THE PEDESTRIANIZATION OF ISTANBUL'S HISTORIC PENINSULA

Perspectives from local businesses

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Istanbul’s world heritage-listed Historic Peninsula is internationally recognized for its outstanding universal value. Unfortunately, its rich heritage has been strangled by rapid and initially uncontrolled urban growth. Concerns over the preservation of the rich cultural and historical heritage have increased during the past decade. In response to raising concerns, local administrations have initiated numerous projects in an effort to protect the city’s 8,000 year old Historic Peninsula. As part of these efforts, Istanbul Metropolitan Municipality and Fatih Municipality pedestrianized more than 250 streets between 2010 and 2012.

EMBARQ Türkiye is dedicated to working with local administration and stakeholders for developing solutions for protecting the area. In this line, EMBARQ Türkiye invited Gehl Architects to conduct a public space and public life survey in the area. The project report included mapping of the major potentials and challenges that the Historic Peninsula experiences in its present state and a survey of the public life taking place in selected areas. The first report studied the Historic Peninsula as a whole, drew attention to current and potential problems and offered recommendations for improvement.

In this second report, a more focused approach had been taken with the aim of assessing completed pedestrianization projects in the Historic Peninsula. Pedestrianization projects from all over the world have shown that transforming car-oriented streets into pedestrianized environments has many potential benefits: Supporting physical activity, social interaction, economic activity, and improved air quality. However, these benefits can only be achieved through successful implementation of complementary measures. Supporting infrastructure (e.g. improved streetscapes, sufficient public transportation options, availability of car parks) and stakeholder buy-in are vital for ensuring the success of pedestrianization projects. In this line, the present study aimed to provide more details on completed projects and shed light on the local community’s perceptions of benefits.

Section 2 starts with some background to the Historic Peninsula and presents details of pedestrian transformation projects that were successfully implemented since 2010. It also highlights planned and ongoing public transportation projects for the peninsula, which will significantly alter current conditions. Section 3 provides some theoretical background to assess economics and air quality benefits of pedestrianization projects. This background was valuable in refining the questions for the perception survey. Finally, Section 4 presents the results from the perception survey conducted with business owners and employees on the pedestrianized streets.

We believe these findings will be valuable for (i) promoting and drawing investments for future pedestrianization projects as it shows that stakeholder are mostly happy with the results, and (ii) encouraging local administrations to improve ongoing and future pedestrianization projects as the results highlight priority areas for improvement.
SECTION 2

PEDESTRIANIZATION PROJECTS IN THE HISTORIC PENINSULA

Istanbul Metropolitan Municipality and Fatih Municipality have been working on pedestrianization projects in the Historic Peninsula since 2010. More than 250 streets were pedestrianized in Eminönü, Laleli, and Hocapaşa.

2.1 THE HISTORIC PENINSULA

A vital part of Istanbul’s historic and cultural legacy

The Byzantine city walls, the Golden Horn, and the Marmara Sea surround the Historic Peninsula. Recent findings show that the Historic Peninsula was settled back in the Neolithic period in the 7th millennium BC. This area harbored many civilizations throughout its thousands of years of history, thus its name Historic Peninsula.

It is currently a significant historical, touristic and commercial center of Istanbul, and also a busy public transport hub. Its rich historical and cultural heritage makes the peninsula a challenging area for transport and urban planners. The chaotic network of historic and narrow streets presents challenges for accessibility and creates high levels of congestion. In addition, the threat of pollution arising from industrialization and rapid urbanization has jeopardized the historical and cultural heritage of the old town. Now, both international and national organizations work very hard to ensure preservation and conservation of the area.
The Historical Peninsula was added to the UNESCO World Heritage List in 1985 covering four zones1. Historic areas in Istanbul are also protected by the national conservation legislation, and the Historic Peninsula was declared an archeological site in 1995. The Istanbul Metropolitan Municipality started transformation projects in an effort to improve the quality of life in the area, in 2010.

Distribution of functions

The Historic Peninsula offers a diversity of functions, mostly in clusters, as presented in Figure 1. The large share of commercial and business activities in the center and lack of residents leave the district very busy during daytime and deserted at night. The peninsula has a nighttime population of approximately 55,635 people in comparison to 2.5 million during the day. Along Râpp Gümüșpala Street underpass, pedestrian traffic is busier than most of the worlds’ busiest main streets in London, New York, Copenhagen, and Melbourne (GEHL, 2010).

Public transportation Hub

The Historic Peninsula also functions as a public transportation hub, contributing to the high levels of daytime population. The area is serviced by a variety of public transport systems including buses, tram, rail, and ferries. Two new public transport lines are planned: The metro line extension across the Golden Horn to Yenikapı, and the rail line across the Bosphorus (Marmaray Project). These projects will help strengthen the existing public transportation network, but will also increase daytime population in the area. Creating walkable streets and further pedestrianization will become increasingly important for the Historic Peninsula.

2.2 PEDESTRIANIZATION PROJECTS

Existing levels and expected increase of the peninsula’s daytime population is a significant cause for concern and calls for careful transport and urban planning. As suggested earlier, rich historical and cultural heritage adds extra challenge to planning efforts. The Cultural and Natural Heritage Preservation Board has already raised concerns over vibrations caused by heavy vehicle traffic damaging the Basiliaka Cistern, in 2011.

As part of municipal efforts to improve the quality of life in the area, Istanbul Metropolitan Municipality started pedestrian-only transformation projects at Sultanahmet Square in 2010. This was followed by pedestrianization of 256 streets by the Fatih Municipality between 2010-2012 in Eminönü, Tahtakale, Beyazıt, Laleli, Gecikpâşa, and Hocapâşa. The municipality also carries out supporting infrastructure projects for the pedestrianized areas including repaving the newly pedestrianized streets with granite pavestones, traffic signalization, waste management, etc. Details of completed pedestrianization projects are presented in Table 2.

Legal framework for pedestrianization projects

The Transportation Coordination Center (UKOME), formed under the chairmanship of the Istanbul’s Mayor, is tasked with undertaking planning for pedestrianization of the streets. UKOME has the authority to make decisions on major transportation projects including pedestrianization. UKOME’s duties are outlined in the Greater City Law dated 10.07.2004.

Faith Municipality defined priority streets for pedestrianization based on UKOME’s decisions and accelerated infrastructure works for selected streets. UKOME has made 16 decisions to pedestrianize selected areas and identified streets in the Historic Peninsula between 2005 and 2012. A summary table outlining these decisions can be found in Appendix B.

2.3 RULES AND POLICIES

A series of supporting rules passed by the Transportation Coordination Center (UKOME) aims to minimize negative impacts of pedestrianization on tourism and commercial activities in the area:

- Streets will be open only to pedestrians between certain hours during the day. Limited vehicle access will be allowed at other times;
- Only official vehicles such as vehicles belonging to embassies, the police, the postal service, banks and the fire department as well as ambulances will be allowed to enter the area during daytime;
- Commercial permit holders will be allowed to access the area after work hours for deliveries;
- Municipal police officers from Fatih Municipality are tasked with monitoring the implementations;
- Streets traders are not allowed in selected pedestrianized streets;
- Tourist buses are allowed to use the new route and stops as defined by UKOME in the neighborhood.

2.4 FUTURE PLANS

As suggested above, the two new public transport lines will add to daytime population of the area, which already is very high at 2.5 million (GEHL, 2010). Creating streets to accommodate pedestrians visiting or passing through the Historic Peninsula will be increasingly important. In this line, Faith Municipality has plans to pedestrianize more streets until Marmaray’s projected opening date, 29 October 2013.

Availability of sufficient parking areas for private car owners is an important aspect to ensure the success of pedestrianization. This is a vital subject of improvement for the current pedestrianization projects as well as the planned ones, as discouraging private car owners from visiting the peninsula might have negative impacts on retailers in the area.
## Table 1: Pedestrianization Projects in the Historic Peninsula

<table>
<thead>
<tr>
<th>Eminönü</th>
<th>Fatih Municipality, Fatih Municipality, Istanbul 2010 European Capital of Culture Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>1 January 2011</td>
</tr>
<tr>
<td>UKMME Decision</td>
<td>Date: 20.05.2010 Number: 2010/3-3</td>
</tr>
<tr>
<td>Number of Pedestrianized streets</td>
<td>23</td>
</tr>
<tr>
<td>Cost of barriers</td>
<td>450,000 TRY</td>
</tr>
<tr>
<td>Cost of renovations</td>
<td>2,900,000 TRY (for 12 streets renovated by Fatih Municipality)</td>
</tr>
<tr>
<td>Total costs</td>
<td>3,350,000 TRY</td>
</tr>
<tr>
<td>Pedestrianized streets</td>
<td>90 streets in total located in Eminönü, Tahtakale, and Beyazıt including: Bab-ı Hümayun Caddesi, Tevfikhanı Sokak, Kutlupınar Sokak, Seyit Hasan Sokak, Ufängaş Sokak, Dalbastı Sokak, Kabasakal Caddesi, Atmeydanı Caddesi, Ticaret Hanı Sokak, Yerebatan Caddesi</td>
</tr>
<tr>
<td>Supporting projects</td>
<td>Sultanahmet Square Pavement Rehabilitation and Landscape Improvement Project Partners: İstanbul Metropolitan Municipality, Fatih Municipality, Istanbul 2010 European Capital of Culture Agency</td>
</tr>
</tbody>
</table>
| Details of implementation | - Infrastructures renewals were completed at pedestrianized streets.  
- New car parks were built for tourist buses (each with 150-160 capacity): Lighthouse Camii St. St. (Dalbastı Street), Ceşme Hamidiye Düğün Sarayı, Little Hagia Sophia (Kennedy Avenue).  
- Official vehicles such as vehicles of embassies, the police, postal service, banks, the fire department, ambulances, and tourist buses are allowed to access the area.  
- Parking is not allowed for other regular vehicles.  
- Vehicles will be allowed in the pedestrian-only zone between 11pm-8am during the summer and 9pm to 8am during winter to pick up and deliver merchandise to shops in the area. |

<table>
<thead>
<tr>
<th>Laleli</th>
<th>Fatih Municipality and Laleli Businessmen Association (LASIAD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Phase 1: 25 April 2011; Phase 2: 21 May 2012</td>
</tr>
<tr>
<td>Number of Pedestrianized streets</td>
<td>23</td>
</tr>
<tr>
<td>Cost of barriers</td>
<td>455,000 TRY</td>
</tr>
<tr>
<td>Cost of renovations</td>
<td>11,500,000 TRY</td>
</tr>
<tr>
<td>Total costs</td>
<td>11,955,000 TRY</td>
</tr>
</tbody>
</table>
| Pedestrianized streets | Phase 1 – Üst Laleli: 7 streets between Hayriye Tescilli Caddesi and Ortdu Caddesi  
Phase 2 – Alt Laleli |
| Details of implementation | Laleli Project Phase 2 covered the largest area in comparison to other pedestrianization projects in the Historic Peninsula. 240 hydraulic vehicle stopping barriers were used, streets lights and waste containers were renewed. |

<table>
<thead>
<tr>
<th>Hocapaşa</th>
<th>Fatih Municipality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>2012</td>
</tr>
<tr>
<td>UKMME Decision</td>
<td>Number: 2012/3-2</td>
</tr>
<tr>
<td>Number of Pedestrianized streets</td>
<td>15</td>
</tr>
<tr>
<td>Cost of barriers</td>
<td>90,000 TRY</td>
</tr>
<tr>
<td>Cost of renovations</td>
<td>2,900,000 TRY (for 12 streets renovated by Fatih Municipality)</td>
</tr>
<tr>
<td>Total costs</td>
<td>2,990,000 TRY</td>
</tr>
</tbody>
</table>
| Details of implementation | - 18 hydraulic vehicle stopping barriers were used.  
- Official vehicles such as vehicles of embassies, the police, postal service, banks and the fire department as well as ambulances will be allowed to access the area.  
- Parking is not allowed for other regular vehicles.  
- Vehicles are allowed in the pedestrian-only zone between 6pm-10am for deliveries. |
Creating walkable communities has many economic, social, and environmental benefits. This study focuses on impacts of pedestrianization on local businesses and air quality. The rational behind this decision are summarized below:

• Pedestrianized areas in the Historic Peninsula are highly commercialized. Local business owners and employees constitute the largest stakeholder group. Yet, it is generally very hard to get initial buy-in from local businesses for pedestrianization projects, as they are often concerned about reduced footfall. Fatih Municipality have partnered with trade unions and business organizations to inform business owners of expected benefits of pedestrianization. In this study, the aim is to get a better understanding of retailers’ perceptions of completed projects. Their input is valuable as stakeholder buy-in is vital to ensure success of these projects. Suggestions for improvement will also help local administration to prioritize budget allocations and projects.

• Pedestrianization projects aim to minimize corrosion risks on historical stocks in the Historic Peninsula by reducing air pollution levels in the area. Significant health benefits can also be achieved through improved air quality, especially given the high numbers of daily visitors in the area. Developing methodologies to quantify benefits of pedestrianization is vital for promoting these projects. Therefore, this study aims to understand whether and how achieved benefits can be quantified.

IMPACTS OF PEDESTRIANIZATION PROJECTS

Transforming car-oriented streets into pedestrianised environments has the potential to support physical activity, social interaction, economic development, and improve air quality.
3.1 ECONOMIC IMPACTS

Local communities might not initially recognize economic benefits of pedestrianization projects. Often, local businesses believe pedestrianization will adversely affect their revenues due to reduced traffic and footfall. However, successful implementations around the world show that pedestrianization contributes to increased retail activity. Pedestrianization of Istiklal Caddesi in Istanbul demonstrated that limiting vehicle access and creating attractive environments for consumers could improve business activity.

Table 2 presents a summary of potential economic benefit categories that should be considered when evaluating walking improvements (Litman, 2003). Litman highlights the importance of wider impacts when thinking about economic benefits of pedestrianization.

Impacts on Businesses

This study aimed to focus more specifically on impacts of pedestrianization on businesses. A brief literature review reveals many studies that suggest positive impacts of similar projects on local businesses:

- Sermonti and Saricikli (2001) identifies benefits or improving conditions for non-motorized street users at the vicinity of urban small business:
  1. Economic Revitalization and Property Values – Traffic calming can increase residential and commercial property values, which attracts wealthier residents to the area (gentrification) and can increase retail sales and bring economic revitalization to a commercial corridor.
  2. Attractiveness and Safety – Traffic calming creates more attractive environments, reduces auto speed, and increases safety for pedestrians, bicyclists, drivers, and other users of the street, which is good for business.
  3. Sales and Attracting Customers – Traffic calming encourages local residents to buy in their own neighborhoods, and also attracts customers from a wider area due to reduced travel time, hassle, and cost. Traffic calming can also help

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Potential Economic Benefits of improving walkability (Litman, 2003)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility</td>
<td>provides mobility options, particularly for people who are transportation disadvantaged.</td>
</tr>
<tr>
<td>Consumer cost savings</td>
<td>provides consumer transportation cost savings</td>
</tr>
<tr>
<td>Public cost savings</td>
<td>reduced external costs – substitutes for vehicle travel and reduces negative impacts</td>
</tr>
<tr>
<td>Efficient land use</td>
<td>helps reduce the amount of land used for roadway and parking facilities, and helps create more accessible, clustered land use</td>
</tr>
<tr>
<td>Unattractiveness</td>
<td>improves the local environment</td>
</tr>
<tr>
<td>Public fitness and health</td>
<td>provides physical exercise to people who are otherwise sedentary</td>
</tr>
<tr>
<td>Economic Development</td>
<td>makes commercial areas more attractive and shifts consumer expenditures to goods that provide more regional economic activity and employment</td>
</tr>
</tbody>
</table>

Table 2

<table>
<thead>
<tr>
<th>Accessibility</th>
<th>Consumer cost savings</th>
<th>Public cost savings</th>
<th>Efficient land use</th>
<th>Unattractiveness</th>
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<th>Economic Development</th>
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<td>provides mobility options, particularly for people who are transportation disadvantaged.</td>
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<td>provides physical exercise to people who are otherwise sedentary</td>
<td>makes commercial areas more attractive and shifts consumer expenditures to goods that provide more regional economic activity and employment</td>
</tr>
</tbody>
</table>

people live less car-dependent lifestyles, which will increase the amount of discretionary income they can spend on things other than transportation.

4. Parking – Most businesses are concerned about the quality and quantity of customer parking and access for delivery trucks. However, too large a supply of subsidized, on-street parking can harm businesses.

5. Impact on Employees – Poor bicycle, pedestrian, and transit conditions can harm businesses by losing worker productivity and time to gridlock, and by impairing employee recruitment. Conversely, improved transportation facilities can provide more convenience for employees.

6. Construction and Costs – Traffic calming projects often require only minimal “down time” for construction, and most do not require any investment from business owners.

- Shops within pedestrian areas are more successful than those outside, as pedestrianized areas are more attractive for shoppers. Increased turnovers are also transferred to landlords partially, in the form of higher market rents. It is also important to note that some reduction on turnovers can be observed in the initial years of implementation during the transition period. (Hass-Klauss, 1993)

- A survey of more than 100 cities around the world, concerning their pedestrianization schemes, revealed environmental improvement closely related to the removal of traffic. The survey also showed that 49% of all the pedestrian areas developed experienced an upward trend in retail turnover, while only 18% experienced a decrease, and %25 stayed stable (OECD, 1978). Cities in Austria, Germany and Scandinavia experienced increase in turnover of more than 60% (OECD, 1978).

These studies show that successful pedestrianization projects create better environments for people. These improvements attract more shoppers, and increase economic productivity and employment in pedestrianized areas. Higher turnovers are also reflected in higher market rents. Individual perceptions play a vital role in achieving these benefits.

This study investigated the perceived benefits and disadvantages of pedestrianizing Historic Peninsula. Interviews were conducted with businesses in the area based on expected benefits as suggested by the literature and local administration.

3.2 IMPACTS ON AIR QUALITY

Environmental impacts of emissions from motorized vehicles in the Historic Peninsula can be analyzed in two main categories: (i) health impacts, and (ii) impacts on urban spaces and historical monuments. Negative impacts are especially significant in urban areas with high levels of traffic congestion. Main pollutants from motor vehicles include sulphur oxides (SOx), carbon monoxide (CO), nitrogen oxides (NOx), volatile organic compounds (VOC), lead, particulate matter (PM), and ozone (O3).

Impacts of air quality on health

Table 3 presents the types of health effects experienced by the most common vehicular pollutants at elevated levels.

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Health effects of pollutants at very high levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphur Dioxide</td>
<td>Respiratory diseases</td>
</tr>
<tr>
<td>Nitrogen Dioxide</td>
<td>Eye and respiratory diseases</td>
</tr>
<tr>
<td>Particulate Matter</td>
<td>Cancer, heart diseases, respiratory diseases, increases in rate of stillbirths</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>Combines with hemoglobin and diminishes hemoglobin’s oxygen-carrying capacity, death</td>
</tr>
<tr>
<td>Ozone</td>
<td>Respiratory diseases, eye and nose irritation, asthma, decrease immunity</td>
</tr>
<tr>
<td>Volatile Organic Compounds</td>
<td>Eye, nose and throat irritation, headaches, nausea, vomiting, liver damage, kidney damage, central nervous system damage</td>
</tr>
</tbody>
</table>

Pedestrianization projects are expected to reduce vehicle traffic, and thus reduce pollution levels. However, Istanbul and particularly the study area lacks sufficient data on pollutants listed above to quantify air quality impacts on health.

Currently, there is a single Air Quality Measurement Station in Aksaray. This station is not representative of pedestrianized streets, as it is located in an area where there is continuous traffic flow. In other words, if pedestrianization of streets were successful in improving air quality, it would not be reflected on measured pollution levels. Indeed, quantitative comparisons between 2009 and 2012 pollution levels for (SO2, NO2, CO, PM10) show no significant changes.

Impacts of air quality on cultural heritage stocks

Corrosion is another important impact of air pollution for the Historical Peninsula, as it is home to rich historical sites. A decade ago, SO2 was considered one of the most important air quality parameters on the corrosion of cultural heritage stocks. Significant increases in the levels of nitrogen compounds, ozone and fine particulate matter in the ambient air have been associated with the increasing automobile traffic; however, a decreasing trend in SO2 levels has been observed in most parts of Europe and Türkiye. Scholars continue to study impacts of vehicular emissions on historical stocks.
Fatih Karaca
Associate Professor, Fatih University

“Fatih University Air Quality Research Group completed the most comprehensive study on the air quality for the Historic Peninsula, and results were published in 2013. Overall, observed levels of pollutants do not pose significant risks for human health. At the local level, traffic density raises pollutant levels, creating hotspots.

European Commission or Environmental Protection Agency does not have threshold levels for ensuring protection of heritage stock. Therefore, it is hard to reach conclusions on risk levels for the historical heritage stock in the historical peninsula. It could be said, however, that observed pollutant levels point to high-risk levels. It is known for a fact that high NOx, SOx, and PM levels might lead to corrosion of heritage stock. Traffic levels contribute significantly to higher levels of pollution. Therefore better traffic planning in the area, and transforming the historic peninsula into a traffic free region is an important step towards protection and conservation of heritage stock in the Historic Peninsula.”

Pınar Mengüç
Professor, Özyeğin University

“It is likely that climate change will become the biggest environmental problem in the history of mankind. There have been changes in the climate before, when the entire history of earth is studied. However, none of these resulted from human activity and no significant changes were observed during the 10,000-year history of humankind. High concentrations of greenhouse gases (GHGs), like water vapor, carbon dioxide, and methane absorb energy, cause changes in Earth’s energy balance in the atmosphere and triggers climate change effects. Fossil fuels used in transportation, building, and industries are the major cause of increased concentration of GHGs in the atmosphere. Burning of fossil fuels in vehicles, power plants and various industrial processes also generate significant amounts of particulate matter.

*Particles less than 10 micrometers in diameter (PM10) pose a health concern because they can be inhaled into and accumulate in the respiratory system. Particles less than 2.5 micrometers in diameter (PM2.5) are referred to as “fine” particles and are believed to pose the greatest health risks. Because of their small size, fine particles can lodge deeply into the lungs.* (US EPA)

A recent article published by Lancet showed that surge in car use in India and China is responsible for millions of premature deaths. Inevitably, all metropolises including Istanbul are faced with the same threat.

Measurements of particulate matter emissions are important for the development of urban transportation policies. These measurements will also help quantify economic consequences of health impacts. Furthermore, high particulate matter emissions create significant corrosion risks for historical stocks, which lead to further economic loss. Fatih University conducted a comprehensive study in the Historic Peninsula for measuring SO2, NO2, and PM10 levels. Details of this study and its findings are presented in this report. We have developed tools to measure characteristics for particulates of size 100 nanometers and below. Fatih University and Özyeğin University have developed tools to measure characteristics for particulates of size 100 nanometers and below. Fatih University and Özyeğin University have

**Dr. Ferhat Karaca’s thesis, “Mapping the corrosion impact of air pollution on the Historical Peninsula of Istanbul” is the most comprehensive study conducted so far for evaluating the corrosion levels related to air quality and the seasonal pollutant (NO2, SO2, and O3) exposure levels over 50 monitoring stations distributed on the historical peninsula of Istanbul. Exposure levels of SO2, NO2, and O3 pollutants in the Historical Peninsula atmosphere were measured using passive samplers between October 2008 and August 2009, seasonal and spatial distribution characteristics of the pollutants over the region were evaluated, and high-resolution corrosion impact maps were obtained on the Historical Peninsula of Istanbul. Findings were published, and below is a summary of study results (Karaca, 2013):

- The SO2 exposure levels in this study indicate a moderate level of risk for the peninsula. There is a SO2 hotspot situated between the two largest university hospitals (Cerrahpasa and Capa). A very busy road (E-5) passes through the area and it is most probable that the SO2 exposure levels around these places have increased as a result of daytime traffic activities.
- Both NO2 and SO2 have been attributed to traffic related distribution, and therefore their exposure distribution maps have similarities. There are two hotspots for NO2 exposure during the spring period: Firstly, the road between the Atatürk bridge and Eminonu, and secondly, an area centered on the Topkapı junction on the 10. Yıl Avenue (Motoway). Both of these areas are combined and it is seen that the NO2 exposure was also stretched from Topkapı Junction into Fatih. It can be referred to as a “hot spot” of the peninsula through Turgut Ozal and Adnan Menderes Avenues during winter.
- Ozone is a secondary pollutant. The tip of the peninsula is identified as a hot-spot. The PM10 values during July and August 2010 were significantly higher than the average value, and no significant relation was observed with the other pollutants during these two months.

Findings above suggest that high NO2 and SO2 levels are attributed to high levels of congestion. Corrosion effects are observed in the identified areas for high NO2 and SO2 levels. Pedestrianization projects are expected to reduce these corrosion effects by reducing traffic in the area. In assessment of net impacts of pedestrianization, air quality measurements before and after project implementation at pedestrianized sites are required for comparisons. Unfortunately, these data were not available and net benefits of completed pedestrianization projects on corrosion cannot be quantified at this stage.

**Quantifying air quality improvements**

Quantifying air quality improvements resulting from pedestrianization is not plausible at this stage due to large data requirements. Therefore, it is hard to put a number on the achieved benefits on health and historical stock. However, it was possible to capture some of the perceived benefits from improved air quality through the survey. Further details on the survey are presented in Section 4.

Conversations with scholars in Türkiye showed significant level of interest in analyzing air quality improvements in the Historic Peninsula. Yet, lack of data hinders researchers. It is important for local administrations to make the data publicly available to promote research as quantified benefits from projects will make it much easier to draw investments to fund similar projects.
4.1 METHODOLOGY
While it has not possible to carry out a complete economic impact analysis within the scope of this project, this study focused on four main regions in the Historic Peninsula and aimed to understand the perceived effects of pedestrianization on the local community.

Inputs from academicians (Istanbul Technical University) and the EMBARQ Network’s experts were used in designing the survey. Project Planning and Technical Works Units at the Fatih Municipality provided pedestrianization project drawings, which were used to define the survey area in our study. Comparative data on function changes before and after the project completion were not available. Therefore, it was not possible to assess the degree of function change in the pedestrianized regions. However old and new photographs taken at the area were also provided for comparison.

Business owners and managers in the area were surveyed to assess satisfaction levels. The rational behind the decision to target businesses are three-fold: (i) businesses rather than residential buildings dominate pedestrianized regions and therefore constitute the largest stakeholder group, (ii) shoppers are also a large stakeholder group, however most are local and foreign tourists who are not regular visitors, (iii) achieving economic benefits from pedestrianization is only possible if businesses perceive benefits of these projects and replicate in new environment.

Survey Area
Pedestrianization projects were implemented at four main regions of the Historical Peninsula: Üst Laleli, Alt Laleli, Hocapaşa-Sirkeci and Eminönü-Tahtakale. 256 streets and roads have been pedestrianized. Sample areas from each of these regions were selected to conduct the survey as presented in Table 4.
Table 4 Survey Areas

<table>
<thead>
<tr>
<th>Area</th>
<th>% of shops surveyed in the sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Üst Laleli</td>
<td>37%</td>
</tr>
<tr>
<td>Eminönü</td>
<td>20%</td>
</tr>
<tr>
<td>Hocapaşa</td>
<td>15%</td>
</tr>
<tr>
<td>Alt Laleli</td>
<td>13%</td>
</tr>
<tr>
<td>Üst Laleli</td>
<td>20%</td>
</tr>
</tbody>
</table>

On December 3-4, 2012, 420 surveys were completed by business owners and managers located on 39 streets 2012. The surveyors were selected from university students and they attended a one-day long briefing meeting prior to field visits.

Inputs from experts in the field
Meetings were held with Dr. Ferhan Gezici and Prof. Dr. Handan Türkoğlu, Research Assistant Efa Beyazit from Istanbul Technical University to receive their inputs and feedback in defining a methodology for assessing economic impacts of pedestrianization through the survey. Their recommendations included the following:

- Occupancy rates and workforce changes,
- Changes in sales volumes,
- Changes in transport mode choice,
- Streets where main arterials roads cross with by-streets, and
- Conducting surveys in four phases: prior to project, shortly after project declaration, shortly after project completion, long after (10-20 years) project completion.

Meetings were held with Laleli Businessmen’s Association (LASIAD) as part of survey design, to receive some insight about concerns and perceptions of businesses in the area. LASIAD worked very closely with Fatih Municipality during renovation of sidewalks and pavements as part of pedestrianization works. LASIAD General Secretary Şerafettin Yüzüak emphasized how much they value rehabilitation efforts. In this line, LASIAD convinced the municipality to use natural granite instead of lock paving stones for 12 streets and paid for the additional costs.

4.2 MAIN FINDINGS

This section presents an overview of the findings of the perception survey conducted on December 4th and 5th, 2012. The analyses are based on responses from 423 shops, all of which are located on pedestrianized streets. Findings from the recent report by GEHL Architects are also used to support survey results where relevant. Below is an overview of the analysis section:

Overview of businesses section presents characteristics of the shops surveyed and provides some background on the sample, 

Attitudes towards pedestrianization section provides a summary of current and past attitudes toward pedestrianization, as well as expectations for the future, 

Changes in sales section aims to provide insights on observed and expected changes in sales volumes, customer base, and income, 

Property values section presents locates’ perception on changes in property values as a result of pedestrianization, 

Travel to work looks at transport modal shares, 

Parking presents perceptions on available car parking alternatives, 

Urban environment section covers respondents’ perceptions on observed changes in the urban environment following the completion of the pedestrianization project.

4.2.1 Overview of businesses

Location
Table 5 displays the representation of each area as a percentage of shops surveyed in the area. For the analysis, overall results are presented, and unique patterns for different areas are highlighted where relevant.

Table 5 Representation of areas in the region

<table>
<thead>
<tr>
<th>Area</th>
<th>% of shops surveyed in the sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eminönü</td>
<td>15%</td>
</tr>
<tr>
<td>Hocapaşa</td>
<td>28%</td>
</tr>
<tr>
<td>Alt Laleli</td>
<td>13%</td>
</tr>
<tr>
<td>Üst Laleli</td>
<td>20%</td>
</tr>
</tbody>
</table>

Shop owners and employees
Only 32% of the respondents were shop owners, the rest were employees (52%) and managers (16%). It is important to take such low percentage in consideration especially when analyzing the responses to questions on expected and/or observed increases in income levels.

Gender diversity
Males dominate the sample population by 93%. This lack of diversity is also reflected in the GEHL Report analyzing the Historic Peninsula as a whole (GEHL, 2010). Pedestrianization and other supporting projects should aim to increase the diversity in the area in the future.

Newcomers in the area
17% of the respondents reported that they have moved to the area within the past five years. Among these newcomers, 52% noted that they have moved to the area because they believe there are better business opportunities, and 20% said that they wanted to attract more tourists. While many shop owners aim to attract tourists, GEHL reported that tourists tend to collect monuments from their checklist and neglect the remaining splendors of the city. Creating a better environment for tourists to walk around the shops promoting social interaction will help these shops to attract more tourists.

Business types: Dominant of wholesales traders
Business type distributions are presented in Figure 2. Only 26% of the surveyed shops were solely involved in retail. Such distribution might not be favorable for a pedestrianized area, as wholesale traders and their customers will have higher delivery and logistics needs. Currently, most wholesale traders are located in Eminönü and Alt Laleli area, while retailers dominate Hocapaşa. Üst Laleli has an equal distribution of retail and wholesale traders. It is expected that the new pedestrianized area will attract more retail traders.
4.2.2 Attitudes Toward Pedestrianization

It is important to understand what locals think about the project to ensure its success. Their views, suggestions, and concerns are valuable for local authorities to improve current conditions and get buy-in of businesses in the area. High acceptance and satisfaction levels are also valuable to get support for future pedestrianization projects.

Q15 ask respondents their views on pedestrianization after its completion:
• 78% of respondents were pleased or very pleased with the results of the project.
• 19% were not pleased or not pleased at all.

Changes in perception
Q14 and Q15 ask respondents if they supported the pedestrianization at the beginning, and if they satisfied with the results at the end. Figure 4 presents changes in perception through responses to Q14 and Q15:
• 40% of the respondents supported the project at the beginning, and 90% of those supporters were happy with the results;
• 62% of the people who did not have an opinion at the beginning were happy with the results at the end;
• 23% of the people who were against the project at the beginning were happy with the results at the end.

High support for other pedestrianization projects
Q27 asks whether the respondents support future pedestrianization projects in the area. 83% said that they would support other pedestrianization projects. Such high percentage is reflection of high satisfaction about the current implementation.

Concerns and expectations
Q13 asks about concerns and expectations about pedestrianization. Table 6 presents a list of common concerns and expectations reported by 125 respondents:

<table>
<thead>
<tr>
<th>Concerns</th>
<th>Expected Change</th>
<th>Observed Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better landscape planning</td>
<td>Increase</td>
<td>No Change</td>
</tr>
<tr>
<td>Noise Reduction</td>
<td>Decrease in sales volume</td>
<td>No Change</td>
</tr>
<tr>
<td>Increased Sales</td>
<td>Problems with enforcement</td>
<td>No Change</td>
</tr>
</tbody>
</table>

Problems with deliveries
Q9 asks respondents if logistics and delivery problems changed. Table 6 presents a list of common concerns and expectations reported by 125 respondents:

<table>
<thead>
<tr>
<th>Problems with deliveries</th>
<th>Expected Change</th>
<th>Observed Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problems with deliveries</td>
<td>Increase</td>
<td>No Change</td>
</tr>
<tr>
<td>Problems with enforcement</td>
<td>No Change</td>
<td>No Change</td>
</tr>
</tbody>
</table>

Suggestions to improve current conditions to make deliveries more convenient include changes to hours of operation and provision of special permits to shop owners. 58% of respondents are happy with the hours, however 41% are not.

4.2.3 Changes in Sales

Pedestrianization projects often aim to increase economic activity in pedestrianized areas by attracting more shoppers. However, it is often very challenging to measure the net effect of pedestrianization on net sales volumes due to high accurate data requirements. This survey aimed to measure perceptions of respondents with regards to observed and expected changes in sales volumes, rather than attempting to measure the net effect based on sales figures. Q18 asks if shops in the area expect their sales to increase or decrease after pedestrianization:
• 56% expect sales to go up
• 16% expect a decrease in the sales volume.

Q14 asks for more details on expected and observed changes in staff needs, annual income, and number of customers, which might be reflective of perceptions on economic activity (Table 7): The expected change in annual income, and 39% expects an increased customer numbers.

• A significant percentage of respondents are concerned about decreases in their income and customer numbers.

4.2.4 Changes in Real Estate Value

As pedestrianization increases the attractiveness of the urban areas and creates high quality environment, it is expected that property values will increase. However, the net effect of pedestrianization on property values is often very hard to measure since there are a lot of external parameters that affect changes in property values. Furthermore, academicians consulted suggested that it might take up to 10 years for researchers to observe increases in property values after project completion. This survey therefore aimed to understand perceived and expected changes in property values.

REMAX, an international real estate company, provided some initial data on real estate value changes. Müşlim Deveci and Murat Ergin underlined the fact that there are numerous factors influencing the real estate market, and emphasized the challenge in understanding the net impact of pedestrianization on prices. Their general opinion was that the pedestrianization project had a positive impact on the market, increasing both rental and property values. Real estate sales price changes between 2010 and 2012 in the area that covers both pedestrianized and non-pedestrianized streets are presented in Table 8 to give an idea of the observed changes in the market.

Table 7 Expected and Observed Changes

<table>
<thead>
<tr>
<th>Pedestrianization Region</th>
<th>2010-2012 Real Estate Sales Price Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altıncılar Region</td>
<td>14%</td>
</tr>
<tr>
<td>Başakşehir (Average)</td>
<td>14%</td>
</tr>
<tr>
<td>Beştepe (Average)</td>
<td>14%</td>
</tr>
<tr>
<td>Gaziosmanpaşa (Average)</td>
<td>14%</td>
</tr>
<tr>
<td>Sultanahmet (Average)</td>
<td>14%</td>
</tr>
</tbody>
</table>

In response to Q13, which asks expectations on property values after pedestrianization, 21% selected ‘Increase in property values’.

Q22 and Q23 ask about observed and expected changes in real estate sales prices.
changes in property values in more detail. Table 8 shows the observed and expected changes in property values reported in response to Q22 and Q23. While most respondents did not observe an increase in rental or property values, 43% and 39% respectively are expecting to see a change in the future.

Table 9 Expected and Observed Changes in Property Values

<table>
<thead>
<tr>
<th></th>
<th>Increase</th>
<th>No Change</th>
<th>Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed change in rental values</td>
<td>25%</td>
<td>74%</td>
<td>1%</td>
</tr>
<tr>
<td>Expected change in rental values</td>
<td>43%</td>
<td>52%</td>
<td>5%</td>
</tr>
<tr>
<td>Observed change in property values</td>
<td>27%</td>
<td>71%</td>
<td>2%</td>
</tr>
<tr>
<td>Expected change in property values</td>
<td>39%</td>
<td>55%</td>
<td>6%</td>
</tr>
</tbody>
</table>

4.2.5 Travel to Work

It is important to understand the modal distribution before and after the pedestrianization. The survey was conducted only three months after the pedestrianization of these streets were completed, and did not ask the respondents about their transport modes before project implementation. While we currently cannot measure any shifts that did occur, it is still important to understand the current situation to analyze modal shifts in the future. The current shares reported by survey respondents are presented in Figure 5. The current share of public transportation is already high at 85%. The expectation is to see more people using public transport and walking as their main mode of travel in their commutes to work.

High share of public transport in Eminönü and Hocapaşa

Walking’s share is relatively high at 14% in the Alt Laleli area. Share of public transport is 75% both for Eminönü and Hocapaşa, which reflects the strong public transport network serviced by ferries, buses and tram. Private cars have a significant modal share in commutes to work everyday at 26%.

Most used public transport mode: Buses

Among public transport users, buses are the most popular choice with 51%, followed by the tram at 36%. Commuter train services and ferry services both have share of 5% among public transportation modes.

4.2.5 Parking

Of the 108 respondents who indicated that they commute to work by car, 93 reported that they use car parks, and seven of them park their car on the roadside. It is however important to note that current car parks are sometimes located on the roadside and inappropriate next to existing monuments as suggested in the report by GEHL.

Additional two questions were included in the survey to understand perceptions of availability of parking space before and after pedestrianization:

- The majority of the respondents noted that available parking spaces are adequate (86%), followed by the 42% who indicated that the available parking spaces are lower in numbers than the demand and there is a need for more car parks.
- The majority reported that there was no change in the availability of parking spaces after pedestrianization (83%).
- 13% of the 176 people who reported that the parking spaces were not satisfactory prior to pedestrianization thought that the number of parking spaces decreased even further.
- 14% of the 236 people who reported that the parking spaces were adequate thought that the number of parking spaces increased since the pedestrianization.

4.2.6 Urban Environment

Pedestrianization projects aim to improve streetscapes, reduce noise levels, and improve air quality. All of these improvements will create better and healthier living environment and consequently better experiences for visitors and locals. It is therefore important to understand perceptions on above noted components to assess the success of the project. In this line, the survey asked respondents some questions on their perceptions of the changes in noise levels, air quality, and landscape improvement/planning.

Noise Levels

62% of the respondents thought that noise levels were very high in the area due to motorized traffic. 91% of these people who were concerned about the noise levels reported a decrease as a result of pedestrianization. This is a very positive outcome of the project reflecting its success in reducing noise levels.

Air Quality

34% of the respondents thought that air quality, especially emissions from cars were serious issues for the area. 86% of these people who were concerned about emissions and air quality reported better air quality as a result of pedestrianization.

Clean Streets

Clean streets improve the atmosphere and the image of a road. 33% of respondents were concerned about their streets not being clean enough. 85% of these people who were concerned reported an improvement after pedestrianization.

Resting Options

GEHL reported an extensive lack of resting options in terms of public benches along the streets. 58% of respondents share this view and report that there is a lack of public benches in the area. However, 85% of these respondents said that there was no improvement in the availability after pedestrianization. This highlights a key area for improvement.

Pedestrian Experience

Pedestrians experience several challenges on the streets in the Historic Peninsula due to limited availability of space for walking. 61% of respondents were concerned about such challenges prior to pedestrianization, and 86% of them reported improvements achieved afterwards.

Street Sellers

21% of the surveyed shops were concerned about the growth in the number of individuals who tout for trade in the Historic Peninsula. Some of these traders might cause annoyance to the public, and obstruct footpaths. Most respondents believe that municipality should be stricter with street sellers.
Insights from interviews with local business are highly valuable for local administrations to increase stakeholder buy-in.

4.3 CONCLUSIONS AND RECOMMENDATIONS

The responses to the survey showed that the pedestrianization was successful and locals were largely happy with the results:

- 78% of respondents said that they were pleased or very pleased with the pedestrianization.
- 83% said that they would support pedestrianization projects in other areas.
- Locals are mostly optimistic about the future: 56% expect sales to increase, 39% expect customer volumes to increase, 25% expect annual income levels to increase, 39% expects property values to increase.
- Current share of public transportation is already high at 65%. It is the most popular mode in commutes to work. The expectation is to see more people shifting to public transportation or walking from private vehicles.
- Respondents who were concerned about noise levels and air quality reported significant improvements.

Key areas for improvement

Survey results highlighted some key areas for improvement. These will be valuable for local authorities to get a grasp on current concerns of the locals and their expectations.

The locals were expecting better landscape planning as part of the pedestrianization project (e.g. more public benches, plants and flowers, infrastructure improvements for pavements, etc.). However, there were no changes on pedestrianized streets apart from physical barriers to prevent motor vehicles from penetrating. Streetscapes should be improved on pedestrianized streets.

There are significant concerns over the imposed difficulties with deliveries to the shops. Further investigations are required to understand business concerns in the area, and whether changes to hours or special permit provisions are required to improve perceptions. These concerns might decline over time, as businesses are more familiar with new requirements and adapt their business operations accordingly.

Decline in sales volumes is another common concern. Respondents are worried that restricted vehicle access in their streets might discourage their customers. It is therefore important to improve the streetscape to attract customers to these streets.

42% of respondents believe that there is a need for increased parking spaces to meet the demand. Furthermore, GEHL Architects report that current car parks are already located on the roadside and inappropriate next to monuments. It is therefore important to improve public transportation services in the area. If more people shift to alternative modes, demand for car parks will decrease. This will also improve streetscapes.

Street sellers are another concern as there is an increase in their numbers with pedestrianization. Regulations and associated increased enforcements to reduce street sellers should be reviewed to ensure a better environment both for locals and visitors.
References


OECD, 1978, Results of a Questionnaire Survey on Pedestrian Zones in Paris, OECD, Paris


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