Modelling Transportation Axes in Suriçi, (Diyarbakır, Turkey) and Determining their Relationship to Social Areas Allocated for Public Use

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Abstract
As is known, transportation is an indispensable part of social life. Especially, transportation systems are used directly or indirectly in order to meet social necessities. In this sense, this study, taking into account traditional street patterns, elaborates on the structure of today's streets within the context of its relationship with areas allocated to public use. As human activity increases in urban areas, demand for transportation increases. It is possible to overcome difficulties faced in this respect by planning transportation and by developing an effective transportation system. Despite the fact that preferred areas by city dwellers change over time in line with new trends and development of shopping malls, Suriçi retains its population density and touristic value. This study aims to make a contribution to the literature on the relationship between transportation and social areas and the importance of preservation of street pattern in the city's traditional centre.

Keywords: public use; street patterns; historical site; Suriçi; Diyarbakır

1. Introduction
What characterizes the development of a city depends on the balance that has been established with changes in the transportation system in the long run (Strathman, 2000). The city of Diyarbakır, which has developed in parallel with the changing transportation axes over the years, is a good example of this fact.

In this study, information is provided as a result of on-site research in Suriçi and a literature review. In this context, social areas in different places in Suriçi and their connection with the transportation axis is reviewed. Existing problems in transportation are discussed and suggestions are made for a transportation system that could provide effective access to social areas.

2. Diyarbakır Suriçi Region
Diyarbakır (37°55'N, 40°12'E) is located on a wide plateau between Karacadag Mountain and the Tigris River in the Mesopotamia region in the southeastern part of Turkey. The foundation of Diyarbakır as one of the most important cities in southeastern Turkey goes back to prehistoric times. The Suriçi region, the first settlement part of Diyarbakır, has been a settlement area with specific values throughout its history (Fig.1.).

The cradle of many civilizations, Suriçi continued its life until the 1940s resembling a city from the Middle Ages, which closed its doors to the outside world.

The walls surrounding the historic city centre, which reached their current extent in the 4th century, have been the most important symbol of the city since their construction.

Fig.1. Location of the Historical Settlement in Diyarbakır (Left); Bird's-eye View of the Settlement (Right). (Bekleyen and Dalkılıç, 2011)

The city wall, in its present form, is a continuous structure with a length of 5.5 km surrounding the Old City. All the historical buildings of Diyarbakır are located within the Old City including churches, mosques, hans (caravanserai), fountains, traditional Diyarbakır houses and other public buildings such as madrasahs (old traditional schools) and libraries (Kavak and et al. 2011).

The traditional housing pattern, urban conservation area and walls forming the historic city centre of Diyarbakır are some of the most
important cultural heritages that must be protected. The social fabric concerning the spatial richness and traditional history which has played an important role in the integrated environment is found in the historic centre of Diyarbakir as geography. However, cases of forced migration during the 1990s especially, have increased the damage to buildings, pinpointing the fact that the urban fabric has been shaped to meet the needs of the population from immigration and population increase. Urban services in Diyarbakir are extensively changing because of rapid urbanization.

3. Street Pattern in Surici

Continental climate, existence of basalt stone in the region, socio-economic structure, and privacy of family life were factors that were effective in determining the shape of streets, making them narrower. Surici attracts attention especially with its intense and congested structure. This intensity reflects on the one hand the characteristics of the eastern organic settlements, and on the other hand a city surrounded by walls since the Roman Era (Haspolat, 2014). In the city, monumental structures which came under Ottoman rule in the 16th century, dispersed in the texture inside the walls, making possible the creation of the streets and neighborhoods which determine the structure of the city (Haspolat, 2014).

In accordance with the settlement plan prepared by Gabriel in 1940, the city has been developing around two perpendicular axes. In a development plan prepared in 1984, it is seen that there are additional axes established parallel to Yenikapi Street and the Wall (Figs.2. a and b). The two-way axes, which remain today connect to the four gates, intersect the centre of the city and form the Hellenistic and Roman city plan.

This city plan changed during the time of the Byzantine and Islamic civilizations and remains today as a two-way axis (Akın and Yıldırım, 2006). Natural and artificial thresholds that prevented the enlargement of the city have been influential in the city's orientation, and transportation axes have developed towards the northwest (Fig.3.).

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Fig.2. a) Settlement Plan for Surici Diyarbakur (Gabriel, 1940)

b) 1984 Master Plan, 1/5000 (Parla, 2005)

Fig.3. Main Transportation Axes, Land Use and Perpendicular Street Pattern

The walls have always played a decisive role in shaping the streets and houses inside. As they limit the extension of the city, intensity within the walls has increased, houses become much closer to each other and streets have become much narrower. Such density has been determinant in the shaping of paved streets and has caused separation of houses from the street with high walls (Aluclu and Özylimaz, 2012). As the streets in the city have been developed on the northsouth and eastwest axis, it has been kept open to cool winds coming from the north, providing natural ventilation (Baran et al., 2011).

In the 19th century, commerce developed along the axis of Gazi Avenue, Izzet Paşa Street, and Melik Ahmet Paşa Street. This function continues in these streets even today (Sinemillioğlu et al. 2010). The main road is 10-15 metres wide and has very heavy pedestrian and vehicle traffic (Photo 1).

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Photo 1. Gazi Avenue (Main Transportation Axis)

Gazi Avenue is the main commercial axis of the city while perpendicular Inönü Street and other
streets nearby are determined as commercial areas of secondary importance (Fig.4.).

The average width of the roads inside is around 2.2 metres, however this is sometimes reduced to 0.58 metres. Although an organic pattern is dominant, perpendicular roads cause the formation of rectangular islands of structures (Fig.5.).

Houses are separated from each other or put together with an irregular geometry. Because of parcels in irregular forms, streets do not have a geometrical order either (Fig.6.). But, no matter how irregular the parcels are, courtyard walls surrounding houses, are joined at right angles to each other as much as possible.

Dwellings are very close to each other and are located on very narrow streets. The dwellings shade each other, pedestrians and streets. Streets that are narrowing and expanding do not move linearly and have organic structures (Fig.7.). If the layout of the street requires the deformation of courtyard geometry, one edge of the rectangle is obliged to follow the layout of the street (Güleç et al., 2006). However, there appears to be an original pattern in these streets compared to today's general building and street typology.

As streets pass through high walls, there are many shady areas receiving limited sunlight, which helps the street underneath remain cool. Some streets are straightforward while others are winding and resemble labyrinths (Haspolat, 2014). Moreover, Y-shaped junctions, where three streets are connected to each other, are very rare (Yılmaz, 2013).

In Diyarbakır houses, entry to the courtyard is generally not direct and there is a buffer area called a street passage, entry passage or passage between the courtyard and street that provides access to houses (Haspolat, 2014), (Photo 2).

In some cases, main and side streets are interrupted and turn out to be streets called 'Kuçeçikmaz' (dead-end) (Haspolat, 2014). Dead-end streets emerged due
to the sense of privacy and have developed in a way that enabled big rich families to live together (Yilmaz, 2013), (Photos 3-4).

Three-dimensional complex forms, such as bridge-like passages connecting one building to another or rooms connecting one part of a building to another, (Baran et al., 2011) prevent the formation of a dead-end, while rooms are constructed 'above the street'. These are called locally "örtme (kabaltı)" or "kantırma". These rooms sometimes form part of a single house or sometimes function as a passage between two different houses (Photo 5-6).

Traditional streets used to have a standard width. Therefore, walls of the ground floors did not invade the street and did not narrow it, while second floors could be extended above the street. These floors are called Şahnişin and their windows used to face the street (Aluçlu and Demir, 2010).

Stone processing in the city has an important place in creating a functional silhouette of the streets. Streets are covered with basalt stones connected naturally (Haspolat, 2014) and main roads are paved with asphalt.

The surfaces of the walls were constructed in such a way as to relieve the car and pedestrian circulation in narrow-street turns (Photo 7). Console stones below the extended floors (çıkmak) contributed to the aesthetic value of the streets (Yılmaz and Baran, 2010). In the facades of the houses facing the street, fountains were placed to provide the public with water, especially on hot summer days.

In Suriçi, areas that have been gained with the demolition of old buildings are generally used for car parking. The accuracy of the placement of such areas, which are very important for traffic, is disputable. In some street intersections and in other empty spaces, tandoors (cooking areas) are placed and other meeting areas for women are established (Photo 8).

4. A Model for Transportation in Suriçi and its Relationship with Social Areas

Establishing social activity areas that meet the social, educational and health needs of the society and maintaining the existing ones are possible only with an effective web of transportation services. In rapidly growing cities with conventional land use and transportation planning practices, this process is typically difficult (Aljoufie, 2014). In Suriçi, there are many important social places of historical and cultural importance.

In response to social, political and economic dynamics, a trend towards integration of transportation planning and planning of other land use functions can be observed. Integration of road infrastructure
and other land use functions is increasingly promoted as a sustainable alternative to traditional planning approaches (Heeres et al. 2012). Integrating town development and transportation planning generally has two goals such as easy accessibility and quality of urban life. It is vital to restrict car traffic and to stimulate public transport and bicycles as environmentally friendly means of transportation to achieve this goal (Wei and Mogharabi, 2013).

In Fig.8., letter A represents the Museum in the inner citadel, while B is cafes and restaurants; C, D, F, G, H, I, J, K, L, M, P and T: religious facilities; E, O and U: education facilities; N: car parking area; and S stands for accommodation.

While education and health facilities are at the service of people living in Suriçi and the surrounding area, cultural, religious, accommodation and commercial facilities provide service to the region in general, while domestic and international tourism will lead to developed economic activity in this area. In Suriçi, there are many important social places of historical and cultural importance. Some of the social areas shown in Fig.8. are illustrated in Fig.9.

Establishing connection with and within these areas is a very important task in cases where transportation is insufficient and people's social activities are limited. Observations made in Suriçi and analyses made over the map show that transportation to social areas is maintained by main roads as well as by side roads. Education, culture, health and religious facilities can be reached via at least two side roads and streets constitute parcel boundaries for most of these social areas. Existence of a transportation route connecting social areas can provide easy and comfortable access for people living in these areas while enabling tourists to safely visit these places of cultural and historical importance.

There are no differences between the northeastern, northwestern, southeastern and southwestern parts of Suriçi in terms of the relationship between transportation and social areas. Adequacy of the social areas in comparison to the living population is the subject of another study. However, it is easily observed that active green areas are insufficient. In this vein, this study explores the existing situation in terms of connection between the transportation system and social areas in northeastern, northwestern, southeastern and southwestern parts of Suriçi.

In the axes arranged as pedestrian and bicycle roads, there should be rest areas at certain intervals. In these areas, there should be local businesses functioning to provide an economic contribution.

It is possible to organize the goals of the alternative transportation model developed in this context and aim for efficient and sustainable transportation as follows:

- improve the transport axis without damage to the historic fabric,
- provide a link between the social areas such as the examples of civil architecture that have historical and cultural value, as well as education, health, cultural and religious facilities,
• present a transport axis that can provide easy movement and prevent the wandering of visitors,
• promote tourism by providing active transportation network access to historical values in Surçi, 
• provide accessible and safe circulation streets,
• make arrangements to encourage pedestrian and bicycle use instead of the operation of motor vehicles.

For this purpose, proposed transportation routes should be planned with pedestrian and bicycle roads connected with the main axis as much as possible as permitted by the width of the streets as shown in Figs.10.-11.

The transportation axes proposal shown in Fig.11., are expected to realize the following goals:
• Melik Ahmet Pasha and Yenikapi streets shown in yellow are the main transport axes and will open to traffic in a controlled manner,
• an alternative transportation axis shown in red will reduce the density of Gazi Street that is heavily used and will provide a comfortable and active transportation axis, providing access to social areas for citizens and visitors,
• the connection path shown in blue that links the main transport axis and alternative transportation will offer roaming capabilities to users with different alternative transportation.

5. Conclusions and Recommendations

Historical walls surrounding Surçi, which has hosted many civilizations, its traditional housing texture, religious and cultural buildings, and other movable and immovable cultural heritage of these areas, create a great tourism potential for the region. Implementation of a protective master plan and protection of structures with historical value will increase the attractiveness of the region. In this context, it is important that policy decisions are made and applied in accordance with master plans and in line with sustainable tourism policies.

Today as well as in the past, Diyarbakır has been a centre of both immigration and emigration because of its location, its morphological properties, and the existence of Dicle River. It has always faced social and urban problems stemming from immigration. While social, cultural and economic structures in Surçi have evolved in line with emigration; some of the existing population has left this area and settled in other places. Because of the population density that is beyond the capacity of Surçi, its original urban texture has been distorted. The transportation system and housing have been shaped to meet the needs of immigrants in accordance with these developments.

The surface covering of existing roads, location of structures, and width of streets, squares, and the walls constitute factors providing originality to this area. Development of transportation around social areas shows the feasibility of social activities when deemed necessary. As the population in Surçi has increased, construction of new housing has re-shaped the web of transportation, creating several problems.

Although the transportation infrastructure in Surçi is predominantly pedestrian, the intersection of heavy pedestrian traffic with car traffic in certain axes such as Gazi Avenue and Melik Ahmet Street causes an important problem. In addition, insufficiencies are being observed in the technical infrastructure and walking areas are limited due to security concerns.

Regulatory practices such as the optimum use principal, urban planning with priority given to pedestrians and designs for disabled persons are important in terms of improving the transportation system in Surçi (Baran et al., 2011). While priority is given to pedestrians, car traffic should not be excluded and a transportation system balancing pedestrian
and car traffic should be targeted. Deficiencies in transportation infrastructure should be eliminated; road quality should be improved with better surface covering materials. Walking safety should be provided both for disabled and non-disabled persons.

Moreover, the route should be reinforced with modern street designs that cover lighting elements, trash cans, flower beds, sculptures and plastic items, seats, fountains, bicycle shelters, signs, billboards, floor elements, gratings and maintenance covers. Active use of this route is expected to strengthen social relations between visitors and inhabitants.

Currently, it is observed that empty areas that have appeared as a result of demolitions are used for car parking purposes. Certainly, there will be a need for car parking areas in a transportation system where car traffic is put under control. However, providing green areas by using these empty places could be also important for establishment of places where strong social relations are maintained and recreational needs of the society are met. In the streets where traditional production methods continue to exist, commercial activities should be maintained. But, limitations should be set in order to prevent overflow of these activities into the streets. It seems possible that with an increase of cafes, restaurants and shops where local production is displayed, commercial functions can be re-activated in Gazi Avenue, Melik Ahmet and Yenikapı streets which make up the main transportation axis. It could be possible to re-activate commercial activity along with Melik Ahmet Street by moving the minibus terminal located there to an area near the Walls.

In conclusion, it is a must to retain the city's original street fabric taking into account the existence of commercial areas, tourism flow and other economic contributions. For this purpose, attaining the support of local administration, developing pilot applications and raising people's awareness are important factors Thus; preservation of the original fabric of the city seems feasible with implementation of effective transport planning and application of a conservational master plan.

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