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**ISTANBUL TRAFFIC PROBLEM: EXPERT OPINIONS**

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***Abstract***

Istanbul is Europe's most populous metropolis. The population of the city has increased sevenfold in the last 50 years and the usage of the area has increased threefold. As a result of this extreme growth, the most important problem of Istanbul today becomes traffic. Therefore, transportation investments are the most important part of the city budget. There are different solution propositions and theories of experts on this problem. Within the scope of the study, 3 different workshops were carried out in order to reflect the opinions of the experts. In these workshops, flexible methods, traffic planning, strategic planning, socioeconomic interaction and intra-urban transportation systems and environmental impacts are discussed in tired transportation planning. More than 200 invited experts attended the workshops. The article summarizes the views that stand out in these workshops. It has been found that safe journey, speed, quality of service, comfort and low cost are all in the first place in terms of both passengers' public transportation view criteria and management's public transportation planning criteria.

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**Keywords:** Traffic planning; workshops; SWOT; problem detection; Istanbul.

## **1. Introduction**

Istanbul has achieved great growth in terms of land use and population in the last 50 years. With this acceleration in growth, Istanbul is now Europe's highest populated metropolis. Beyond its population of around 15 million and crowdedness, the ratio of young and working population is also high. As a result, urban mobility is also high. Due to the reasons stated above, transportation structure becomes complicated and traffic and transportation problems arise as the most important problems of Istanbul.

Suffering traffic congestion every day, millions of dollars of lost time and fuel costs are faced and people become worse off regarding the quality of life (TUBITAK TUSSIDE, Report on Assessment of Existing Public Transportation System, 2014). For these reasons, the greatest proportion of the city budget is allocated for transportation infrastructure projects and investments such as new public transportation investments, bridges, roads and tunnels are implemented to solve the problem. The infrastructure is strengthened by the subway and Bus Rapid Transit investments within the scope of public transportation.

During the realization of investments, evaluations are carried out based on reducing the traffic of private vehicles and increasing the comfort of people in transportation. The technical experts' opinions are dominant as technical solutions are put forward to solve problems during the periods of these evaluations. However, the traffic problem has strategic planning as well as socioeconomic dimensions. The opinions of the experts in these fields related to Istanbul traffic are not reflected very clearly.

Within the scope of the study, expert interviews were conducted on the problems, priorities and proposals of solutions related to Istanbul traffic. Within the scope of these 3 workshops, studies are conducted with the experts with the following titles:

- Transportation priorities for management and passengers,
- Socioeconomic interactions in transportation,
- Urban transport systems and environmental interactions

More than 200 invited guests attended this workshop. Within the participant profile, senior and middle level managers and responsible experts in the field of traffic planning and public transportation planning participated in the workshops. In addition to the experts involved in transportation management, experts and academicians working on the subject also participated in the studies. Sociologists, psychologists, environmental engineers, ergonomics and public health experts, city planners in the field of transportation engineering, transport economics and planning experts have also participated in the workshops.

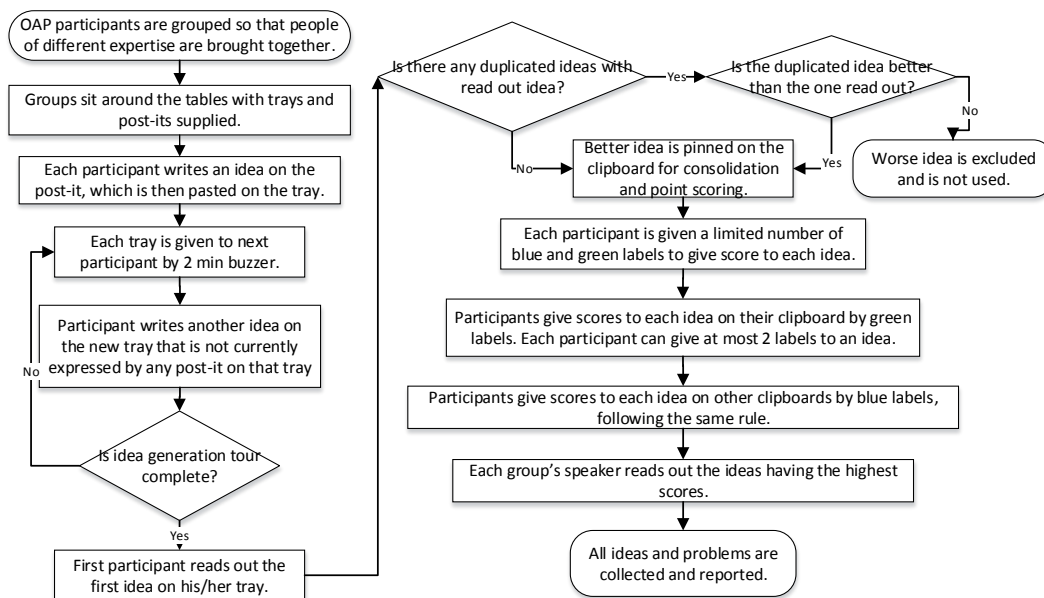
A specific topic was defined within each workshop and the traffic problem was related to that topic. Expert opinions were taken, and a systematic approach was used to obtain targeted information from experts. This article aims to share the findings of the workshops with the specialists. When designing the article, firstly, the methodology applied during the workshops was explained. This section was followed by the implementation and also the reporting of the findings resulted from the implementation process. After this section, discussion and conclusion sections are given.

## **2. Research Method**

Two different methods were used in the workshops. The principle of these methods is OAP (Common Intellectual Platform), a proprietary trademark and method of TUBITAK TUSSIDE<sup>1</sup>. In this method, a group of 8 to 10 people around a table is producing ideas. While groups are being created, attention is paid to the diversity of perspectives in the same group of participants with different stakeholder groups or specializations. In groupings, there is no classification or hierarchy of status among participants, and each participant's opinions are of equal value.

In the method used, a question or opinion is written on the paper trays in front of each participant within 2 minutes with 1 post-it. At the end of 2 minutes, the bell rings and trays are given by each

participant to the next participant, mostly following a counterclockwise direction. Participants quietly read the findings or ideas written in front of their new paper. Provided with previous ideas, they paste another post-it on the tray by writing another idea or finding that is not duplicated, and they wait for the next buzzer. This process is repeated until the people are given their initial trays with their first writings on it, also called a complete tour. With this method, each participant is equally involved in the idea generation work. Biased opinions and interests are avoided in the produced ideas. After the idea production work is over, duplicate records are excluded by the group and consolidation studies are carried out, combining the expressions into a single statement. Ideas remaining after the consolidation work are first scored by participants in the group and then by other groups according to their importance. Higher valued ideas are given priority after rating process. In Figure 01, the process of OAP procedure is shared.



**Figure 01.** Common Intellectual Platform Process

The second method of collecting expert opinions systematically within the context of workshops is to make in-depth discussions with other participants by presenting ideas within the whole group.

### 3. Findings

Workshops Workshops have been carried out using the workshop management steps outlined in the methodology section. The work was conducted in December 2015 (TUBITAK TUSSIDE, Transportation Types and Strategic Recommendations Common Mind Platform), May 2016 (TUBITAK TUSSIDE, Socio-economic Common Mental Interaction Platform) and October 2016 (TUBITAK TUSSIDE, Urban Transportation Systems and Environmental Interaction Common Intellectual Platform). The most prioritized judgments specified by experts in the workshops conducted within the department are shared.

### 3.1. Transportation Priorities for Management and Passengers

In the workshop which was realized with transportation priorities, the participants determined the priorities by management and passengers. In this context, expert opinions were collected by following the analysis steps expressed in the methodology section. For each of the two evaluations, 13 groups of expert opinions were formed. Individual priorities have been identified in each of these groups. Sequencing was performed after detection. Within the scope of the evaluations carried out for the administration, 103 priorities were identified by experts at 10 priority levels. The priorities expressed in the first two levels are given in Table 1. There are 28 priorities shown.

**Table 01.** Transportation Priorities (Experts)

Gr No	Primary Priorities	Secondary Priorities
1	Safe trip	Fast service
2	Comfort	Lower costs
3	Provide comfortable service to passengers	Increase operating quality of the system
4	Transition from private to public transport	Providing comfort in public transport
5	Comfortable transportation	Fast transportation
6	Solving traffic	A wide range of transport networks
7	Planned, integrated, sustainable transportation	Service-oriented understanding
8	Public transportation focused planning	Becoming the only authority
9	Public transportation focused transportation	Accessibility
10	Renewable cities air, environment, zoning	Life facilitating transportation
11	Sustainable transportation	Integration in Public Transportation
12	Serving the whole of the city	Uninterrupted safe, comfortable and accessible
13	To finish the subway projects at the targeted time	Abbreviation of travel time
14	Rail system network should be increased	Integration must be ensured

Within the same workshop, priorities for passengers were also assessed. Table 02 gives determinations about priorities for passengers. For passengers, 153 priorities were determined at 10 different levels of importance. These are given as 28 priorities falling to the first two levels.

**Table 02.** Transportation Priorities (Passengers)

Gr No	Primary Priorities	Secondary Priorities
1	Vehicle frequency	Speed
2	Freight frequency and comfort	Distance based charging
3	Comfort	Charge
4	Planned voyages are on time	Not suitable for disabled access
5	Route intervals should be frequent	Maritime transportation should be given importance
6	Travel time is long	Vehicle occupancy should be low
7	Main transport routes must be provided by public transport	Providing a comfortable and comfortable journey
8	Prevent traffic congestion	Safe transportation methods
9	Increase supervision	Revenue / Earnings
10	Governance	Speed (fastest from point A to point B)
11	Security	Traffic management authority sharing
12	Single-center management (transportation)	Increasing the capacity of roads
13	Subway line construction	Establishment of the transport authority
14	Strengthening central and local government cooperation	Management of transportation-zoning relationship

### 3.2. Socio-Economical Interaction in Transportation

In this study, it was aimed to evaluate the possible effects of current and future transportation policies in Istanbul from the point of view of social science experts and to reflect the views of different stakeholders (academicians, civil society authorities and public) groups in the project. During the study, the participants were divided into 5 different groups and each group was provided with different disciplines. Later, participants were asked to identify the social and economic impacts of transport, the determinants of these impacts and the current situation of those affected. The evaluations and opinions of the participants were then referred to regarding possible transportation policies to be implemented in Istanbul. Later, a short panel was held covering the transportation policies of Istanbul under the headings of health, sociology, psychology, economics, accessibility and logistics. While socio-economic policies are defined in transportation, it is primarily requested from the participants to evaluate 21 policies proposed by TUBITAK TUSSIDE and given in Table 03.

**Table 03.** TUSSIDE Project Team Proposals

Proposals	
1- Allocation of public transportation for the use of private vehicles	12- Increasing vehicle prices
2- Allocating E5 to public transportation during peak hours	13- Keeping price policies high in corridors where demand is concentrated
3- Management of main arteries with participation management	14- Production of HOV Lane policies
4- 10 times increase of bridge crossing price	15- Adjustment of income tax according to home-work distance
5 - Flexible pricing on the bridge, higher pricing policies during peak periods	16-Planning of services by the Administration
6- Congestion-based charging	17-Vehicle sharing applications
7- Increase of taxes excluding public transportation and commercial vehicles	18- IETT public transportation card issuance by companies
8- Tax reduction and more economical for public transportation	19-Vehicle ownership difficulty, lottery and vehicle ownership
9- Public transportation free of charge	20-Recognition of a separate public transport to bicycles
10-Boundaries over 10-65 years	21-High wage policy in main arteries
11- Single pair plate applications	

Participants assessed these policies by rating 5 or 4 if they supported it, or 2 or 1 if they did not support it on a 1-5 scale. The evaluation results are given in Table 04.

**Table 04.** Policy Evaluation Results

Policy	Score
20-Recognition of a separate public transport to bicycles	4,52
18- IETT public transportation card issuance by companies	4,26
14- HOV Lane policies	4,24
17-Vehicle sharing applications	4,13
8- Tax reduction and more economical for public transportation	4,00
3- Management of main arteries with participation management	3,91

5 - Flexible pricing on the bridge, higher pricing policies during peak periods	3,48
16-Planning of services by the Administration	3,43
13- Keeping price policies high in corridors where talebin is concentrated	3,36
21-High wage policy in main arteries	3,32
6- Congestion-based charging	3,30
10-The social impact of the border over 10-65 years. The effect of popular cards	2,90
2- Allocating E5 to public transportation during peak hours	2,74
7- Increase of taxes excluding public transportation and commercial vehicles	2,64
1- Allocation of public transportation for the use of private vehicles	2,52
9- Get free public transportation	2,52
15- Adjust the income tax according to the domestic working distance	2,43

Participants then proposed 75 different policies that are more or less connected to each other or have no links between them. These policies are given in Table 05.

**Table 05.** Policy Proposals (Participants)

No	Policy
1	Density based charge
2	Parking (parking) fee
3	Restricted vehicle access to city centers
4	High-capacity parking lots at metro stations
5	HOV
6	Increase bicycle routes and link to schools
7	Tightening traffic audits
8	Development of Metro network
9	Increasing the use of electric vehicles with state support
10	1.Broadcasting public transport bicycles and disabled pedestrian access
11	Flexible road and bridge pricing (according to the student)
12	Strengthening Mass Transit options
13	Density restriction for Istanbul
14	Policies for stopping city migration
15	Policies to inform public use of public transport
16	Policies for senior politicians and managers to encourage mass transportation
17	To produce flexible transportation policies. (Only for public transport but only for individual transport needs)
18	Observation of the policies on the use of the area
19	Public transport (application of metro investments in the system framework)
20	Traffic pricing (density based)
21	Create city parks in specific areas
22	Safety strap control
23	Strengthening of sea transportation
24	New transport arteries must be established
25	Car parks should be built to leave vehicles at city entrance
26	Underground transport should be increased
27	Raising public awareness that traffic rules are vital
28	Ensure that roads are never parked for efficient use of roads
29	Any kind of traffic infringement can be compensated by monetary penalty
30	Traffic police day-to-day traffic monitoring
31	Increasing alternatives for maritime transport
32	Making maritime transport very low

33	Construction of bicycle parking areas
34	Free parking spaces on subway stops
35	Creation of new settlements outside the city
36	Taking minibuses to the intermediate centers of the main arteries
37	Application of park bans in main arteries
38	Increase bus numbers
39	Small buses connecting main arteries to neighborhoods
40	Restricting the number of people to be taken on buses (Taking a certain number of people, these can be considered in Metrobuses)
41	Having sea transfer for bridge crossing points
42	Prepared Istanbul strategic plan with wide participation
43	Modifying the zoning legislation
44	Visa application to Istanbul
45	I encourage the return from Istanbul.
46	I do not allow vertical structuring
47	Visa applications to vehicles entering the city center
48	Educational, health-based, industrial and institutional arrangements
49	Reproduce green areas
50	Based on universal standards
51	Documentation of applications
52	If I were president, I would give priority to home business
53	Planning of services and sightseeing in every province county
54	Public vehicle duplication is not free, but rather a reasonable amount
55	Separate public transport for bicycles
56	Turning off public transport for one of the bridges
57	Yes, I fully agree with this
58	Complete HOV Lane policies
59	Certainly tax deduction would be number ten
60	Instead, the lines should be separated by public transport as a private vehicle
61	Right attitude at the age of 05 can be downloaded even lower class
62	Opening of offices by two or more companies with more than 500 disabled staff
63	Speeding up Metro projects
64	Close shopping malls in the main artery, do not allow new settlements
65	Build intelligent city centers
66	Moving the factories out of the city with state aid (Çorlu, Gebze)
67	Ensure that services are in one authority
68	Collect public transport in one car
69	Making every plan by asking the people living in the city
70	Transport plan to master plan
71	Policies to ensure the social inclusion of different and fragile segments
72	The employee in the community will not break the situation of the poor
73	Public transport system for the elderly and disabled
74	Considering the equality of women / men, policies that give women prior to mass transportation
75	Policies that people will be convinced about the necessity of rules and sanctions

### 3.3. Intra-Urban Transportation Systems and Environmental Impacts

#### 3.3.1. The Effects of Existing Traffic Interaction Analyses

During policies have been established, it has been discussed whether the analyses to be made on transportation-related problems are really timely or whether the efficiency and effectiveness of the

analyses are present and the existing problems, results and effects are presented. For this purpose, the participants wrote them on the positive and negative expression forms and then they selected the most important results with a joint group rating and a second evaluation and developed suggestions and strategies about them. Selected results are given in Table 06.

**Table 06.** Prioritized Existing Traffic Effectiveness Problems

Problem Statement
Urban transformation not considered with traffic interaction
Adding density of settlement without feasibility to existing transportation infrastructure
Not evaluating bicycle facilities and urban transportation, making planning impossible or haphazard
Create a "mobility gap" when urban return occurs
Demand increase-transportation planning incompatibility
Economic and other effects of construction activities (Baghdad Street Example)
Determination of earthquake risks according to rents
Neighborhood and transportation opportunities, culture - transportation
Socio-economic profile - no consideration of urban transformation

### 3.3.2. Handling Urban Transportation Projects Together With Transportation Policies

After the presentation of the activity criteria and activities of the transportation-related analyses by the participants, characteristics of existing urban transformation projects that will be realized in short term will be delivered to project users on the basis of their time schedules and transportation possibilities. Participants were asked to make assessments and suggestions on alternative policies that could be implemented in an integrated manner with urban transformation projects in Istanbul transportation (TUBITAK TUSSIDE, Flexible Public Transportation Model Common Intellect Platform, 2016) Priority problems in this context are given in Table 07.

**Table 07.** Evaluation of Prioritized Urban Transformation Projects

Project Name
Failure to determine the system limits of the application area
The city has grown up in an unplanned way and still continues to be unplanned
Demand increase - incompatibility of transportation planning
Urban transformation, planning without consideration of traffic effects
Urban transformation planning of different infrastructures
Evaluation of emissions and environmental impact according to different tools
PARK & DRIVE systems do not meet the requirements

Policies regarding the solutions of these problems are then prioritized, which are given in Table 08.

**Table 08.** Evaluation of Problems/Impacts/Results in Urban Transformation

Policy Statement
We should move from small-capacity vehicles to large-capacity vehicles
Small transport vehicles should be made reasonable.
Every transport mode needs to be managed well within itself and at the macro level.
Integration points must be compatible
The price policies to be applied in transfer management can increase the attractiveness of public



transportation.
Transport must be managed by a single authority. An upper structure must be formed for this.
It should be institution-based rather than individual-based.

### 3.3.3. Evaluation of Urban Congestion

After evaluating the transport policies of urban transformation projects, relevant studies have been conducted on policies for managing traffic congestion, pricing policies, application areas and benefits. Participants were asked to make evaluations and suggestions on alternative policies that could be applied to solve traffic congestion in Istanbul, shown in Table 09.

**Table 09.** Evaluation of Prioritized Urban Congestion Policies

Policy Statement
Pricing/rights of private vehicles / bicycles and other vehicles
Charging/price planning according to high occupancy rates (In-car or lane)
Price planning for public transport for pre-closure
The user has to encourage alternative systems and applications
Public transport promoting practices and systems
Vehicle users' general insensitivity / compulsory insensitivity
Transferring the income from pricing transparently to necessary areas such as education, awareness and other infrastructures

## 4. Discussion and Strategies

Safe Safe journey, speed, quality of service, comfort and low cost are all in the first place in terms of both passengers' public transportation view criteria and management's public transportation planning criteria. The increase in the total prosperity of the country due to the transportation facilities depends on the effective development of these criteria, and only in this way citizens are able to benefit satisfactorily from the public transport. Failure to take the required measures or keep it below the expected level will prevent the transport service from reaching its goal. The biggest problems faced in the current situation are the lack of integration, academics and experts pointed out that the use of private vehicles is well above the level defined in the traffic congestion and that the comfort levels of public transport do not make public transport preferable. Another point that needs to be mentioned here is that a higher occupancy rate, defined as vehicle comfort, even in cases where the basic factors such as security, speed and cheapness demanded in public transport are high, may make the public transport less preferable. For this reason, during the development of the mentioned factors, each factor should be assessed separately and measured within the total benefit as well as within the transport strategy.

The main steps to be taken to solve these main problems are the integration at the very beginning. Integration, on the other hand, requires public transport to be borne by a single authority, which requires that the authorities take the necessary precautions in the name of speed, comfort and safety. Lack of integration arises as a result of the lack of communication between the central authorities and the local authorities at the interregional level as well as the transport authorities in a region and their inability to work independently. Politics is also condemned, as it will not be the right approach to produce a transportation policy without consulting with municipalities and experts with knowledge and experience. Mega transportation projects with potential to completely change a region in both population and

economic direction must not be initiated without the necessary feasibility studies, prospective effects should be measured, and execution should take place without any loss of prosperity in the entire region.

In addition to integration, it is necessary to increase the transportation capacity with other transportation types, especially the railway, freeing from highway. In addition, tunnels, junctions and connection points belonging to the land route, but with a system and complexity in itself, should be examined as a whole in terms of traffic effects. The use of private vehicles, which are shown to be the greatest cause of traffic, will only be reduced by these innovations to be made in the public transport system, as well as directly due to the use of private vehicles and the work to be done on Traffic. At the beginning of these studies are congestion pricing, vehicle lanes with high occupancy rates, flexible working hours politics and park-et al applications. Especially when the traffic is heavy, the police are being appointed and the places where parking restrictions are strictly inspected. These are the steps that should be taken in order to effectively manage the traffic. There is a lot of traffic on the road, so it's easy to get to the airport. It's a great place to spend your money. Therefore, parking fees should be dynamically charged and parking practices developed on population and density. In the long term, it is the opening of new settlements, balanced population planning and the effective management policies of the migration movements will balance traffic. In addition, the urban transformation activities supported by a strong legal infrastructure must also be achieved because of the integration of transports that can only be achieved through an accurate urban transformation.

## **5. Results and Conclusion**

As of today, Istanbul has become a city with two separate villages, one in Asia and one in Europe. Moving people from one gang to another or carrying out an effective transport policy in the same vicinity is becoming a big problem with increasing population and urbanization. Taking into consideration the economic and sociological and psychological factors of the problem is also important for the success of the entire transportation policy.

In this study, the reasons for not carrying out urban planning and other investments together with each other and urban growth due to the lack of integration, reasons for not carrying out effective transportation policies and proposing solutions are discussed and the steps to be taken by reflecting the opinions of relevant academicians and experts are examined.

Urban congestion affects people both economically and healthily, especially since they reach high levels at peak hours. A person who prefers to transport is not different from a passenger traveling by private vehicle instead of public transportation. Therefore, it is important to increase the road capacity of public transport along with the passengers and make them more attractive, especially in order to nurture Istanbul, which shows a rapid growth in terms of population, in terms of transportation.

The management processes as well as planning are also important in order to be able to apply and be effective in all the activities mentioned above, the decisions taken and the steps to be taken, which are closely related to the above mentioned traffic. Often the two initiatives or the decisions made at the bottom are not adopted at the lower levels and are weakened in practice, so that the successful planning in the first place is leading to failure in progressing processes. For this reason, all responsibilities of the traffic regulations of the works to be carried out in Istanbul should be provided by a single decision

mechanism. In the process of project feasibility or effective planning, ideas can be gathered from all kinds of academic people, experts or knowledgeable people, and common mind platforms or meetings can be organized, but decision should be made with the same sensitivity and sense of belonging in every part of the city. This can only be done if the decision-making body decides not to place any disagreements or conflicts of duty on any application area and applies it on a project-by-case basis with legal safeguards.

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