

Urban Management

Assessing the Impacts of Pedestrianisation on Historic Urban Landscape of Tehran

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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. The historic core of Tehran, the capital of Iran, embraces significant tangible and intangible values. For a long time, enhancing the mobility in the area has been the important concern of the urban developers; pedestrianisation is their recently solution to this issue in this site. To study and evaluate this project, a literature and field research have been performed through investigating the valid documentations and using questionnaires and interviews with the locals and visitors. Taking advantage of the Historic Urban Landscape approach, the results of the field and bibliographic research have been evaluated and recommendations have been made for improving the pedestrian-oriented areas in the historic context. The findings of this research show that converting a street to a pedestrian zone does not mean to simply ban the vehicles from entering the site. On the contrary, there are essential bases in the site such as multifunctional places, human-scale dimensions or activities during the whole day and night that should be taken into consideration to provide a suitable space for pedestrians including citizens and tourists. Pedestrian zones include different functions such as residential, social, cultural, tourists, physical, economic, etc. on various dimensions and scales which affect the whole city design and management. Moreover, these spaces should be supported by variety of facilities like parking lots, public transportation and equipment for people with disabilities. Assessing the impacts of pedestrianisation in Tehran Grand Bazaar can pave the way for future studies with the aim of conserving unique features of the historic sites within an urban development process.

Keywords: Historic urban landscape (HUL), Tehran, Impact assessment, Pedestrianisation.

1. INTRODUCTION

Until the advent of the Industrial Revolution, walking was the main mode of transportation in the urban areas, and there were specific restrictions on the vehicle traffic like daily limitations on taking heavy cars to the city centres that were the main heart of the pedestrian movement and social interactions. Nevertheless, after the emergence of the automobile, the structure of cities changed fundamentally; eventually, vehicle streets became dominant parts of the city. The first "pedestrianisation" project with the current meaning took place about 1929 in Essen, Germany. 'The street was a very narrow shopping place which could not accommodate both pavement and

vehicles sections'. Pedestrian streets are urban public areas with full-time or part-time restrictions on vehicles and the highest social role for walkers dominated with social activities, shopping and wandering in relation to economy, environmental quality and social wellbeing in the urban spaces [1]. There are several aims for pedestrianisation in different regions including accessibility, solving traffic problems, strengthening land uses and economic functions and social interaction [2]. This process has its own positive and negative aspects and is accompanied with some challenges such as complicated security issues especially during the nights, connection to the public transport system for accessing other parts of the city and considering alternative roads for through traffic and parking lots outside the pedestrian zone. Consequently, some basic features should be considered for creating the pedestrian street in the cities; There are many different ideas and theories about the characteristics of the pedestrian zones such as Nozzi's

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sixteen fundamental bases for a walkable street which refer to: convivial concentration of 'pedestrians, residential densities, human-scaled dimensions, active and diverse retail, traffic-calming, 24-hour activity, narrow lots, weather protection, wide sidewalks, unobtrusive equipment, active building fronts, modest turn radii and crossing distances, proximity, short block lengths, vista termination and appropriate businesses'. He believes that pedestrian zones are not only the restricted areas to vehicles, but also are the spaces for social interactions and the specific form of development to link up a whole urban environment and all its functions [3]. 'The opportunity to see, hear, and meet others can be shown to be one of the most important attractions on a pedestrian street' [4]. With the same definition, pedestrian zones create the impression of the urban space for both residents and tourists. Sometimes, pedestrianisation has been used to form memorial images of the city centres. It is also used as a means for decreasing the traffic, constructing a more convenient access to the facilities, minimizing commuting congestion, improving energy efficiency, providing more opportunities for social interactions and gathering diverse communities so as to enhance the urban vitality, the street life and viability of urban facilities, as well as creating the feeling of safety [5].

Nevertheless, in the developing countries such as Iran where car-oriented developments are dominant, pedestrianisation approach has recently gained attention. In Tehran, since the publication of the report of the Committee of Urban Issues in 1999 that 'had requested designing and developing pedestrian-oriented streets that turn walking in the cities into an attractive task for citizens' [6], a few activities have been undertaken for facilitating walking in urban public spaces including pedestrianisation with the goal of developing tourism and identifiable spaces. Tehran Grand Bazaar is a historic centre in Tehran that has been inscribed on the National Heritage List in 1977. This complex has tangible and intangible values including historic structures and ornaments as well as important political and social memories of the Qajar and Pahlavi dynasties. Located at the Arg Square in Southern Tehran, it contains several corridors over 10 km in length with the main entrance in Sabze Meydan (a historic square in the site).

The site -encompasses an enormous variety of shops, mosques, banks, guesthouses, cafes and restaurants- is in the heart of the Historic Urban Spaces Improvement Project. The area has been transformed to a pedestrian-only zone in the present decade with the aim of reducing traffic, recreating the historic images of the city centre as well as improving the historic urban space-factor to provide a safe and pleasant space for social interactions, shopping, tourism, economic development and living. Since each project has its own specific impacts, studying the positive and negative impacts of pedestrianisation could be important for assessing the threats to the most historic part of the city and providing suggestions for preservation of the significant values of the site.

Considering the importance of walking movement in developing pedestrianisation projects, Franklin, a British researcher in the Living Streets program, has prepared a

10-point checklist for improving the walking condition. These factors include vision, involvement, focusing on the accessibility rather than mobility, valuing walking as a form of transportation, considering the condition of the streets, necessity of links with health, valuing small projects as well as big ones, necessity for outcomes not outputs, attention to the quality and that the local transport plans be not solely about the engineers. Based on this checklist, pedestrian zones in Tehran are quite far from the desired conditions of walkers. According to a research on 1200 citizens of Tehran, 76% of the participants thought that Tehran was not a suitable city for walking and only 11% of the interviewees mentioned the streets as a place for walking and wandering [7].

1.1. Literature review

Existing documentations are considered as a base point of this research. The idea of pedestrianisation, the process of developing the concept of the pedestrian zone and its impacts on the urban spaces are studied to have a better understanding of the project and its connection to the social and urban life. Unfortunately, there is no documentation of the case study before the implementation of the project.

A pedestrian zone is a part of the urban space which, due to some specific reasons, is dedicated to the pedestrians so that automobiles are banned completely or during some hours in a day. The process of converting a street to a pedestrian zone is called pedestrianisation. According to Chiquetto, pedestrianisation can provide better accessibility and social interaction with the urban areas for the local communities [8].

Based on research by Mumford, Leonardo Di Vinci was a person who suggested the separation of the vehicle roads from the pedestrian zones in the 15th century [9]. In Paris, Geist wrote that the covered shopping arcades were a very successful experience of pedestrianisation with the aim of business development during the early 19th century; because people could easily pass through the pedestrian areas, look at the windows and shop. (Geist, 1983) This street was considered as a new market place -passage- was one of the earliest modern examples of a pedestrian zone, the idea of which was rapidly expanded throughout Europe during the 19th Century. 'However, the first pedestrianisation project with the current definition took place in a shopping street in Essen in Germany around 1929 to make it easier for people to come to the street and do shopping'. The main reason for banning the vehicles on this street was that the street is too narrow to be used by both pedestrians and vehicles. 'After the Second World War, European cities considered the idea of pedestrianisation in the process of urban planning' [1]. During 1950s and 1960s, with the purpose of improving the business marketing, some shopping streets were converted to the pedestrian areas in the United States; however, most of them were not successful and were later on opened to the automobiles again [10]. Asija mentioned that pedestrianisation has recently turned into an issue for the sustainable development of the cities. Since walking is

considered as the best way of movement, pedestrianisation is called the base for sustainable transportation or green-transportation movements [11].

Explained the impact of pedestrianisation and 'reducing the traffic on the retailing in Germany and the UK by highlighting traffic and economic changes' in these two countries. She believed that these changes have generally had positive impacts on the economic growth of the area so that retailing and shops inside the pedestrian zones have been more successful than those outside of the zone, which in turn has caused an increase in the rent of these properties. She explained, however, there can be a reduction in the turnover during a transition period of 1-2 years, and the effects can be unfavourable for shops outside the pedestrian zone, unless the scheme is carefully designed [12].

In the National University of Singapore, examined the pedestrian streets in Singapore. They claimed that by the time of their research, other than America and Europe, only little research has been done on the Asian pedestrian streets. They mentioned that the pedestrianisation in Singapore is counted as a way for conservation of the streets and revitalization of the historic pathways such as bridges which were being used for horses before and later lost their function in vehicle era; therefore, in order to revitalize these bridges, they have been transformed to only-pedestrian streets [13].

Focusing on the human scale in designing urban areas, Jan Gehl described the main principles of livable city spaces. According to him, human scale is the most important factor in designing cities and urban spaces. He believed that many of the pedestrianisation projects in the historic city centres are only performed based on the tourism development objectives. He explained that pedestrian zones are the best spaces for communication and interaction between people, architecture and spaces. [14] He described that the best examples of human spaces can be found in the areas where the car traffic is limited [15]. In addition to the human scale, Jan Gehl introduces five main factors for livable cities including attractiveness, liveliness, safety, sustainability and health. Based on his idea, when a city approaches these criteria, it can be considered as a successful experience of creating a lively urban space. He believed that a pedestrian zone and walking can provide more options for people to interact with their environment; while, on the contrary, using vehicles makes them have less contact and communication with each other and their city [14].

Based on their study on the pedestrian streets in Auckland, New Zealand, reported that a pedestrian environment not only has positive impacts on the air quality, but also it increases the income of the merchants in these streets [16]. Also studied the economic impacts of pedestrianisation in the historic urban centre of Valdemoro –in Madrid, Spain [17]. They used a specific market study in that area through contacts with local trading associations and related people to quantify the specific impacts of pedestrianisation. Consequently, they presented a benchmarking result as a pattern for the

development program of the businesses centres in this area [17].

In a report published by the University of Northampton (2014) [18] about Abington Pedestrian Street in Northampton, advantages and disadvantages of pedestrianisation in urban areas have been explained. This report was based on three main subcategories; the impacts of pedestrianisation on trade, safety and health and the environment. However, this street is not located in a historic zone and the urban features are considered as the value of the site [18].

Explained about the environmental and social impacts of pedestrianisation in Istanbul's historic peninsula. From the social point of view, the social context, access to the pedestrianised area, structural deficiencies in the area and the satisfaction level of the citizens and tradesmen of the pedestrianisation have been used as the main criteria for evaluating this project. From the environmental point of view, factors such as air quality and the level of noise pollution and emissions which are proportional to the traffic reduction in the area have been considered [19].

In Iran, the economic aspect of pedestrian zones is always very well considered. Yet, there are some examples in which the memory of the historic urban spaces and recreating of the sense of belonging to the cities have also been taken into attention. Studied the elements of historic citadels and believed that Tehran Grand Bazaar dates back to the Safavid Era reckoned that to create sustainable cities in developing countries like Iran, pedestrianisation is a great necessity in the urban planning. She believed that instead of creating metropolis, intermediate cities which have a limited dimension and a relatively small area should be developed. By providing services and facilities for respecting pedestrians as the main users of the urban areas, a compatible, healthy, safe and attractive environment for the users can be created [20-21].

Hence believed that pedestrianisation and experiencing a city as a pedestrian is a part of sustainable urban development; but obviously, this issue, which has been only considered recently in the developing countries, still has a long way to be deemed as a sustainable urban project. In their research, they first called the attention to some of the problems of a pedestrianisation project; such as lack of 'awareness of the local authorities on the subject, poor quality of the footpaths or lack of a pedestrian Master Plan'. They then provided suggestions for overcoming these problems and reducing their impacts. Have studied the quality of implementation of the pedestrianisation projects by examining the difference between theory and practice in this process and focusing on positive results of these projects [7, 22]. They are the only team that considered the pedestrianisation project in Panzdah Khordad Street in 2012 and 2015 after implementation of the project. The evaluation system is this research are based on their research on 2015 [23].

The next section considers the evaluation factors in order to identify and assess the positive and negative impacts of pedestrianisation on the site.

1.2. Evaluation factors

In locating and analysing the pedestrian zones, several important issues should be considered. In addition to urban planners and landscape designers, sociologists, anthropologists and historians can have important roles in the pedestrianisation process.

Therefore, 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 and 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 following table shows the factors of analysing the pedestrianisation project of Tehran Grand Bazaar and the recommended tool for the evaluation of these factors Table 1.

Table 1 Criteria for analyzing the pedestrianisation project (Based on [23])

Aspect	Criteria	Factors/Components	Evaluation Tools
Sociocultural-Economical	Exhibition, Events,	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
Physical	Local Participation	Participation in decision making and implementation process	Questionnaire, Interview
	Variety of Functions and Service Units	Cafes, Restaurants, Vendors, Entertainment activities, ...	Observation
Accessibility and Traffic	Number of Visitors of the site	Density, Cleaning, Safety, ...	Interviews, Observation
	Access to the other kind of Transportations	Accessing the metro stations, bus and taxi, parking spaces	Observation
	Access to the near Pedestrian Streets	Guild 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

1.3. Methodology

In this research, Heritage Urban Landscape (HUL) methodology will be used to evaluate the physical and environmental impacts of the pedestrianisation project.

Urban areas and their complicated social, economic, cultural and physical networks provide a challenging context for the management and conservation of the cultural heritage and historic sites. Due to the constant changes of the physical resources, places, people, ideas and services, the urban environment is dynamically transforming over time. The new decisions about the

development of cities may challenge the conservation of cultural heritage because of the changes that it imposes on an urban area; for example, dislocating local communities and threatening the intangible values of a heritage site. HUL approach “has been developed as a way of rethinking the relationship between heritage and development and managing change in sustainable ways.” Recommends four tools and six steps for the implementation of a plan with the HUL approach to provide a platform for managing and conserving the urban environment from the heritage point of view [24]. These four tools are “civic engagement, knowledge and planning, regulatory systems and financial

tools". UNESCO (2011): The six steps that should be taken based on the UNESCO's guideline are mapping the city's natural, cultural and community resources, communicating with stakeholders to identify the values and attributes of the site, assessing the vulnerabilities of the identified values regarding the impacts of the socioeconomic pressures and climate change, integrating the urban heritage and their vulnerabilities in the framework of the city development, prioritizing actions and finally, establishing an appropriate management framework for each conservation and development project. UNESCO (2011): Generally, 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.

For acquiring the raw data for the implementation of the HUL approach, studying the existing documents regarding the history of the site and field investigation (observations, interviews and questionnaires) are the main tools of this research. Considering the unknown statistic society, for calculating the number of respondents, the formula of $N = \frac{z^2 \times \alpha}{d^2}$ is used. In this format, $Z_{\alpha/2} = 1.96$, $S^2 = 0.0532$ (based on the first twenty questionnaires), $d^2 = 0.05$ is replaced and the result is calculated around 82. Accordingly, hundred people are randomly selected from three groups of the site visitors, bazaarians¹ workers and 12 planners and decision makers of the project to get their ideas about the pedestrianisation project.

In addition, Jan Gehl PSPL method (Public Spaces Public Life research method) will be the basic framework for the recommendation part of the study. His approach is to invite more pedestrians to use the public spaces. The invitation is the provision of appropriate urban spaces, infrastructure and furniture that make it easy and attractive to accomplish daily needs on foot or bicycle for both citizens and visitors. This policy would enable the creation of lively, attractive, safe, healthy and sustainable cities. The PSPL surveys enable an understanding of how people are using a space and comparisons of city public spaces and levels of use (walkability) over space and time, allowing cities to monitor their changes, compare themselves to other cities and/or provide quantifiable results.

Accordingly, the research uses a mixed-method, layer montage approach, combining literature analysis, active participation, participatory observation, interviews with participants and theory development based within a practice-based interpretive research paradigm.

2. CASE STUDY

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 street in the city, Panzdah Khordad St. -a pedestrian zone- that is located in Tehran Municipal District 12 is studied as a case study Fig. 1.

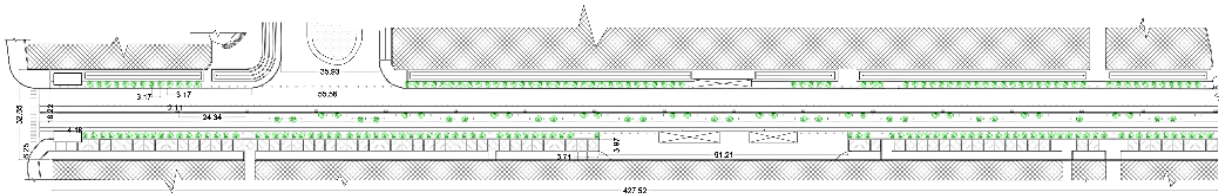


Fig. 1 Plan of the pedestrian zone of Tehran Grand Bazaar (Author, 2017)

Due to these important elements that the area encompasses, it has always been one of the main centres of political, economic and social movements not only in Tehran but also in Iran. For example, in the constitutional revolution during Qajar Dynasty or later in the Islamic Revolution during Pahlavi Dynasty, this area was the centre of social, economic and political movements. At the present time, more than one and a half million people with different desires and aims visit the site every day [25].

As mentioned, 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 was a residential space and residents liked to their living environment due to the ease of accessibility to all the fresh and cheap products in the bazaar. Thus, the

population of the site was balanced during days and nights. 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 residents who had not sold their houses and whose properties were now surrounded by storages. Furthermore, since they could not bring their private cars to the area, they too preferred to sell their buildings with a good price to bazaarians and leave the site. As a result, during the day, many people visit the site; but after the working hours, very few who are mostly workers, pass through the street for transferring the goods at nights or stay in this area to start their work early in the morning. The following table shows the changes of population during 36 years Table 2.

Table 2 Changes of population in 36 years [25]

	1980	1986	1996	2004	2016
Population	14747	8711	3958	1706	56
Number of Residential Units	1630	1183	796	679	21 (Just use as a temporary living space)

The population during days and nights are totally different. According to the author's observations, during the working time, the population of people is more in some parts which have fast foods shops and restaurants, seating benches which are in front of fast foods or banks, nuts and chocolate shops, sale offers, vendors, dollars dealers and during the praying time (except Friday) in Sabze Meydan. In this site, during weekdays, midday prayer is hold by bazaarians and people in mosques and Sabze Meydan, but on Friday, Friday Prayer is held in mosques (Imam and Arq).

Tehran historic centres are the main parts of the socio-cultural, political and economic activities of this city. Due to the importance of the site, this area is still a priority for the Tehran municipal activities. The improvement project of this site includes pedestrianisation, street lighting, expansion of the public spaces, renovation of facades, improving the flooring and pavements, expansion of the bazaar and improvement of the urban facilities. The process was started in 2002, while the pedestrianisation project of Panzdah Khordad Street was launched in 2008. Following pictures show the development of the project from 31.05.2008 to 15.09.2016 Figs. 2-3 [23].



Fig. 2 Aerial photo of the site on 31.05.2008 before pedestrianisation project (Data source: Google map)



Fig. 3 Aerial photo of the site on 15.09.2016 after completion of the pedestrianisation project in the whole area; (Data source: Google map)

2.1. Evaluation of the pedestrianisation project of panzdah khordad street based on observation

Pedestrianisation in Tehran Grand Bazaar zone was a part of the Conservation of the Historic City Centre Project. In order to evaluate this 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 following 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 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 centre of the country, Tehran Grand Bazaar, all the residential places were being sold gradually to be converted to businesses or storage [23]. 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 liveable 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 Tehran Grand Bazaar, all other places than what were mentioned have been dedicated to marketing and shopping and storage activities Table 3.

Table 3 Types of functions and their proportion in the area [25]

No.	Function Type	Number	Proportion of the function in the area (Percent)
1	Residential	0	0
2	Business	2453	95.81
3	Educational	2	0.07
4	Religious	3	0.11
5	Cultural	4	0.14
6	Gastronomy (food, drink, ...)	44	1.71
7	Medical	1	0.03
8	Entertainment	2	0.07
9	Sportive	1	0.03
10	Administrative	26	1.01
11	Green Spaces and Parks	3	0.11
12	Industrial	0	0
13	Urban Facilities	2	0.07
14	Transportation	9	0.34
15	Sanitary (Bath)	2	0.07
16	Social Services	1	0.03
17	No function	7	0.26
18	Others	4	0.14
	Sum	2560	100

With regard to the building functions in this area, the following results can be drawn:

- The business sector covers the biggest area in this site.
- Focus of administrative sector shows the importance of the site.
- Due to the history of the site, cultural and religious functions cover a large area.
- There are small areas, which are dedicated for sport and entertainment activities in the site.
- There is no vacant area that can be used for the required functions.
- There is lack of urban amenities in the site.

• **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.

- **Infrastructures**

Considering the strong economic forces in this site, all the possible spaces have been allocated to business sector for more financial benefits. For example, although Tehran Municipality tries to preserve the green spaces and develop these areas wherever it is possible, compared to the past, especially in the bazaar area, many of the green spaces have been destroyed to be replaced with shops and storages.

In the pedestrianisation project, it was planned to save all the existing trees of the site and plant more trees to help improve the air quality of this area as the most crowded site in Tehran. 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 Street 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.

Considering grey infrastructure, 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. The path of these canals has also been paved by a distinct material from the other parts of the area 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.

Regarding transportation infrastructure, as it was mentioned before; metro lines provide the access to the other part of the city. Because of the large number of visitors during the day, all parts of the underground railroad have been reinforced to secure the site against vibration, noises and probable natural hazards or man-made disasters.

- **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 which are 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 spaces are specified by different materials or patterns; 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. Water ditches and the canals are covered by waterproof metal plates and stones.

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 has 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 centre 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 Tehran Grand Bazaar, 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.

2.2. *Urban transformation on the site after the pedestrianisation project; based on the views of visitors, shopkeepers and residents*

Before analysing the results of the questionnaires and

interviews, the general social and economic characteristics of the respondents including shopkeepers and passengers will be explained.

100 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 following, all the responses of the interviewees are summarized in the following table based on the pre-defined evaluations factors Table 4.

Table 4 Summary of the respondents' ideas based on evaluation factors

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

3. IMPACT ASSESSMENT

3.1. Identifying the current and potential impacts

Based on the previous chapters, the pedestrianisation project in Tehran Grand Bazaar zone has had negative and positive impacts from different points of view. This site is considered as the main economic centre of the country and a historic space, which recalls all the social and political events since Tehran has turned into the capital of Iran. On the other side, in addition to the only world heritage site of the capital which is located in this area, Tehran Grand Bazaar is one of the famous touristic spots of the city. Therefore, in an attempt to recreate the image of the

historic city centre with the aim of preserving its values and encouraging people to spend time in the most memorable space of their city as well as improving the business sector of the site, the area was nominated for a pedestrianisation project. The decision-makers believed that the best way to interact with the environment is by walking through it.

In this chapter, the impacts of this pedestrianisation project are identified and analysed from four different aspects; general architectural principles for a pedestrian zone (based on literature reviews), physical aspect of the urban design, transportation and function. The following table illustrates the strengths and weaknesses of the pedestrianisation project of Tehran Grand Bazaar Table 5.

Table 5 Strengths and weaknesses of the pedestrianisation project

Aspect	Strengths	Weaknesses
General principles	– Increase in the number of visitors of the site	– Big gap between the number of visitors during the day and night
	– Appropriate Location	– Illegal activities after working hours
	– Creation of the spaces according to human scale	– No safety during the night
	– Historic image of the city	– Lack of 24-hour activities
	– Strengthen of the old structures	– Lack of introduction of the values of the site to the visitors and shopkeepers
	– Restoration and repairing of the bazaar structure	– Difficulties for transportation the goods
	– Integration of the site with bazaar and the Golestan palace-garden	– Lack of physical barriers to prevent the access to the site by vehicles
	– Creation of the multi-functional areas	– Difficulties for finishing the pedestrianisation project due to the high number of visitors
	– People encouragement to walk and use of the public transportation and bicycle	– No consideration of different types of users and different age groups (children, elderly, disabled people, women and men)
	– Cooperation among shopkeepers and administrative group	
Urban design	– Local participation	– Shortage of benches, trashcans and urban facilities
	– Arrangement of the cultural events regarding the history of the site	– No toilet in the site
	– Dedication of the benches and drinking fountains for visitors to pause and rest	– Lack of signs and information Centre in the site
	– Design of the wide space to shop and window shop	– Shortage of lights during the night
	– Creation of the arcade in some parts	– Implantation fruit trees in the site
	– Appropriate paving	– lack of tall evergreen trees for shading
	– Appropriate way of collecting the surface water and sewage	– lack of specific spaces for gathering in the open area
	– Appropriate utilities including electricity, gas, telephone and internet in the site	– Lack of facilities for disabled
	– Consideration of the implementation specification	– No specific area for emergency access
	– Shortage of shades and shelters for rainy and sunny days	
Transportation	– Consideration of the different transportation possibilities in the site	– No parking space nearby
	– Air pollution decreasing	– No taxi and motorcycle stations next to the site
	– Traffic in the area decreasing	– 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
		– No café in the site
Function	– Introduction of new activities to the site	– No specific area for seat inside the restaurants
	– Creation of new jobs	– No resting place for travelers from other cities to stay in the site
	– Mixture of different activities	– Lack of residential function
	– Increase of the number of urban pedestrian services like banks, restaurants, ...	– Lack of entertainments and artistic activities in the site
	– Improvement of the business in the site	– Increase of the price of the land in the area
		– Allocation of the residential buildings to the storages or private offices

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. However, there are some problems, which can threaten the site if the current condition will be not improved in the near future. These threats include an increase in the price of the products in the bazaar due to the difficulties for the transportation of goods to the site, an increase in the crime rate in the site during the night because of lack of 24-hour activities and finally a growth in the number of homeless and addicted people who are using the area for sleeping during the night.

3.2. Application of the methodology

The HUL approach defines different layers for dealing

with historic urban areas in an urban development project. According to the UNESCO's guideline, several layers should be considered while using the HUL approach. These layers include geomorphology, hydrology, built environment, infrastructure above and below the ground, open spaces and green areas, land uses, urban structure, social values, cultural practices, economic processes and all the urban features. In the presented table, only the layers that are affected by the pedestrianisation project are mentioned [24]. In this approach, the most important issue is local participation during the decision-making, implementation and monitoring phases. There are also some steps for making the application of the HUL action plan possible. The first step is to clarify all the layers of the city, then to inform the locals about the idea and ask about their suggestions and recommendations and if possible, include them in nextphases of the project. In the next step, vulnerability of the site from social, economic, cultural and natural points of view should be assessed. The

cultural heritage of the site will be used as an important factor for future development of the site. Finally, UNESCO (2011) policies and priorities in addition to a framework for the collaboration of different stakeholders in the implementation phase should be defined.

According to the HUL approach, the opinion of the local community should be also requested, considered and valued in any development project. Because they are the main users of the site, the ideas of the locals should be applied in the future plans and the development of the site. Based on the results of the field research, people would

like to enjoy more green spaces and the shades of trees, more seats in the historic area, more entertainment opportunities and space for their gathering and resting.

Any changes in the site and their potential impacts should be studied to have a clear view of the future of the area. In such a way, it is possible to find creative solutions for the problems and obstacles and apply sustainable and clever changes in the historic site.

In the following table, the impacts of the pedestrianisation project of Panzdah Khordad Street are categorized based on the layers of HUL approach Table 6.

Table 6 Impacts of pedestrianisation project in Tehran grand Bazaar zone based on the different layers of HUL approaches

HUL layer		Impacts of the urban project
Diversity and identity	+	Increased public knowledge of the history and values of the site
		Different generations of the society visit the site
		People are interested to have a picture about the historic view of their city
		Older people feel better in this environment
		Retired people use the site as a meeting point
Social values	-	Mixture of different activities in the site
		Lack of residential spaces in the area
		Losing the identity of the site during the night due to the considerable decrease of population after working hours
Social values	+	Decreasing the diversity of businesses in this area because most shopkeepers prefer to sell foods and eating stuffs due to more customers
		Different people find this opportunity to meet other people in this site
		The site is suitable for group visiting
Utilities (Gray infrastructure)	+	People are encouraged to have their social meeting in the site
		Increasing the number of visitors causes more social challenges comparing to the past
		All the underground infrastructures were organized by implementation plan
		The whole area is covered by internet, telephone and gas network
Transportation	-	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
		Installing several firefighting pumps in the site
		Insulation of the ground against precipitation and creating canals for collecting underground water
		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
Economic processes	+	Increased use of the public transportation to access the area
		Encouragement of people to use sustainable means of transportation
		Reduction of the motorized traffic in the area
Economic processes	-	Difficult Access during the emergency time due to high population and lack of specific space for emergency access
		Unsafe site for walking due to mixture of handcarts way and pedestrian area
		Increased number of customers
Environment	+	Development of the business in the bazaar
		Changed unsuccessful business to the restaurants
		Creation of temporary jobs for vendors
Open spaces	-	Difficult transportation of the goods for shopkeepers
		Increased price of the goods in the area
		Increased price of the field in the site
Open spaces	+	Decreased air pollution
		Decreased noises
Open spaces	-	Increased trashes and dirt in the site
		Increased green areas compare to the past
Cultural practices	+	Usage of the open spaces as the parking place by local people and taxi drivers
		Implantation of fruit trees in the site and consequently, more dirt and less shadows
Cultural practices	+	Help up the temporary events regarding the values of the site
		Recreation of the historic image of the area by building new facades

	☐	Increased homeless people in the site after the working hours
Built environment		Repair and restoration of the structures in the bazaar
		Opened new entrances to the bazaar
	+	Constructed a second facade
		Improvement of the pavement
		Usage of the materials which are in harmony with the historic buildings in the site
Urban structure	☐	Decreased temporary spaces for resting during the night in the site due to the economic value of the area
	+	Integration of the historic sites and the bazaar zone
		Preservation of the sky-line and human scale in development project of the site
	☐	Decreased population in the site during the night

In the next chapter, based on previous pedestrianisation experiences, field observation and the results of the interviews, some suggestions regarding the adverse and positive impacts of the project are presented. The aim is to improve the condition of the site by respecting its values, maintaining the positive impacts of the project, mitigating its adverse impacts and preventing future risks in the site.

4. CONCLUSION

According to the development principles by MVRDV architects, there are eight factors, which are considered in urban development project with the aim of creating lively and attractive urban area. These elements are sensitivity, diversity, connectivity, green quality, community, sustainability, flexibility and efficiency.

This group introduces some features, which can be considered in each category. This diagram also provides a guideline for the future development in historic urban landscape. Based on these factors, less interfere in the site, using renewable energy, revitalizing the neighbourhoods, building community spaces and more greenery in the site create the lively, safe and dynamic area which attracts people to live in the site and build their own communities and memories and deal with urban life challenges like traffic and noises.

Considering Jan Gehl approach, the ground floor is an important elements for “the attractiveness and functionality” of the city. In the other word, the ground floor is like a window between the inside and outside of the building, which should provide a comprehensive interaction among people, building and life in an urban area [14]. Tehran Grand Bazaar site includes several small and large shops, which are located next to each other and made a lively and vibrant area. In the south part, the shops mostly have big windows and glassy facades, which make easy interaction between pedestrians and buildings. 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.

Based on the field observation and questionnaires, the pedestrianisation of Panzadah Khordad Street has increased the harmony of buildings with the 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 so as 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.

Based on the four predefined evaluation factors of the project, some suggestions for the improvement of the pedestrianisation project of Panzadah Khordad Street are presented in the following.

- **Social-economic aspect**

- Holding cultural, social and entertainment events such as religious and national celebration, street theatre, music performances and painting in the open spaces.
- Introducing the values of the site and touristic spots to the visitors with the use of information signs.
- Conducting further cultural and social studies to clarify the challenges and difficulties for hesitancy in the site and the possible ways for encouraging people to live in the area.
- Transferring the addicts and homeless people to the related social rehabilitation centres.
- Organizing the vendors and dedicating an open space for them to sell their products without interfering with the other activities that are taking place in the bazaar.
- Increasing local participation in maintenance of the buildings and monitoring the activities in order to prevent vandalism.
- Presenting the future development plans in a public presentation to inform all the users about the decisions taken by authorities and giving them this opportunity to express their ideas and suggestions about the decisions.

- **Physical aspect**

- According to the results of the questionnaires, the main goal of pedestrians for visiting the site is shopping. Despite different arrangements and provisions for including diverse functions in the site; lack of residential spaces and entertainment centres has converted the site to a big business area. Moreover, this problem has also affected 24-hour activities of the site, which has caused huge difference between day and night situations. Allocating some temporary spaces for sleeping during the nights, especially for visitors who

come from other cities, can be a vital step for introducing residential function to the site in the future.

- Preventing new constructions in the site and giving financial supports to the owners for renovation and reinforcement of their buildings.
- Using historic architectural patterns and harmonic materials for new constructions and renovation of the existing building.
- Installing video cameras along the path to increase control in the site with the aim of providing more security and decreasing the crime.
- **Traffic and accessibility**
- Due to the several ongoing construction projects in the site, there are many barriers for people to walk through the street. These barriers should be removed to make more space for pedestrians.
- Creating taxi stations in the vicinity of the site to prevent them from entering the pedestrian zone and installing appropriate guiding signs for leading the pedestrians to these stations.
- Building the parking spaces for vehicles and motorcycles.
- Providing bicycle rentals for interested users.
- Considering the difficulty of transporting goods to the site by shopkeepers, it is suggested to create a specific path for the vehicle movement at specific times of the day with limited speed.
- The results of the interviews show that the pedestrians prefer a design in which the path is divided into separate lanes for bikes, handcarts, emergency vehicles, transportation and pedestrians.
- **Urban design**
- Considering the paving and locating the utilities, an appropriate path should be designed for children, disabled and elderly to freely walk in the site.
- Creating information centres, providing banners, brochures and information signs about the historic building. New methods can also be used for informing the passengers about the historic image of the site such as visual projection to display a model of the historic buildings on the facades. This approach encourages people to discover the area and learn more about the values of their city.
- Providing adequate toilet facilities and drinking fountains the site.
- Dedicating a specific area for children to play and stay during the time that their parents do shopping or walking.
- Increasing the number of seats and trashcans and organizing an orderly garbage collecting system in the site and installing banners to educate people.
- Planting tall evergreen trees instead of fruit trees in order to create a pleasant green covered path.
- Dedicating an open space for people gatherings to develop a pause point along the path.

Overall, it can be said that Tehran as a metropolis needs more pedestrianisation projects to deal with its air pollution and traffic problems. In addition, pedestrianisation is a way to develop pedestrian culture and encourage people to walk while it helps improve the

local business. The pedestrianisation project of Tehran Grand Bazaar is considered as one of the best pedestrianisation experiences in Iran. Based on the comments of the visitors and shopkeepers, most of the problems in the site are related to the lack of resources, inappropriate urban management and lack of pedestrian culture, which in fact have not been caused by the pedestrianisation project [23]. Considering the large number of people who are visiting the site every day and the strategic location of the project, design and implementation of this project was well planned so that it would not disturb the everyday activities of the visitors and shopkeepers. Regarding the planning and implementation timetable and the balance between costs and resources, this project can be evaluated as a successful experience in the development of historic urban areas of Tehran, however there is this possibility to make it better in the future phases.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

NOTE

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

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