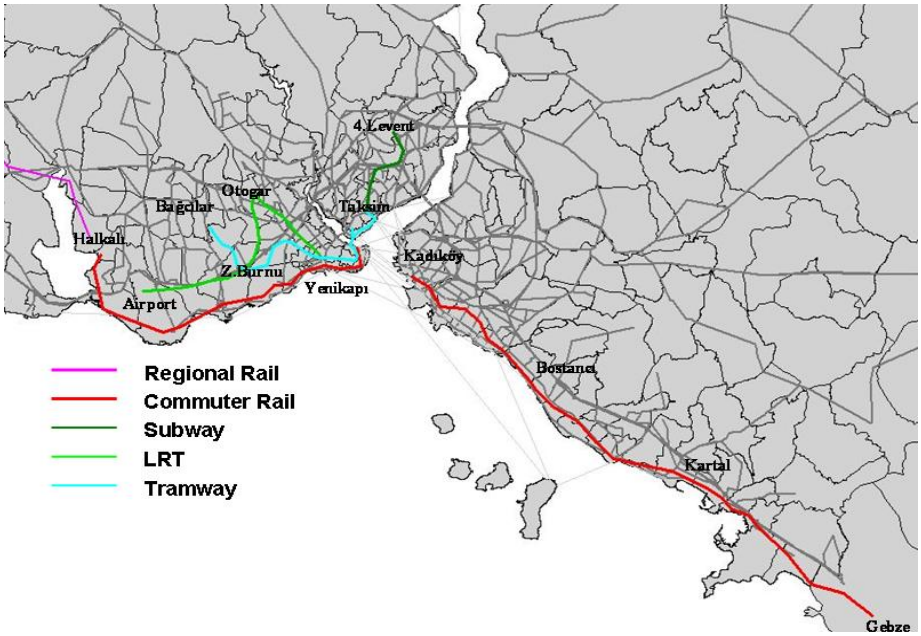

Figure 3 – Railway Network (Source IMM)

Unfortunately, the rail network share is far behind what it should have been despite the highly urbanized and populated city. Similarly, although the city is surrounded by water, the inland water means of transportation are not much utilized. The share of these two modes stands at 6-8 % without much change over the past two decades.

The Istanbul Strait

The first efforts to cross the Istanbul Strait go back to 400s B.C. when ferries and floats were lined up to carry the soldiers of the Persian Empire. The ferries have been acknowledged as the symbols of Istanbul, and have long been the only means of crossing (until 1973). Approximately one third of the population is accommodated on the Asian side and the morning peak is from the Asian side to the European side. The total daily motorized trips of 1.5 million use (will use) the following means of transport (Alpkokin *et al*., 2013).

- First Highway Bridge: Opened in 1973 and tolled bridge
- Secon Highway Bridge: Opened in 1988 and tolled bridge
- Third Highway Bridge: BOT[4] type tender has been concluded and the construction is expected to start soon.

[4] Build Operate Transfer

- Highway Tunnel: BOT type tender has been concluded and the construction is expected to start soon.
- Ferries: Both public and privately owned and operated ferries through a number of ferry stations
- Seabuses: Fast ferries and fewer lines
- Vehicle ferries: One line that is connected to the historical peninsula is available
- Buses: Both public and privately owned and operated buses run across both of the bridges
- Dolmus: Filled up or Stuffed means Dolmus in Turkish and is a type of intermediate form of public transport with seven seats and runs across the First Bridge.
- Bus Rapid Transit (BRT) Metrobus is the name given to the system in Turkey and runs through the First Bridge and its expressways.
- Mass Rapid Transit: Istanbul Strait Railway system and is still under construction (Marmaray is the name given to this high capacity in Turkey). The Istanbul Strait section (approximately 1.5 km) is immersed tunnel under the Strait.

ASSESMENT OF ISTANBUL STRAIT POLICIES

Istanbul serves as one of the best, or maybe, the best reference of additional bridge induced road traffic demand. The evidence is the dramatic increase in the number of cars, and the higher share of car trips, crossing the bridges in comparison to the metropolitan average. As a consequance, the travel times in peak hours across the Istanbul Strait double or triple in the peak hours.

The capacity of the bridges were not efficiently used until the extension of the bus rapid transit (BRT). Today, the BRT has an hourly directional capacity of 24,000 passengers. The user surveys also highligh that despite the highly crowded in-vehicle and station conditons, almost all the users prefer BRT because of the substantial reduction in travel times (Alpkokin *et al*., 2012).

Accessibility is a determining factor in personal mobility. An improvement in mobility is very likely to enhance accessibility. But will this be a long term impact? In many cases, the land-use and transportation interaction works promptly and due to the induced demand, the improved mobility or accessibility cannot be maintained for long. This has been the case for the Istanbul Strait crossings. The rapid land developments along the corridors of both bridges further created demand and the bridges reached their capacity earlier than expected. The Second Bridge was highly influential in shaping urbanization towards north. Figure 4 presents the land development changes in Istanbul since the 1940s.

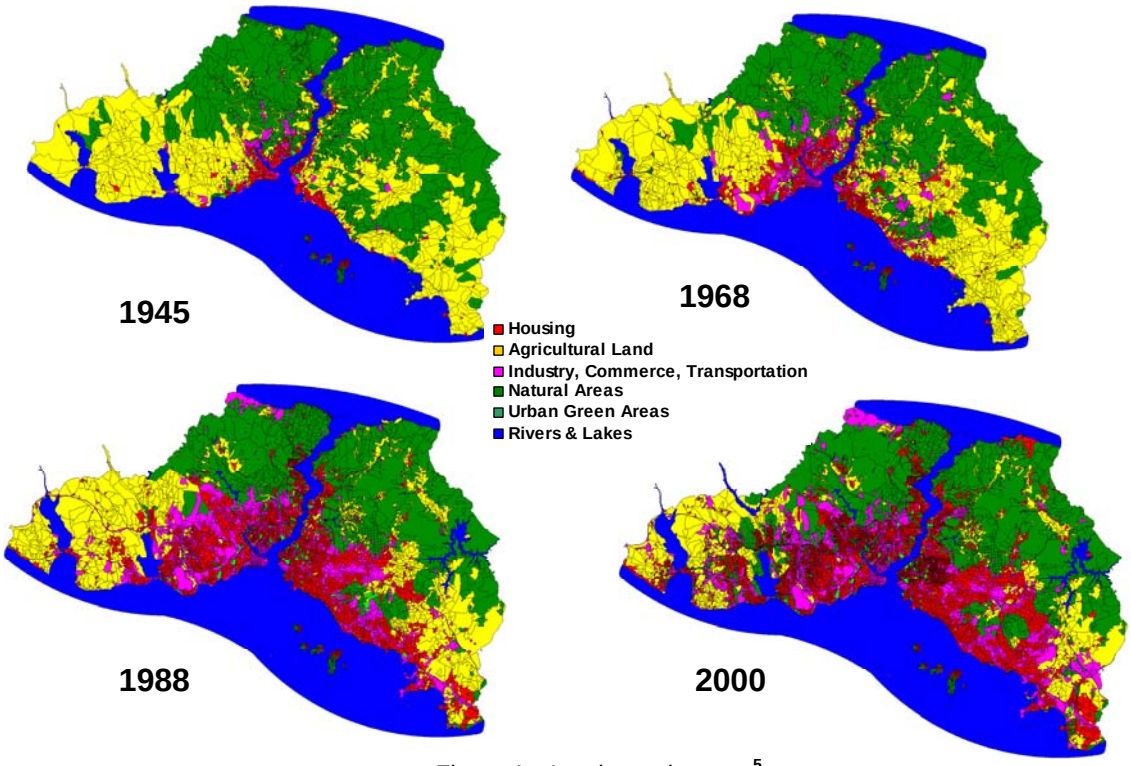

Figure 4 – Land use changes [5]

The Third Bridge, which is planned far north from the Second Bridge through the green part, may prompt further dispersion towards the north and destruction of the green along the corridor of the new bridge. To keep pace with the economic growth and increased mobility, both of the Bridges were indispensable and timely investments. The Second Bridge, as part of the Trans-European Network, aimed to serve national and international traffic. However, very quickly, its role to serve more for urban traffic distribution became more dominant and today trucks are not allowed through the Second Bridge and its expressway during the peak hours. Now, the Third Bridge is planned to serve the former role of the Second Bridge – that is predominantly through transit traffic.

In surveys of both the car and bus users, the citizens have always raised transportation as the most problematic issue in the city for the long travel times across the Istanbul Strait. The only alternative means of transportation are the ferries but they are not efficiently operated and the low level of service for bus trips has reduced the quality of life of residents and further has added to the social inequity or mobility gap for public transport users (the BRT has slightly changed this).

The Istanbul Starit crossings have long attracted the attention of politicians. The construction of the highway bridges have always been considered as a political success. The Istanbul Strait railway system is a huge investment (the total cost is expected to be around 5 billion USD). The government is using international loans to finance the project. Although it has been included in the transportation master plan since 1995, the financial problems and economic

[5] Source : Kemper et al., 2000

instability delayed the start of the construction until 2004. However, the BRT is a success story of financial viability and political acceptability. The Government currently favors the BOT type of infrastructure procurement for the two forthcoming highway crossings (Third Bridge, Highway Tunnel) which requires a guaranteed number of vehicles to make it financially viable.

CONCLUSIONS

There are few such transportation bottlenecks in the world that utilize (and will utilize in the near future) many different means of transportation: highway bridges (three); highway tunnel; conventional buses; intermediate form of public transport; BRT; mass rapid rail transit (railway tunnel); ferries (passenger and vehicle); and sea buses. We believe that our critical review of such infrastructure development focused policies in this case study will contribute to the sustainable transport debate.

Although the newspapers announced the opening of the First Bridge in 1973 with a headline of "*how great it is"*, it led the way to the Second Bridge, and potentially more highway crossings (third highway bridge and highway tunnel). Since the First Bridge was constructed, over the past two decades, the crossings have lacked any high capacity public transportation. Land-use plans were not effectively integrated. By the mid-1990s, the government adopted a poly-centric structure plan for a more balanced growth of Istanbul. By the beginning of the 2000s the government initiated the rail and bus rapid transit projects across the strait. These are all planning attempts to bring more sustainable outcomes to the crucial mobility problems of the Istanbul Strait crossings.

Mobility is the engine of economies and is essential for the communication functioning of society. In this sense, the two Bridges were necessary for Istanbul. However, the ineffective and unbalanced planning until the 2000s did not much help to fulfil any sustainable mobility aims. The current and future attempts to reverse the trend in the favour of sustainable development need bolstering.

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