The Effect of Underground Subway Development on the Rehabilitation of Historical Urban Places: Case Study Tehran-Iran

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ABSTRACT

One of the important criteria of developed urban regions is the fast and easy connection between people and historical places by underground subway network. Accessibility and connection between people and city center by new developed subway causes rehabilitation in historical area and also it increase the historical and cultural values of places. But in this time because of suddenly developments and high population in the most of great cities, there is not a suitable relationship between network and population density and people are not able to access to this area easily. So most of attraction historical places remain unknown for peoples. In this way underground subway with fast transfer and lock of pollution has a very important role to attract people in these historical places and also in making a living area. In this paper with regards to statistical analysis and field survey methodological describe the effect of development underground subway on the number of visitors who visit city center, people satisfactory and comfort ability, suitable connection between city center and other residential area.

1. INTRODUCTION

In this article we attempt to analyze the impact of Tehran underground railway (metro) presence on city's historical areas and its role in step by step revitalization of the existing urban structure and rediscovering urban identity of these areas.

2. INTRODUCTION OF TEHRAN'S HISTORICAL AREAS AND THE METRO LINE PASSING THROUGH THEM

2.1 Phases of Tehran growth and formation of city's historical areas

“The expanse of city of Tehran (comprising 22 urban zones) according to official estimate is 707 square kilometer. The primary nucleus of Tehran which was built at the time of Safavie dynasty was as large as 4/2km2. In the year 1249(1870) a new fortifying wall was built around Tehran which increased the expanse up to 18km2.In the year 1310(1932) close to 46km2 was added to the size of Tehran and the city started grow northward due where the climate was more pleasant. This growth continues even today. In the 1340s (1960s) the pilgrimage center of Abdolazim was merged with rural areas in Tehran. In the beginning of 1350s decade (1970s) northern areas (Shemiranat) and central
areas of Tehran were united and the expanse of Tehran reached 250km² point. In addition to confronting structures of north and south which since 1330s (1950s) was a determining factor in designating the structure of the city, with overall growth of capital city in all fronts structural confrontation between center and margin also appeared in the city and a new spatial order was established’.

Fig. 1. Central historical section of Tehran.

2.2 Tehran Metro Lines and future plans

In the framework of first phase of construction and utilization of Tehran metro network so far lines 1/2/and 5 with 90km length and 52 stations have already become operational. Also further expansion of lines 1 and 2 as well as construction of lines 3and 4 in the second phase since the winter of 1383(2004) have started and they are expected to be completed by the spring of 1390(2011). After completion of phase 2 more than 74km length and 50 new stations will be added to the capacity of Tehran metro. In addition to that at the moment the lines 6/7/8/and 9 are under study. Though the above mentioned figures put Tehran in 20th position among the cities equipped with metro system, but having considered Tehran’s 707km² expanse and more than 7 million population, based on ideal standard of 1 station in per square km, Tehran at present requires over 700km line and 700 stations and definitely a full coverage of urban areas in Tehran would need more lines and more stations. Lines 1/2/3/4/and 7 directly connect marginal areas of Tehran to the historical area of the city and lines 5/6/8/and 9 also in an indirect manner would be connected to the historical area (Fig. 2.).

3. NUMBER OF PASSENGER TRANSPORTED BY TEHRAN METRO SYSTEM FROM 1997-2002

Based on statistics prepared by Tehran Metro Co. during the fourth 3 months of 1384(2006) more than 77 million journey by lines 1/2/and 5 of metro have been carried out and after construction of metro on a daily basis over 409320 hours of time saving have been achieved. Saving of close to 480000 liters of fuel worth about 1/6million US Dollar during winter season of 1384(2006) has been another advantage of metro construction in Tehran. Furthermore the increase in the number of journey from 6000000 in the year 1378(1998) to 216 000000 in the year 1383(2005) reflects increasing public enthusiasm for using this new transport technology and shows the efforts of relevant authorities in the direction of metro expansion.(Fig.3).
4. NATURE AND AIM OF ACCESS BY VISITORS AT METRO STATIONS

According to recent census most of movements and transportation of tourists and local visitors in central area of Tehran are by metro system. For this purpose a questionnaire (Fig. 4.) has been designed and distributed among 200 visitors of historic sites of Tehran. The extracted results show that more than 50% of the group has reached their destination via metro lines 1 and 2. Thus with regard to limited urban coverage by lines 1 and 2 and great development potential for other lines there is hope that in case of upgrading and expansion of metro lines bound for
historical areas of Tehran, we may witness a greater enthusiasm among visitors of special attractions and people in general.

At present due to insufficient number of metro lines, relative to the expanse of the city, many metro passengers have to use personal or other public vehicles to get to metro stations (Table No. 1) In case of completion of underway projects and expansion of existing lines and stations inevitably and gradually there will be a remarkable decrease in the volume of journeys by private and public small and large vehicles and on foot movement will be on the increase.

In accordance with Table 2, metro passengers in lines 1, 2 and 5 are mostly state their aim of traveling as being occupational or educational.

Traveling with shopping and entertaining aims plus some other goals comprising an average of 22% of total, shows the enthusiasm of passengers for using metro system to travel to the center of Tehran.

Fig. 4. A sample of questionnaire distributed among visitors of historic sites.

Table 1. The results of census among passengers of metro lines 1, 2 and 5.

<table>
<thead>
<tr>
<th>Means of accessing to metro</th>
<th>On foot</th>
<th>Bus</th>
<th>Mini bus</th>
<th>Taxi</th>
<th>Passenger car</th>
<th>Private car</th>
<th>Office service</th>
<th>Motorcycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 5</td>
<td>12</td>
<td>46</td>
<td>3</td>
<td>26</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Line 2</td>
<td>21</td>
<td>42</td>
<td>3</td>
<td>20</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Line 1</td>
<td>19</td>
<td>45</td>
<td>3</td>
<td>19</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 2. The results of census among passengers of metro lines 1, 2, and 5.

<table>
<thead>
<tr>
<th>Various aims of traveling</th>
<th>Occupational</th>
<th>Shopping</th>
<th>Educational</th>
<th>Administrative</th>
<th>entertainment</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 3</td>
<td>42</td>
<td>7</td>
<td>27</td>
<td>8</td>
<td>3</td>
<td>10</td>
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<tr>
<td>Line 2</td>
<td>48</td>
<td>9</td>
<td>24</td>
<td>6</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Line 1</td>
<td>48</td>
<td>8</td>
<td>25</td>
<td>5</td>
<td>4</td>
<td>10</td>
</tr>
</tbody>
</table>
5. THE ECONOMIC, SOCIAL AND ENVIRONMENTAL IMPACTS OF METRO ON SURROUNDING STRUCTURE

5.1 The optimum utilization of land plots surrounding stations by having them built as station complexities

Optimum land use in areas surrounding stations provide passengers with necessary support and creates the right environment for multi facade activities while the appropriate network of transportation is also accessible. Furthermore such idea would help to distribute land use more evenly among service providers, construction activities and other businesses in the city.

5.2 Prevention of activities destructive to urban structures

One of the effected solutions in pursuit of resolving urban transportation problems and finding access to the central city limit is widening those streets which leads up to central limit and the lanes within historical urban structure. Although execution of such solution have eliminated many of the existing hindrances and in reality provide easier access, but will certainly carry negative social impacts and cause some degree of destruction in the overall picture of urban structure. In such circumstances metro by passing under city limit and penetrating into the heart of historical limit without confronting physical and architectural values and destruction of historical structures, provide residents as well as visitors with easy access.

On the other hand existence of traffic beyond normal capacity of areas streets network leads to increase in the volume of polluting elements and erosion of historical structures. In these circumstances expansion of metro system in larger scale inside historical limit would bring about a considerable decrease in the volume of cars moving at the heart of the area.

5.3 Facilitating the traffic

Metro by passing under urban areas far removed from busy atmosphere of the city has provided the easiest access for citizens. The easy traveling away from noise of the city, encourages tourists and citizens of Tehran to voluntarily visit these areas and such a change in attitude could play an important role in boosting these areas from entertainment and tourism points of view.

5.4 Increase in stronger inclination towards living in historical areas

Lack of balance between the capacity of streets of central Tehran and the volume of current activities inside it and also the shortage of parking lot as well as narrowness of roads in some parts of historical sections and ensuing traffic and commuting problems has forced many of the residing population to move to the calmer and more accessible parts of the city. A number of these movements have occurred under pressure and emigrants of this type despite living in new parts of the city always introduce themselves as people belonging by identity and origin to the central nucleus of Tehran. The increase in the number of metro stations and lines passing through central limit of Tehran could help people to like better the idea of living in historical areas and encourage some of those people who once upon a time left the area for reasons of overcrowding and access problem. Return of population and their living in those area which have now lost their original function, while preventing further destruction and erosion would also help revitalization of the structures left intact in these localities.

5.5 Increase in social intercourse

Communication between citizens in urban environments have great importance. This communication in metro as an urban environment takes 3 different forms:

1-In the routes leading to stations: pedestrian routes formed under the influence of existing stations where encounters take place and urban and social communication materializes.
2-In stations: stations as the place where people are gathered and distributed and as the origin and destination of many journeys and also as the place of pausing and thinking have a role in establishing social contact.

3-During journey: being in the same train wagon until arrival at destination is indeed a good opportunity for conversation and social exchange.

5.6 Generating discipline and social merriment

One of the difficulties constantly bothering human beings is disorder and relative absence of serious timetable for daily actions. Inefficiency of transportation system and urban traffic usually worsens the state of disorder and problems relevant to it. Metro by designation of journey time (with regard to constant speed and absence of general traffic) helps to save time in favor of passenger. As the statistics published by Metro company show considering a value of 500Rls for every spent hour, the total cash value saved by saving time during 1384 (2005) is estimated at 1012 billion Rls (close to 1.125,000,000 US$). It is a proven fact that punctuality and exactitude in life planning could add vivaciousness and vigor to everyday life.

5.7 Creating genus balance among passengers

Due to administrative difficulties and the complications of living in Tehran's (bazaar) area temporary solutions so far have not been able to solve the problems of this important area of Tehran. Following the start of operation by metro line 1, the reports of Molavi, Khayyam and Panzdah e Khordad stations, activities have given many reasons to consultants and urban designers to be hopeful about resolving the problems of this important area.

Passing line 1 through west side of Tehran bazaar and the existence stations situated at Panzdah e Khordad, Khayyam and Molavi not only have increased the customers (without car) of the bazaar, even created a new balance in the number of men and women walking on foot around bazaar and it's vicinity such as Marvi lane, Naser Khosrow, Pamenar and Molavi. For this reason present features of Tehran bazaar are quite different from what it used to be in previous years.

5.8 Inevitability of moving on foot and consequent reinforcement of sensual perception

No doubt our perception of environment immediately after entering and moving in a particular urban structure has impact on our understanding of the space. In on foot movement we have all our senses in the service of our purpose whereas in movement by car may be the only sense that is effectively helping us is our sense of sight. What is more, walking in the urban structure and streets could give incentive for similar action in the future. Development and expansion of metro lines and stations would result in decrease in cars, movement and increase in on foot movement within the urban structure and valuable historical elements.

5.9 Discovery and preservation of urban identity of citizens

Urban identity only after comparing the objective and subjective dimensions of it would become a real concept. The appearing of objectiveness of historical areas of the city is depended on the level of direct contact and easy access. Shortage of rapid and comfortable public transport vehicles have undermined this idea and have prevented the full materialization of it. Metro by providing the means of safe and easily available commuting help us to reach this goal.

5.10 Decrease in environmental pollutions and increase in safety of inner-city journeys

Car traffic oriented Tehran air pollution and pollutions created by other sources have for a long time been beyond the permissible level and therefore traffic limitation in the central area increases in number day by day.
The historical sections of Tehran though rich with many attractions, because of the transport difficulties and inefficient management of traffic and environmental pollution have turned into a place to which people travel only out of absolute necessity. The situation has made the entity of the area something other than what it should be. Nowadays the central area no longer functions as the center of tourist attraction, a place for entertainment and almost totally has changed into a district of shopkeepers and administrative and trading centers with a great deal of pollution.

6. CONCLUSION

Metro by its calculated and rapid movement and its side effects such as bringing down environmental pollutions and causing economic savings is able to offer easy access between marginal parts and central areas of Tehran. Beside all the positive direct effects of construction and expansion of metro lines underground rapid commuting could bring about the formation of nucleus, of gathering and distributing in the structure and absorption of population, and offer definition for on foot routes, and decrease the presence of cars, create more security in streets network, prevent social misbehavior and erosion of urban structure in the central area, and finally help to carry out the revitalization of historical areas of Tehran.

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