

## A Study on the Development of Transportation Systems City of Tehran between 2006 and 2016

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### ABSTRACT

New strategies and policies in developed countries have shift from vehicle-oriented to human-oriented. Accordingly, due to the problems in Tehran, the attitude towards transport plans and strategies in the target documents has been changed. And the concept sustainable developments have also been considered in the transport literature in the country. Sustainable development requires simultaneous attention to the economic, social and environmental components. In this regard, the study of how to develop transport systems is important.

The purpose of this research is to investigate the success or failure of transportation programs in relation to the missions and prospects of the transport sector of tehran during the last decade with the help of quantitative indicators the results of this research show that urban planning and development of transport infrastructure are such that the length of mass public transportation (BRT and Metro) has grown by 298 percent, but the share of travel by private cars for many reasons, and problem in travel management has increased by 4.4 percent indicating an increase in direct and indirect costs in the transportation.

The results show, although public transportation facilities and its technology have grown significantly, programs have not succeeded in reducing the share of personal transportation and emissions control, and it is imperative to limit the use of personal and motorcycle policies such as getting tolls, raising fuel prices, development HOV lanes and launching new public transportation systems such as LRT and Trams will be implemented.

**Keywords:** Public Transportation, Development, Infrastructure.

### INTRODUCTION

In the Tehran's traffic and transportation prospective, features such as high share of travel with public transport, increasing non-motorized travel, improving the safety of transport systems and optimizing energy consumption and reducing air pollution have been considered. Finding the above outline requires strategies such as developing public transportation infrastructure, developing walking and cycling, implementing safety standards in urban transport and traffic, implementing strategies to save on non-renewable energy in transport and reducing the emission of air pollutants in Tehran is to implement strategies above all, planning is required in various areas. These include the construction and expansion of a massive public transport network, the construction of pedestrians and bicycles infrastructure and the use of modern technologies to record driving violations as a deterrent and reduce traffic accidents, reducing

travel by personal vehicles and reducing the share of motorcycle trips.

Recognizing the status of the actions taken in the last decade and examining the extent to which success or failure in these programs can help identify the right orientations and modify approaches to achieve major missions in the field of transport and traffic. The purpose of this paper examining these programs is based on quantitative indicators.

Due to shortcomings in some of the issues in 2006, the 2011 statistics were also used to review the development process and changes in the 2006 to 2016 period.

### PROBLEM STATEMENT

Questions that are addressed in this paper are:

- Have public transit systems been well-developed in the last decade?

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- Have traffic infrastructures in the non-motorized transport sector been well-developed in the last decade?
- How has traffic been changed?

### ASSESSMENT OF TRANSPORT INFRASTRUCTURE DEVELOPMENT

In this part of the paper, the trend of development of transportation infrastructure in four scope is reviewed, the situation of public transit, the situation of the road's network, the situation of walking and cycling, the situation of modern technologies during the 2006 to 2016 in Tehran. It

**Table1.** Average Daily Ridership (Metro)[1]

Year	Daily Ridership (trip)	Growth Rate Compared To 2006 (%)
2006	773,678	0
2011	1,555,586	101
2016	2,156,435	179

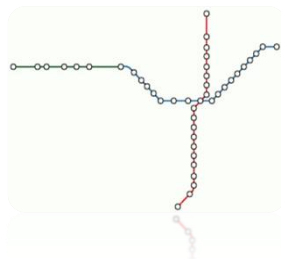
The number of metro fleets has risen from 69 in 2006 to 180 in 2016. Also the length of the BRT network, which was 0 km in 2006, increased to 184 km in 2016.

**Table2.** Metro Fleet Number[2]

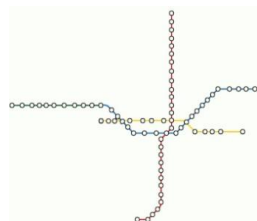
Year	Metro Fleet Number	Growth Rate Compared To 2006 (%)
2006	69	0
2011	127	84
2016	180	161

**Table3.** Metro Network Length[2]

Year	Metro Network length (km)	Growth Rate Compared To 2006 (%)
2006	89	0
2011	125	40
2016	170	91



1385 ( 2006)



1390(2011)



1395(2016)

**Figure.** Metro Network[2]

**Table4.** BRT Network Length[3]

Year	BRT Network length (km)	Growth Rate Compared To 2006 (%)
2006	0	0
2011	105	----
2016	184	----

### Review the Status of Development of Non-Motorized Transport Infrastructure

Walking and cycling as non-motorized modes of transport have many social, economic and environmental benefits.

should be mentioned some statistics was not available.

### Assessment of Public Transportation Systems

The development of a public transportation systems as one of the main factors of urban development has and will have an important role in attracting population and improving the business situation and, in general, changing the development Tehran.

The average daily ridership by the Tehran metro network in 2006 was 773,678 people and in 2011 it was 1,555,586 people and in 2016 it was 2,156,435 people.

mentioned earlier, the issue of human-oriented is one of the issues highlighted in the comprehensive plan document, and walking and cycling have become more and more relevant in this regard.

The situation of non-motorized transport facilities in 2006 is not accurate, but according to

information from the Tehran transportation and traffic organization, the number of pedestrian bridges in 2011 was 830 and the length of the walkways was 7.2 kilometers.

In 2011, the length of the bicycle routes was 172 km, the number of bike houses was 109 and the bicycle numbers were 3,996.

**Table5.** Non-Motorized Transport Facilities[4]

Year	Number of pedestrian bridges	Length of the walkways (km)	Length of the bicycle routes (km)	Number of bike houses	Bicycle numbers
2006	-----	-----	-----	-----	-----
2011	830	7.2	172	109	3,996
2016	-----	-----	-----	153	4,000

**Review of the development of new technologies**

New technologies, including video surveillance cameras, speed control cameras, and cameras at intersections have played an important role in controlling driving offenses.

According to statistics, the number of VMS, the number of video surveillance cameras, the number of cameras that record violations is 111.

The optic fiber network length have been a lot of Growth during 2006 to 2016 period.

**Table6.** ITS System[5]

Year	VMS	Number of video surveillance cameras	Record violations camera	Optic fiber network (km)
2006	17	149	---	173
2011	36	404	111	622
2016	175	1400	567	1359

**Investigating the Development of Road Networks**

The introduction of cars into urban communities, while facilitating and increasing the speed of travel, it has led to the development of urban spaces, the construction of various land uses and the reduction of travel time between different points and the construction of roads and communication networks as an infrastructure for moving cars.

Increasing the growth of highway road network, bridges and urban tunnels can be considered as one of the most visible operations of the Tehran municipality in the field of traffic transportation.

The length of the major highways in Tehran in 2006 was 2686 kilometers, 51 percent of road network belonged to collector and local access, and 32.4 percent were related to arterial streets. Also, 10.1 percent of the length of the network belonged to expressway and freeway.

The length of the major highways in Tehran in 2011 was 3116 kilometers, 47.8 percent of road network belonged to collector and local access, and 26.6 percent were related to arterial streets.

Also, 15 percent of the length of the network belonged to expressways and freeways.

The length of the major highways in Tehran in 2016 was 3510 kilometers, 47.9 percent of road network belonged to collector and local access, and 23.8 percent were related to arterial streets. Also, 16.2 percent of the length of the network belonged to expressways and freeways.

**ANALYSIS OF THE STATUS OF TRANSPORT INDICATORS**

Indicators of transportation are mainly indicated of the adequacy of the system's supply against demand. Among these indicators, speed, travelled distance and travel time in the network can be pointed out. Some indicators such as fuel consumption and air pollution are the success or failure of the programs in terms of sustainable development.

The average speed of vehicles on the road network of Tehran at the peak of traffic at a working day of 2006 was 23.7 km. Also the average speed of the bus was 16 km / h and the average speed of the metro was 47 km / h. Also. The number of daily trips in 2006 was 15.2 million.

The average speed of vehicles on the road network of Tehran at the peak of traffic at a working day of 2011 was 23.4 km. Also the

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average speed of the bus was 16.1 km / h and the average speed of the metro was 45 km / h. Also. The number of daily trips in 2011 was 17.2 million. The average speed of vehicles on the road network of Tehran at the peak of traffic

at a working day of 2016 was 23.2 km. Also the average speed of the bus was 16.2 km / h and the average speed of the metro was 44.6 km / h. Also. The number of daily trips in 2016 was 18.7 million.

**Table7.** The average speed of vehicles on the road network of Tehran at the peak of traffic [1]

Year	Average Speed (Peak Period) -Km/h	Growth Rate Compared To 2006 (%)
2006	23.7	0
2011	23.4	-1
2016	23.2	-2

**Table8.** The number of daily trips [1]

Year	Daily Trips (Million)	Growth Rate Compared To 2006 (%)
2006	15.2	0
2011	17.2	13
2016	18.7	23

The share of private cars in the daily travel of the city of Tehran in 2006 is 38.5% and in 2016 is 43%

**Table 9.** The average of transportation indicators of Tehran at the peak of traffic at a working day [1]

Year	Travel Distance (vehicle-km)	Travel Time (Hour)	Fuel Consumption (Liter)	Air Pollutants (Kg)
2006	7,476,110	315,000	1,408,193	487,250
2011	7,714,017	317,495	1,492,987	507,003
2016	8,133,892	350,246	1,524,829	556,097

### CONCLUSION

Although the attitude towards transportation planning in Tehran's metropolis has changed, but due to the growing number of private vehicles and imbalance between supply and demand for transportation facilities, traffic problems in Tehran have increased and negative effects on the situation environmental and economic conditions in Tehran.

Although public transportation facilities and its technology have grown significantly, programs have not succeeded in reducing the share of personal transportation and emissions control.

It is imperative to limit the use of personal and motorcycle policies such as getting tolls, raising fuel prices, development HOV lanes and launching new public transportation systems such as LRT and trams will be implemented.

### REFERENCES

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- [5] Tehran Traffic Control Co.

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