

Assessing the Impacts of Pedestrianisation on Tehran Historic Center Case Study: Panzdah Khordad St.

Niku Khaleghi

Brandenburg Technical University, Cottbus, Germany Petersilienstrasse 3D, 03044

Abstract: Urban planning has received tremendous public attention in the last few years. Energy cost, environmental issues, traffic congestion and the feeling of lack of belonging in the cities are among the factors that have contributed to the development of pedestrian areas. These public spaces provide opportunities for shopping, entertainment, eating facilities and gatherings where people can experience urban life as pedestrians. Over decades, the concept of pedestrianisation has become part of social urban life in the developed countries. However, developing countries such as Iran have just recently paid attention to pedestrianisation and walking as a mode of transportation. This paper studies the impacts of pedestrianisation in historic central urban open spaces of Tehran. Literature and field research have been performed through investigating the valid documentations and using questionnaires and interviews with the locals and visitors. Historic Urban Landscape has been chosen as the main research approach in this article to conduct evaluation and recommendation for improving the pedestrian-oriented open spaces in the historic urban context.

Key words: Historic Urban Landscape • Urban Spaces • Impact Assessment • Pedestrianisation • Tehran

INTRODUCTION

‘Pedestrian movement is known as the best type of human interaction with the urban environment: What makes pedestrians distinct are that they are open and slow. These qualities enable walkers to truly experience and interact with their urban environment. It is walking that knits the structures, spaces and people of any city together [1]. Nevertheless, in the developing countries like Iran where car-oriented developments are dominant, pedestrianisation approach has recently gained attention [2]. In some cities like Tehran, historic urban areas are being transformed to the pedestrian-only urban spaces in order to reduce the traffic in these areas and create a pedestrian-friendly environment.

Panzdah Khordad St. is a historic center in Tehran that includes the only world heritage site in Tehran, Golestan Palace [3]. Due to the constant changes of the physical resources, places, people, ideas and services, the urban environment is dynamically transforming over time. Consequently, the new urban development’s decisions

may challenge the conservation of cultural heritage and social structure because of the changes that it imposes on an urban area.

MATERIALS AND METHODS

In this paper, Heritage Urban Landscape (HUL) methodology has been used to evaluate the physical and environmental impacts of the pedestrianisation project. HUL includes both aspects of tangible and intangible values of the urban environment and provides a comprehensive management framework for the development of the city and conservation of the urban cultural heritage. Literature review (including maps, pictures, itineraries, drawings, reports and books about the history of the area, before and after the project) and field investigation (observations, interviews and questionnaires) are the main methods of this research. In this case, people are randomly selected from three groups of the site visitors, bazaarians¹ workers and the planners to get their ideas about the impacts of the pedestrianisation project.

¹Bazaarians include the shopkeepers and all the people who work in the bazaar

Corresponding Author: Niku Khaleghi, Brandenburg Technical University, Cottbus, Germany Petersilienstrasse 3D, 03044

Table 1: Criteria for analyzing the pedestrianisation project.

Aspect	Criteria	Factors/Components	Evaluation Tools
Sociocultural-Economical	Exhibition, Events, etc.	Religious events, theater and music playing, cultural event, art exhibition, ...	Questionnaire, Interview
	Safety and Security	Criminal cases, street harassment, ...	Questionnaire
	Pedestrian Culture	Educational Signs and Information in the Site	Questionnaire
	24-hour Activities	Variety of functions and activities, mixture of residential and business functions	Questionnaire, Observation
	Considering Cultural and Historical Sites	Information signs, tours, advertisement, emphasizing on the important elements of the site, ...	Questionnaire, Interview, Observation
	Local Participation	Participation in decision making and implementation process	Questionnaire, Interview
Physical	Variety of Functions and Service Units	Cafes, restaurants, vendors, entertainment activities, ...	Observation
	Number of Visitors of the Site	Density, cleaning, safety, ...	Interviews, Observation
Accessibility and Traffic	Access to the other kind of Transportations	Accessing the metro stations, bus and taxi, parking spaces	Observation
	Access to the near Pedestrian Streets	Guid Signs in the Site	Observation
	Absence of Traffic	Access of the vehicles to the Site, Type of Transportation	Interviews, Observation
	Emergency access	Access of the emergencies' vehicle to the area, Separated line for emergency access	Interviews, Observation
Urban Designing	Appropriate Design	No different ground level, appropriate flooring, considering disabled people, facile navigation, disposal surface water	Questionnaire, Interviews, Observation
	Providing Urban Furniture	Siting spaces, Lighting, Toilets, trashcans, ...	Questionnaire, Observation
	Facilities	Shades, fences, ...	Questionnaire, Observation
	Diversity in the path	Pause points, diversity of materials and forms, ...	Questionnaire, Observation
	Human Scale	Height of the Buildings, Eye-level view	Observation

Pedestrianisation is a multi-disciplinary process, which is not limited to merely physical aspect but based on literature reviews and experiences, to attractiveness, human scales, safety, health and sustainability too. Here, based on the goals of this research, four main categories are considered for evaluating a pedestrianisation project including sociocultural-economical, physical aspects, accessibility and traffic and urban design. The given Table shows the factors and the recommended tool for the evaluation of these factors (Table 1).

DISCUSSIONS

Tehran as the 200-year-old capital of Iran, embraces many historical and significant monuments including Qajarid houses, water storages, museums, churches, mosques, palaces, schools, gardens and bazaars. In this research, one of the most historic streets in the city, Panzdah Khordad St. –a pedestrian zone- is studied as a case study.

This area does not include any residential space. Therefore, the information that mentions the residents is regarding the workers in the bazaar zone who stay temporarily in the site the whole day. In the past, this area included also residents of the site. After pedestrianisation, due to the difficulty of transferring goods to the site, most of the buildings were bought by shop owners to be used as storage of the demanded goods of the bazaar. Later, this problem created an unsafe environment for other residents who had not sold their

houses and whose properties were surrounded by storages. Furthermore, since they could not bring their private cars to the area, they also decided to sell their buildings with a good price to bazaarians and leave the neighborhood. As a result, during the day, many people visit the site and after the working hours, a few who are mostly workers, pass through the street for transferring the goods at nights or stay in this area to start their work earlier in the morning.

Tehran historic centers are the main parts of the socio-cultural, political and economic activities of this city. Due to the importance of these parts of the capital, for a long time, they have been in the center of attention so that several developing and improving plans have been prepared to empower the old Tehran against modern urban changes [4]. The process of improvement of the historic Tehran center was started in 2002, while the pedestrianisation project of Panzdah Khordad St. was launched in 2008 [5].

Evaluation of the Pedestrianisation Project Based on Observations: With the aim of evaluation of the project, the site has been described in two different phases; before and after the pedestrianisation project that was completed in 2008. A comparison between these two phases gives this opportunity to clarify which elements have been changed during this process and how this urban project has affected the historic urban landscape. The given maps illustrate the site in these phases. In the end, based on this comparison, the results of the evaluation and the conclusion will be presented.

In summary, renovating the facades, improvement of the pavement, modification and/or creation of suitable urban furniture and services, reconstruction/renovation of the old facades and restoration of historic spaces like Sabze Meydan have been carried out within the framework of the main project. Designing a canal for urban installations such as water and gas pipes and telephone and electricity cables with the cooperation of all concerned organizations, repairing the infrastructures, the extensive cooperation of the stakeholders including visitors of the site and the shopkeepers at the implementation phase have been among the main objectives of this project. In the following sections, the main features of the site before and after pedestrianisation project are considered.

Functions and Activities: Several important historic places are located in this site which have kept their previous function or have changed their function according to the contemporary needs. Considering the high price of land in this area and the power of the biggest economic center of the country, Panzdah Khordad St., all the residential places were being sold gradually to be converted to businesses or storage [5]. In Tehran Master Plan this problem has been considered and it is suggested that some temporary or permanent living spaces should be provided for residents and visitors in this area. Nevertheless, the main issue in this regard is providing a livable environment and social welfare for residential places. The biggest problem is converting the environment to businesses that are only active during the working hours and late evenings when mostly trucks for transporting the goods to bazaar enter the area. This problem makes the site unsafe and uncomfortable for living. In addition to Panzdah Khordad St., all other places than what were mentioned have been dedicated to marketing and shopping and storage activities.

Access and Transportation Services: There are several types of transportation means for accessing the site. Thanks to the metro, accessibility to the site is cheap, fast and easy. In case that people want to visit the site by private car, there are no parking spaces near the site and it would usually be a hard task to find a free space to park the car. There are four main bus stations in the region. Taxis are available for all parts of the city exactly in front of the metro station in Khayyam Street and also Imam Khomeini Street.

Inside the site, there are different kinds of transportation means for the pedestrians who do not want to walk including historic model of trams, horse carriages and bicycles. Considering disabled people as one of the target groups of the project, many obstacles prevent them from using the site.

Transferring goods inside the site is one the biggest difficulties that bazaarians have emphasized about had several demonstrations. Before pedestrianisation, trucks could enter the site; then, depending on the size of the entrance, which they wanted to use, other means like pickup cars, motorcycles, handcarts or workers were used to carry the goods inside. However, after pedestrianisation, the only possible option is to hire a worker with or without a handcart for transferring the goods, which costs a lot for bazaarians.

Some bazaarians, during the night, bring their goods by motorcycles and store them inside the yards or storages; this creates an unpleasant and disorderly view inside the bazaar.

Green and Gray Infrastructures: Considering the strong economic forces in this site, all the possible spaces have been allocated to business sector for more financial benefits and especially in the bazaar site, many of the green areas have been destroyed to be replaced with shops and storages. Nevertheless, based on the field observation and comparing the aerial photos of before and after the pedestrianisation project, there are only few changes in the green spaces. The most evident transformation is related to the two sides of Panzdah Khordad St. where the municipality has planted two rows of trees with the aim of reducing air pollution and providing shades for the pedestrians during the hot and sunny days.

The site includes the technical infrastructure facilities such as electricity, sewage canals, drinking water and well water, gas network and telephone. During the pedestrianisation project, deep canals were dug in the ground in order to cover all the exposed pipes. The walls of these canals have been reinforced by metal meshes and insulated against the ascending humidity of the ground. Metal plates have been used to cover the canals. A distinct material from other parts of the area has also paved the path of these canals in order to be easily accessible in emergency cases. The locations of these canals and their resources are well documented. The resulting documentation has been shared with all the responsible organizations.

Materials and Structures: In the trajectory of time, the buildings of this historic site have been repaired and renovated several times. As a result, there are different structures such as wooden, concrete and steel that is covered by a distinct finishing material such as brick, glass, concrete, cement, stone or wood. Before pedestrianisation, each façade had its own materials like stone, concrete, glass or metal. In this project, with the aim of creating harmony, a second façade with red brick and cement sand mortar was defined to cover the old one and the shop sign were designed with blue tiles. The main materials in the public spaces including the urban furniture are concrete and cement sand mortar. In the pavements, different materials or patterns specify different spaces; for instance, the bicycle line has a different pattern from the pedestrian path. For preparing the paving, the underneath layer has been filled with layers of concrete and cement mortar, a layer of a humidity insulator, sand and granite stones and another layer of cement mortar. Waterproof metal plates and stones cover water ditches and the canals.

One of the most important aspects of this project was rehabilitation of the historic core of the city. To this purpose, renovation of the facades based on the historic architectural pattern of the site was one of the concerns of the planners. Historic documents regarding the architectural style in this site shows that the buildings had mainly been constructed based on the Islamic architecture. Therefore, all the facades in Bazaar site were changed according to the historic style in order to provide an integrated image of the historic site. In the north side of the street where Melli Bank and Golestan Palace are located, due to the historic values of these places, the changes are very limited. In contrast to the facades, plans of the buildings have not been altered in this project. Nevertheless, based on needs, the urban furniture and services have been changed and these changes have imposed some changes on the plan of the site too.

Due to changing the site to a pedestrian area, the paving of the site needed to be improved. One of the proposed future changes in the site was to define paths for trams. This, in addition to other foreseen activities such as walking, bicycling and riding horse carriages, led the planners to design different flooring line in this path. Moreover, the street was insulated to solve the problem of humidity in rainy and snowy days and prevent descending humidity from penetrating and damaging the metro stations. Granite stone and cement sand mortar have been used as the materials for flooring the street and the entrance of the bazaar.

Moreover, historic architectural patterns were chosen through researching historic pictures, photos, drawings and descriptions about the site. In addition, based on the Islamic architecture patterns in Iran that were popular in the historic center of Tehran, some features such as blue tiles, calligraphy, equilateral pointed arches and lancet arches were used in the design process.

Urban Furniture: In the pedestrianisation project of Panzdah Khordad St., different urban elements were added to the site with the purpose of converting the area to a pedestrian zone. This furniture includes ramps, fences, stoppers, street lamps, planter boxes and trashcans and benches.

Evaluation of the Project Based on the Views of Visitors, Shopkeepers and Residents: Before analyzing the results of the questionnaires and interviews, the general social and economic characteristics of the respondents including shopkeepers and passengers will be explained.

One hundred passengers including 52 women and 48 men responded the questionnaire. In addition, 50 shopkeepers including 49 men and 1 woman were interviewed. The average age of the passengers and the shopkeepers were respectively 31 (between 16 to 75 years old) and 36 (between 19 to 60 years old). The occupation information of the passengers can be described as 27% employees, 25% self-employments, 16% students, 4% teachers and professors, 3% retired, 3% jobless, 1% worker and 3% other job. Most passengers (64%) know the area for less than 10 years 30% shopkeepers know the site more than 10 years. The majority of the Passengers (33%) between one to three times, 23% three to five times, 14% only once, 14% five to ten times and 10% more than ten times in a year visit the site.

In the given Table, the analysis of the questionnaires and interviews based on passengers and shopkeepers' opinions in four categories is elaborated (Table 2).

Impact Assessment: In this section, the impacts of pedestrianisation project are identified and analyzed from four different aspects; general architectural principles for a pedestrian zone, physical aspect of the urban design, transportation and function. The given Table illustrates the strengths and weaknesses of the pedestrianisation project of Panzdah Khordad St. (Table 3). Considering the values and importance of the site, there are some opportunities for improving the plan and future development of the area such as taking advantage of the academics' knowledge, attracting international financial support and designing the available spaces for creative and/or necessary functions.

Table 2: Summary of the respondents' ideas based on evaluation factors.

Aspect	Criterion	Positive	No Idea	Negative	Suggestion
Sociocultural-Economical	Exhibition & Events	43	18	58	Organizing the vendors in a specific place
	Safety for Children	55	12	41	Traditional events in the site
	Pedestrianism Culture	46	17	62	Music performance and street theater
	24-hour Activities	13	45	66	Distributing brochures about historic values of the site
	Considering Historical Sites	32	47	15	Information Center
Physical	Local Participation	18	48	56	Information Center
	Mixture of residential and business functions	7	75	40	Hostels for travelers
	Variety of functions	81	3	15	Information Centers
Accessibility and Traffic	Number of visitors	22	0	101	More entertainment spaces for visitors
	Access to the other kind of transportations	83	12	14	Specific area for handcarts
	Access to the near pedestrian streets	51	31	34	Two-side way for pedestrians Using Tram
	Absence of Traffic	64	2	58	
Urban Designing	Emergency access	6	16	83	
	Appropriate designing	85	22	17	More urban furniture (benches, water foundations,)
	Providing urban furniture	57	8	58	Building toilets in the site
	Facilities	44	14	67	More green spaces
	Diversity in the path	51	27	46	Designing gathering areas for pedestrians
	Human Scale	27	76	7	

Table 3: Strengths and weaknesses of the pedestrianisation project.

Aspect	Strengths	Weaknesses
General Principles	<ul style="list-style-type: none"> - Increase in the number of visitors of the site - Appropriate Location - Creation of the spaces according to human scale - Historic image of the city - Strengthen of the old structures - Restoration and repair of the bazaar structure - Integration of the site with bazaar and the Golestan palace-garden - Creation of the multi-functional areas - People encouragement to walk and use of the public transportation and bicycle - Cooperation among shopkeepers and administrative group - Local participation - Arrangement of the cultural events regarding the history of the site 	<ul style="list-style-type: none"> - Big gap between the number of visitors during the day and night - Illegal activities after working hours - No safety during the night - Lack of 24-hour activities - Lack of introduction of the values of the site to the visitors and shopkeepers - Difficulties for transportation the goods - Lack of physical barriers to prevent the access to the site by vehicles - Difficulties for finishing the pedestrianisation project due to the high number of visitors - No consideration of different types of users and different age groups (children, elderly, disabled people, women and men)
Urban Design	<ul style="list-style-type: none"> - Dedication of the benches and drinking fountains for visitors to pause and rest - Design of the wide space to shop and window shop - Creation of the arcade in some parts - Appropriate paving - Appropriate way of collecting the surface water and sewage - Appropriate utilities including electricity, gas, telephone and internet in the site - Consideration of the implementation specification 	<ul style="list-style-type: none"> - Shortage of benches, trashcans and urban facilities - No toilet in the site - Lack of signs and information center in the site - Shortage of lights during the night - Implantation fruit trees in the site - lack of tall evergreen trees for shading - lack of specific spaces for gathering in the open area - Lack of facilities for disabled - No specific area for emergency access - Shortage of shades and shelters for rainy and sunny days
Transportation	<ul style="list-style-type: none"> - Consideration of the different transportation possibilities in the site - Air pollution decreasing - Traffic in the area decreasing 	<ul style="list-style-type: none"> - No specific area for bicycles and handcarts - No parking space nearby - No taxi and motorcycle stations next to the site - No path for transporters of goods - Accession of the taxis and motorcycles to the site - Usage of the area as a parking space during the nights
Function	<ul style="list-style-type: none"> - Introduction of new activities to the site - Creation of new jobs - Mixture of different activities - Increase of the number of urban pedestrian services like banks, restaurants, ... - Improvement of the business in the site 	<ul style="list-style-type: none"> - No café in the site - No specific area for seat inside the restaurants - No resting place for travelers from other cities to stay in the site - Lack of residential function - Lack of entertainments and artistic activities in the site - Increase of the price of the land in the area - Allocation of the residential buildings to the storages or private offices

Table 4: Impacts of pedestrianisation project in Panzdah Khordad St. based on different layers of HUL approaches.

HUL Layer	Impacts of the Urban Project
Diversity and Identity	<p>Increased public knowledge of the history and values of the site</p> <p>Different generations of the society visit the site</p> <p>People are interested to have a picture about the historic view of their city</p> <p>Older people feel better in this environment</p> <p>Retired people use the site as a meeting point</p> <p>Mixture of different activities in the site</p> <p>Lack of residential spaces in the area</p> <p>Losing the identity of the site during the night due to the considerable decrease of population after working hours</p> <p>Decreasing the diversity of businesses in this area because most shopkeepers prefer to sell foods and eating stuffs due to more customers</p>
Social Values	<p>Different people find this opportunity to meet other people in this site</p> <p>The site is suitable for group visiting</p> <p>People are encouraged to have their social meeting in the site</p> <p>Increasing the number of visitors causes more social challenges comparing to the past</p>
Utilities (Gray Infrastructure)	<p>All the underground infrastructures were organized by implementation plan</p> <p>The whole area is covered by internet, telephone and gas network</p> <p>Easy access to infrastructure in the emergency situation due to the construction of canals for collecting water and electricity pipes and telephone and electricity cables</p> <p>Installing several firefighting pumps in the site</p> <p>Insulation of the ground against precipitation and creating canals for collecting underground water</p> <p>Usage of the improper paving material has caused the permeability of the soil to decrease considerably which results in water accumulation and flooding in rainy days</p>
Transportation	<p>Increased use of the public transportation to access the area</p> <p>Encouragement of people to use sustainable means of transportation</p> <p>Reduction of the motorized traffic in the area</p> <p>Difficult Access during the emergency time due to high population and lack of specific space for emergency access</p> <p>Unsafe site for walking due to mixture of handcarts way and pedestrian area</p>
Economic Processes	<p>Increased number of customers</p> <p>Development of the business in the bazaar</p> <p>Changed unsuccessful business to the restaurants</p> <p>Creation of temporary jobs for vendors</p> <p>Difficult transportation of the goods for shopkeepers</p> <p>Increased price of the goods in the area</p> <p>Increased price of the field in the site</p>
Environment	<p>Decreased air pollution</p> <p>Decreased noises</p> <p>Increased trashes and dirt in the site</p>
Open Spaces	<p>Increased green areas compare to the past</p> <p>Usage of the open spaces as the parking place by local people and taxi drivers</p> <p>Implantation of fruit trees in the site and consequently, more dirt and less shadows</p>
Cultural Practices	<p>Help up the temporary events regarding the values of the site</p> <p>Recreation of the historic image of the area by building new facades</p> <p>Increased homeless people in the site after the working hours</p>
Built Environment	<p>Repairing and restoring the structures in the bazaar</p> <p>Opened new entrances to the bazaar</p> <p>Constructed a second facade</p> <p>Improvement of the pavement</p> <p>Usage of the materials which are in harmony with the historic buildings in the site</p> <p>Decreased temporary spaces for resting during the night in the site due to the economic value of the area</p>
Urban Structure	<p>Integration of the historic sites and the bazaar zone</p> <p>Preservation of the sky-line and human scale in development project of the site</p> <p>Decreased population in the site during the night</p>

CONCLUSIONS

The HUL approach defines different layers for dealing with historic urban areas in an urban development

project. In the given Table, the impacts of the pedestrianisation project of Panzdah Khordad Street are categorized based on the layers of HUL approach (Table 4)

Using traditional Iranian architecture motifs, low-height buildings and big open facades with lots of details present a friendly atmosphere for people. However, with the aim of improvement of the site, comparing to the successful pedestrianisation experiences in the same context, there are many obstacles for movement that should be solved. In following, based on Jan Gehl pedestrianisation elements, some positive and adverse features of this site are listed [6,7].

Activeness in South Side:

- Many entrances, small units next to each other
- Variety of functions
- Detailed Facades
- Horizontal lines
- Traditional architectural patterns, colours and material

Friendly:

- Variety of activities for pedestrians, vendors and shopkeepers
- Different Width in the street
- Using vertical and horizontal lines for separation
- Different materials
- Easy interaction among city, building and people

Lively:

- Using traditional patterns and materials
- Variety of function
- Small units
- Considering the environmental issues

Mixture:

- Variety of spaces includes buildings, green spaces and closed areas
- Different height of the buildings in the two sides
- Integrating nature and the built environment

Health:

- Using sustainable ways of movement in the area
- Safe space for walking
- Providing urban facilities for enjoying and resting in the site
- Integrated transportation to the other parts of the city

Inactive and Boring Facade in north side:

- Large units with few entrances
- No variety of function
- No interaction between people and building
- No specific detail in human eye level

In this research, based on the field observation and questionnaires, the pedestrianisation of Panzdah Khordad St. has increased the harmony of buildings with historic and cultural values of the site and gives people the identity of citizenship of a historic city. However, at some points, the project can still be improved to create a better condition for all the users including shopkeepers, visitors and future residents of the site. For example, increasing the security of the pedestrian zone, providing more appropriate urban services regarding the number of users, integration of the pedestrian path with other places with historic and cultural values and introducing them to the visitors by installing guiding signs, organizing the vendors and handcarts, etc. can improve the condition of the site.

REFERENCES

1. Reid, D., 2005. The right foot forward, What's needed to make Toronto a great pedestrian city? Spacing Publishing, Available online: <http://spacing.ca/archive/ped-dylan01.htm>, [Access: 17.04.2017]
2. Kashani Jou, Kh., 2011. Emergence of pedestrianisation in Tehran: obstacles and opportunities, International Journal of Urban Sustainable Development, 2: 1-2, 121-134.
3. UNESCO World Heritage Center, (2016); Golestan Palace Nomination File, Available online: <http://whc.unesco.org/en/list/1422>, [Access:15.03.2017].
4. Monshadi, E.F., S. Habibi and A. Rouhi, 2012. Urban Pavement, from Theory to Implementation, journal of Art University, 9: 45-63.
5. Monshadi, E.F., A. Rouhi and O. Khodaverdi, 2015. Challenges and Opportunities for Pedestrianisation in Tehran, Studies and Planning Center of Tehran City, Traffic and Transportation department, report No. 323.
6. Gehl, J. and L. Gemzøe, 1996. Public Spaces, Public Life, Copenhagen, The Royal Danish Academy of Fine Arts Architectural press.
7. Gehl, J., 2010. Cities for people, Washington DC., Island Press.