

Evaluation Environmental and Social Impacts of Pedestrianization in Urban Historical Areas: Istanbul Historical Peninsula Case Study

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Abstract—In this study, the evaluation of the pedestrianization is analyzed in the aspects of social and environmental issues. By researching the progress of pedestrianization in Historical Peninsula of Istanbul from past to present, the pedestrianization has been explained with the basic terms and best practices about from all over world and Turkey. The pedestrianization was evaluated from two contexts which are social and environmental. From social context, access to the pedestrianized area, structural deficiencies in the area and pleasure of the citizens and tradesmen about pedestrianization had been used as the main criteria in the evaluation of process by making surveys to both visitors and tradesman. From environmental context, air quality, noise disturbance issues were considered in terms of emission reduction that is proportional to traffic reduction in the area by using indicators and the potential of the area to be a Zero/Low Emission Zone.

Index Terms—pedestrianization, historical area, questionnaire.

I. INTRODUCTION

Pedestrian zones are the roads or integrated roads or streets or areas which are reserved for pedestrians. Pedestrianization can be applied in different types. Full mall is completely pedestrianized area/street without permission to any traffic, and organized for only needs of pedestrians. Transit mall is the street with only public transport is allowed and other vehicles are prohibited to enter. Semi mall is pedestrian priority streets/areas where vehicular traffic is not prohibited, only the speed and volume of traffic is restricted by considering the needs of pedestrians. Road transport is by far the major source of environmental degradation in urban centres. Hence, transport schemes like pedestrianization can have

significant impacts on local environmental conditions, by provoking changes in the characteristics of traffic flows and on the patterns of traffic emissions [1]. Your goal is to simulate the usual appearance of papers in the. We are requesting that you follow these guidelines as closely as possible.

Pedestrianization is used by the local authorities for the following general reasons; to improve public safety, to increase street life, to decrease isolation due to living outside of the city center, to eliminate transportation problems in the historical problems which have generally narrow streets, to portray social life [2]. Furthermore the scopes of pedestrianization can be organized in three titles which are increasing urban economics, urban quality and social wellbeing [2], [3]. Pedestrianizing areas that are generally in the old part of town has been widely used in recent years in both developed and developing countries as a way to improve urban quality in cities traditionally designed for intensive vehicle use [4].

The importance of the pedestrianization is increasing in Turkey and one of the most important pedestrianization is historical peninsula pedestrianization and its impacts on environment, on region traffic, regional trade and other issues. Since the achievement or failure of this project from all aspects will affect future pedestrianization projects, this subject will be covered in this study. Good application of those projects is the front foot of the identical future projects where bad applications are the drawbacks. When considering historical areas of Turkey and Istanbul, and huge traffic load in those areas, such projects should be investigated more deeply from academic perspective.

II. MATERIAL AND METHODS

A. Study Area

This study was conducted for the historical area of Istanbul, which is covering Sultanahmet Mosque,

Topkapi Palace, Grand Bazaar, Hagia Sophia and other numerous historical monuments. Pedestrianization in that area was conducted gradually, initially only the surrounding area of the abovementioned area was included; then surrounding streets were included and pedestrianized area was enlarged [6]. The most current pedestrianized map is given in Fig. 1.



Figure 1. Most current pedestrianization [6].

B. Pedestrian Survey

105 pedestrian surveys were conducted. Following questions were asked to the randomly selected pedestrians;

- Accommodation district
- Gender
- Age
- Education Level
- Occupation
- Reason of visit to the region
- Visit frequency
- Visiting days
- Visiting hours
- Transportation method to the region
- Parking place if private are used
- Any hitch after pedestrianization
- Recommendations for improvement of pedestrianization
- The idea for the impact of the pedestrianization the physical environment
- Idea for the followings after pedestrianization
 - Increase in area visit
 - More comfortable walking the area
 - More comfortable shopping
 - More safe shopping
 - More comfortable showcase watch
 - Increase in environmental perceive
 - Increase in attendance to social and cultural activities in the region
 - Less arrival opportunities to the region
 - Harder shopping when compared to shopping with car option
 - Decrease in noise/environmental/air pollution
 - Increase in bicycle use

- What are advantages of pedestrianization to your life?
- What are disadvantages of pedestrianization to your life?

C. Tradesman Survey

In order to understand pedestrianization effect on trading in the historical area, a survey was conducted for tradesman who is working in the surrounding shops, restaurants, hotels etc. Following questions were asked to the randomly selected pedestrians;

- Gender
- Age
- Education level
- Transportation method to the region
- Parking place if private cars are used
- Entity field of area
- Entity service time
- The ownership status of the shop (owner / rent)
- Real estate value and rent increase after pedestrianization
- Percentage change of client number
- Percentage change of annual turnover
- What are advantages of pedestrianization to your life?
- What are disadvantage of pedestrianization to your life?
- Is it more advantageous or disadvantageous to you
- Do you like last situation of the region
- What are recommendations to increase the advantages of pedestrianization?
- Idea for the achievement of pedestrianization aim which is ease to visit historical and cultural sites
- and shopping by tourist and local people in that historical area
- Idea for the followings after pedestrianization:
 - Increase in area visit
 - More comfortable walking the area
 - More comfortable shopping
 - More safe shopping
 - More comfortable showcase watch
 - Increase in environmental perceive
 - Increase in attendance to the social and cultural activities in the region
 - Less arrival opportunities to the region
 - Harder shopping when compared to shopping with car option
 - Decrease in the noise/environmental/air pollution
 - Increase in bicycle use

III. RESULTS

A. Result of Pedestrian Survey

The first set of questions was about personal information of surveyed people which are including gender, age, education level and occupation.

According to results of this part, 40% of the surveyed people were women and 60% was men. 9% of the

people's ages were between 18-25 where it was 41% for the people between 25-35 years old, 37% was 35-45 years old, 9% was 45-55 years old and 4% was older than 55 years. The majority of participants, 78%, seem to be between 25-45 years of age.

8% of the participants' education level was primary school where 14% was secondary school, 29% was high school, 41% undergraduate level, and 8% was graduate level. The dominant group was graduated from a university, which was 41%.

Occupation of the participants was the last question of the pedestrian survey. According to replies of this question, 26% of the people was officer, 16% was housewife, 14% was student, 9% was tradesman, 7% was self-employed 4% was retired people. Furthermore 24% of the people marked "other" category as their occupation which is including private sector workers, such as technicians, engineers etc.

Further questions were about evaluation of visiting habits of the participants the region. In this part visiting purpose, visiting days and hours were asked to the participants. Visiting days of the participants were distributed half between weekdays and weekends. Answers of "visiting hours to the region" and "visiting purpose of the region" are given in Fig. 2 as pie distribution.

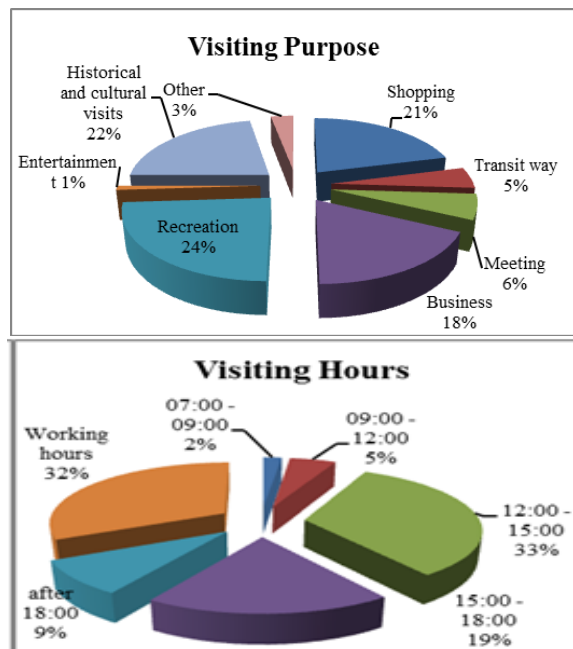


Figure 2. Answers of "visiting purpose" (a) and "visiting hours" (b) of the participant

According to the answers distribution given in Fig. 2, nearly half of the participants visit the region between 12:00 and 18:00. Since this area is an historical and cultural area, 22% of the visits are due to see historical cultural places where 24% of the visits are for recreation purposes. 18% of the people seems to visit the area for business purposes other than shopping people, which are mainly tradesman.

The crucial part of the survey is the questions for evaluation of pedestrianization in that region which is

affecting transportation of the pedestrians to that area, parking habits and their idea for the current situation of vehicle-free area.

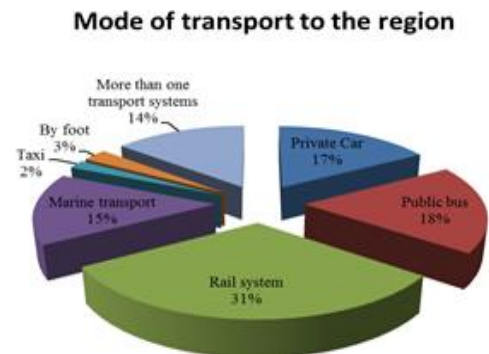


Figure 3. Answers of question "mode of transport to the region" by participants

According to the answers presented in Fig. 2, rail system is mainly used by pedestrians where private car and public bus options are the second type of transportation means to the region. 40% of the private car users are parking to the roadside near the region, and remaining part is parking to the autoparks. Roadside parking of the visitors seems a serious problem in that area which worsens visual impact of the pedestrianized area.

The answers of the question about the pedestrians idea for the impact of pedestrianization to the physical environment are 80% positive, where 11% of the surveyed people has no idea. Furthermore there were accompanied questions to this one as described in the Methodology part of this study, which were about some comparisons before and after pedestrianisation. Following common replies were derived:

- Frequency of use pedestrianization zones increased in 66% of pedestrians
- 89% of the pedestrian travels more comfortable in the pedestrianized area
- 89% of pedestrians states to have more comfortable shopping in the pedestrianized area
- 82% of pedestrians states to have more safe shopping in the pedestrianized area
- 82% of pedestrians states to have more comfortable showcase watch
- 83% of pedestrians states to have a better perceive of the environment
- 75% of pedestrians states an increase in participation to the social-cultural activities
- 68% of pedestrians states a more comfortable transportation to the region
- 66% of pedestrians an increased usage time of the region
- Pedestrians thinks approximately 55% decrease in environmental and air pollution
- Approximately 68% increase in visitor number
- Approximately 51% increase in bicycle use

By considering entire of the abovementioned survey results, there is a general positive idea of the pedestrianisation in that area by visitors.

B. Result of Tradesman Survey

The first set of questions was about personal information of surveyed people which are including gender, age, education level and occupation.

According to results of this part, 24% of the surveyed tradesman was women and 76% was men. 10% of the tradesman's ages were between 18-25 where it was 35% for the people between 25-35 years old, 32% was 35-45 years old, 14% was 45-55 years old and 9% was older than 55 years. When compared to pedestrian visitors, surveyed tradesman older than 45 years old are two fold of the surveyed pedestrians in that area. Education level of the surveyed people was as follows; 13% of the participants education level was primary school where 13% was secondary school, 29% was high school, 34% undergraduate level, 5% was graduate level. The dominant group was graduated from a university, which was 34%.

The second set of questions was about the entity. Answers of tradesman are summarized in Fig. 3.

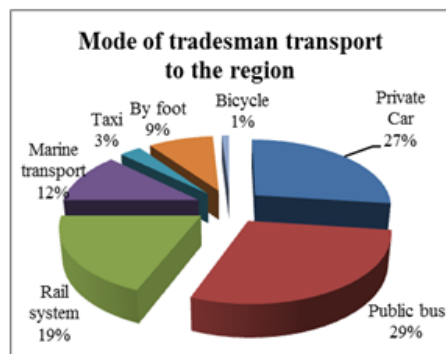


Figure 4. Answers of "Entity field of area" (a) "serving year of the entity" (b)

According to Fig. 4, the surveyed tradesmans' entities are mainly textile (27%), tourism (15%), lunch counter and restaurant (11%). The distribution of the entities seems to reflect general structure of the current historical area. Furthermore, 50% of the entities are serving more than 9 years.

Tradesman transportation type to the region is summarized in Fig. 3.b. Rail system is not used commonly by tradesman (19%) as visitors (31%), instead public bus (29%) and private cars (27%) are used by tradesman. The reason is thought to be that, tradesman are living in close areas to the region, therefore rail system is a less eligible method when compared to visitors of the region. According to survey replies, 91% of the tradesman parking their private cars to autoparks rather than roadsides.

The next set of questions were about impacts of pedestrianization to the entity profits and costs. Despite 54% of the tradesman express an increase in client number, only 40% of the entities indicated an increase in turnover after pedestrianization. However 70% of the tradesman express an increase in real estate values, according to Fig. 3. This shows that, pedestrianization has no significant direct effect to entity annual turnovers however indirect effects should be analyzed more deeply.

Furthermore incoming people are coming to the shopping area of the historical region for walking and showcase watch. Indeed, the turnovers were not decreased, however has no significant increase.

As we inferred from previous survey results, number of visiting pedestrians and clients increased after pedestrianization of the area, however there is no comparable increase in the shopping area turnovers. This shows that, pedestrianization increased recreational benefits from the region or historical/cultural visits. In order to quantify this effect of pedestrianization, number of visitors to the museums in that area can be obtained and compared for before/after pedestrianization conditions. Since this survey includes only verbal declarations, unit prices of the shops and accompanying data should also gathered in order to understand any increase in prices after pedestrianization and its quantified impacts on shopping habits of the clients. Meanwhile, 82% of the tradesman expressed that they are benefiting from pedestrianization according to results of the survey.

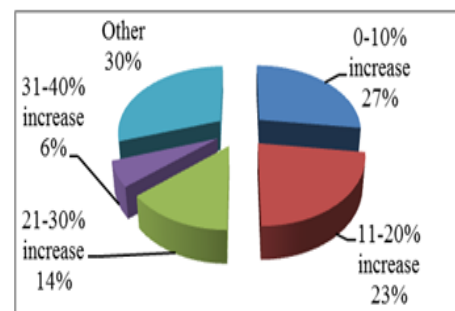


Figure 5. Real estate value and rent increase according to replies of tradesman

The remaining questions of the survey was including the idea of the tradesman about the achievement of the pedestrianization project to its aim, which is ease to visit historical and cultural sites and shopping by tourists and local people in that historical area. 86% of the tradesman expressed that, this aim was achieved totally or partially. Furthermore, following

- Frequency of use pedestrianization zones increased in 78% of pedestrians
- 92% of the tradesman travels more comfortable in the pedestrianized area
- 85% of tradesman states to have more comfortable shopping in the pedestrianized area
- 86% of tradesman states to have safer shopping in the pedestrianized area
- 95% of tradesman states to have more comfortable showcase watch
- 95% of tradesman states to have better perceive of the environment
- 69% of tradesman states an increase in participation to the social-cultural activities-
- 70% of tradesman states a have more comfortable transportation to the region+
- Approximately 76% increase in visitor number+
- Approximately 44% increase in bicycle use

- 78% of the tradesman states positive impact of pedestrianization to the regional traffic problem

IV. DISCUSSION

Damage to the environment due to noise and exhaust of vehicles that are using the region are eliminated after pedestrianization. Buildings and regional environment has become perceptible after the integration of the region. Easy walk environment without the danger of traffic was generated.

As well as, it is identified that, parking and recreation areas are not in the sufficient amount in the pedestrianized area. Therefore parking spaces which are easily accessible, in adequate amount, in affordable prices and outside of the pedestrian zone should be planned.

Advertisements and billboards in front of the facade off or historical monuments and buildings should be removed or should be in an acceptable size and content which is compatible with the city's identity.

Urban furniture should be selected according to the city's identity and landscaping should be done according to the rest of the field. There should be integrity throughout the pedestrianized zone. Bicycle paths should be created.

Some arrangements should be made to meet the basic needs of pedestrians, peddlers should not be allowed, crafts and traditional products units can be established, by considering integrity of the area.

Arrangements should be made to facilitate the transport of disabled people and walking in the area.

Goods handling times should be determined for the commercial area and registered vehicles should be allowed to enter the area between specific hours.

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