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Original Research Article

Resilience the values of Historical Streets in Order to Protect them (Case Study: Chaharbagh Street, Isfahan)

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Abstract

Problem statement: Chaharbagh Street, despite its physical and land use changes throughout history, is still considered as one of the main commercial and recreational streets of Isfahan city. Reviewing the history and evolution of historical sites' architecture can provide opportunities for next refurbishment steps and finding resilience factors can be effective in planning for the design of new spaces. Resilience is a way to strengthen communities and cities by using their capacities, and one of the most important factors of resilience is the space which continues to preserve the identity of urban spaces during changes.

Research objective: This research seeks to answer the main question of what factors have led to the resilience of Chaharbagh Street throughout the history relying on the hypothesis that planning is effective in reconstruction of historical streets according to users' demand and the historical factors in resilience.

Research method: The research method in this paper is a descriptive-analytic method and to achieve this goal, first by referring to reliable sources four factors including physical, social, economic, and environmental factors are presented in resilience' conceptual model. By field study and asking the people in this street, a closer look has been achieved and sub- factors for each of the factors have been addressed.

Conclusion: According to the results, the reasons for choosing this historical street and its users' expectation of protective measures are in line with the historical features of the 17th and 19th centuries. The importance of different resilience factors differs from users' point of view and the social and environmental factors are in a more favorable position than other factors .

Keywords: *Resilience, Chaharbagh Street, Physical factor, Social factor, Economic factor, Environmental factor.*

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Introduction

Resilience has many factors including physical, social, economic, institutional, livelihood, spatial and etc. (Lu & Stead, 2013, 201). In the historical study of urban spaces, their resilience is considered during different periods. By identifying the various components of the historical streets throughout the history with numerous functions, concepts and meanings and by carefully considering the issue of restoration and reconstruction can help us to preserve these valuable works throughout history.

Chaharbagh Street is one of the main and historical streets of Isfahan city which has not lost its appeal to people using this street over time. The theory presented in this study is the expression of the resilience of Chaharbagh Abbasi Street as a historic urban space from the perspective of Isfahan's visitors and the local community. and introduce effective measures to make this street resilient.

This study seeks to answer this key question of what factors made Chaharbagh Street resilient throughout history and to what extent the reasons for choosing this street and its users' expectations of protective measures are consistent with its historic features and users are demanding action on which factor of resilience and which ones are more favorable to them. The results of this study show that planning for reconstruction of historic streets with regard to their historical features can be effective in the resilience and decisions that are made to preserve historic streets.

Theoretical framework

In this section, the concept of resilience and preservation are discussed. Resilience is defined in many ways. Resilience is the degree whereby the system is able to tolerate changes and re-organize itself (Alberti & Marzluff, 2004, 241). The term resilience was first introduced in 1973 by Holling (Ecologist) in an article entitled "Resilience and Stability of Ecological Systems" from an environmental perspective. He described resilience as a descriptive and qualitative concept that provides insight into the dynamic properties of a system (Gross, 2008, 3) and the

ability of the eco-system to preserve basic functional characteristics facing damage (Meerow & Newell, 2016, 311). Focusing on the identity and structure of systems (in a single equilibrium approach), critics of this approach have argued that eco-system resilience is more related to the functionality of whole system than the stability of components' deficiencies of selected population or even the ability to maintain (restore) a constant and continuous ecological situation (Tavalaei; Zanganeh, Parizadi, & Shakibae, 2019, 35).

Nowadays resilience is considered as a way to strengthen societies with regard to their capacities (Kärholm; Nylund & del la Fuente, 2014, 121). Resilience in urbanization appeared in the 1990s, about two decades after -it was raised (Lu & Stead, 2013, 201). The discussion of resilience in urban and regional studies seeks to reduce urban damages (Thilo, 2010, 19) and to preserve functions which provide welfare for citizens (Da Silva, Kernaghan & Luque, 2012, 1) and preserve quick return to optimal performance facing disorder or adapting to a change (Meerow & Newell 2016, 7) or reorganize (Folke, Carpenter, Walker, Scheffer, Chapin, & Rockstrom, 2010, 3). Early detection of changes and their impacts on the city, and planning as well as designing based on this recognition can greatly enhance the city's resilience to changes. (DE Souza & Flanery, 2013, 93-94). Kazemian et al. (2014), in a paper entitled "Studying the support level of urban resilience concept in Iranian urban law" concluded that the crisis management approach in Iranian urban law is physical and only the retrofitting of buildings is considered and other aspects of resilience (economic and social) are getting less attention.

In fact, the questions arise for resilience include resilience for whom, what, when, where and why (Meerow et al., 2016, 316). In the resilience study to respond the question what to what? It should be noticed that the answer of the first what is the type of system that should be resilient and the second what refers to the type of crisis that the system must be resilient against (Shirani, Partovi & Behzadfar, 2017, 50). In this research, the resilience of Chaharbagh Street is studied from the users' perspective.

Resilience can be studied in a variety of ways, and in each study according to the approach associated, definitions of resilience have been presented. The approaches concerning the concept of resilience can be divided into three main categories.

Resilience as sustainability: in this approach, resilience is defined as the amount of disturbance that a system can tolerate or absorb before it is transferred to another state (Tavalaei et al., 2019, 37 cited by Beatley & Newman, 2013, 45). Resilience as recovery: the recovery approach of resilience is about the ability of a society to “return to the past from change or pressure factor and push back to its original state.” Resilience is here a measure of how much time a community takes to recover from change (ibid, 38 cited by McEntire, 2014, 5).

Resilience as transformation: this approach relates more to social resilience and to the capacity of a society to respond to change in an adaptive way, rather than simply returning to the previous state, which could mean shifting to a new state that is more sustainable in the current environment (ibid, 38 cited by Matyas & pelling, 2015, 8).

“In Gothenburg conference held in Sweden in 2005, four general concepts were considered for resilience: social, economic, physical and environmental dimensions.” (Resilience & Alliance, 2007, 17) Discussed dimensions in this study are also taken from the presented dimensions in this conference. This research is also based on the Folk’s perspective which expresses that resilience is not only a system that back to its past or balance, but also gives the likelihood of adaptation and transformation in the present state, as well as the probability of survival and changes in the future (Folk, et al., 2010, 2). Since many studies of resilience have focused on providing security without regard to the human emotional connection with place, the crisis experiences occurred in recent decades have clearly emphasized the role of man in resilience (Partovi, Behzadfar & Shirani, 2016, 100).

Different aspects of protection have also been addressed in different periods. Conservation is an inevitable measure to preserve historical sites; therefore, to achieve

its goals it has come into close contact with various professions and specialties, including the history of architecture (Abouee & Nikzad, 2017, 170). This term, which initially emphasized the mere maintenance and upgrading of historical structures, has been used in recent decades with the concept of managing change in historical sites (Drury & McPherson, 2008). The 1970s appears to have been crucial in protecting cities (Jokilehto, 2007, 17).

Published documents on heritage and conservation typically emphasize both the physical and the contextual-semantic aspects, and conservation and recreation of heritage has been introduced as a comprehensive and integrated activity (Hanachi & Fadaeenajad, 2011, 16). In 1975, at the European Congress on Conservation of Architecture, a social approach to the issue of architectural heritage protection was introduced, and was emphasized on the need to strengthen the resilience of cultural, social and physical values in conservation processes. One of the clauses of the resolution also mentioned the importance of the people’s contribution to the conservation of architecture and their participation in the restoration of cities and states that this heritage belongs to everyone and that people should be properly informed because citizens can participate in decisions about their environment. They are also responsible for transmitting this legacy to future generations (Congress on the European Architectural Heritage, 1975). Therefore, in addition to studying historical sources, the views and opinions of users in contemporary times have also been questioned.

Literature review

Several studies have been conducted in the field of urban resilience and have addressed the subject from their point of view. In Iran, researches have been conducted to measure resilience capacities in the cities of Qazvin, north and northeast of Tehran, Tabriz, and so on. Research in foreign articles have also been done on this issue; one research has been measured urban resilience in 50 Spanish Cities and these results showed that resilience can be achieved through measures such as reducing resource consumption, promoting local

commerce, creating a citizen-friendly environment and diversifying the local economy (Suarez, Baggethun, Benayas, & Tilbury, 2016). There have also been studies into the resilience of traditional spaces. In this regard, in the paper of spatial resilience of Isfahan Qeisariye Bazaar, it was concluded that the flexible and robust market construction along with its constant protection and restoration, diverse uses, unique identity of space, environmental comfort and beauty in the space, accessibility to the various spaces and uses of this space, and sense of belonging to the place has led to the spatial resilience of this historical urban space (Shirani et al., 2017, 49). In the "Evaluation of traders' attitude toward the durability of historical and cultural values in the conservation of bazaar", the most significant causes of the current deficiency physical and functional resilience of Tehran's historic bazaar have been outlined (Razeghi & Derakhshani, 2015, 91). Also in Jolfa neighborhood in Isfahan city factors related to urban design with emphasis on social resilience to six components has been categorized including environmental quality improvement, identity, flexibility, inclusiveness, teaching spaces and social interactions (Partovi et al., 2016, 99). Some studies have also been conducted on evaluating different sidewalks. For example, a case study on Tarbiat sidewalk in Tabriz showed that organization of this axis in the central urban texture has been adapted to the policies of the pedestrianization and promising a clear prospect for the development of commercial and recreational spaces (Ghorbani & Jamekasra, 2010, 55). Also in recent years, the construction of pavements in Tehran has got serious attention from urban management and for example we can mention to make sidewalks such as 17 Shahrivar (Shohada), 15 Khordad, Sepahsalar, Soresrafil, Bob Homayoun, Naserkhosrow, Marawi, Sabounian, Ehsani, Shah Abdul Azim and Baradaran Mozaffar that in a research an evaluation has been done on the results of their construction and identities of their strengths and weaknesses and their comparative study. Also apart from Sepahsalar sidewalk that is managed public

involvement, the construction of the other pedestrian routes was without public involvement and consent (Fallah Manshadi, Rouhi & Khodaverdi, 2013, 7).

Research method

The research method is descriptive-analytical and information has been collected by searching information in databases, field observations and questions from street passers. In the first step, four factors including physical, social, economic and environmental are presented as factors of resilience's conceptual model and with the content analysis technique, the underlying sub-factors of each of these factors have been obtained from respondents with higher frequency (Fig. 1). In the second step, the characteristics of Chaharbagh Street in the Safavid and Qajar eras are discussed regarding these factors.

• Analysis of opinions of respondents and evaluation of resilience dimensions

Pedestrians in Chaharbagh Abbasi Street were questioned in December 2017 along with the ongoing renovations. The respondents were asked to make three major reasons to choose the street. The results of the responses are presented with greater frequency in Table 1. Respondents were also asked to propose three effective measures to promote this historic street, the results with greater frequency are showed in Table 2 and the studies carried out by Isfahan Municipality Planning and Research Department are presented in Table 3.

Chaharbagh Abbasi Street

A Street is a space or place used for public access and transportation (Marshall, 2004, 293). The background of the street, meaning the wide and long road with water stream and trees, goes back to at least the second Hijri century in the Iranian urbanization (Ahari, 2006, 49); but in none of the samples before the formation of Chaharbagh Street, which can be considered as urban space, there was not a designed place for gathering and stopping (ibid, 51). In the structure of this street, both material

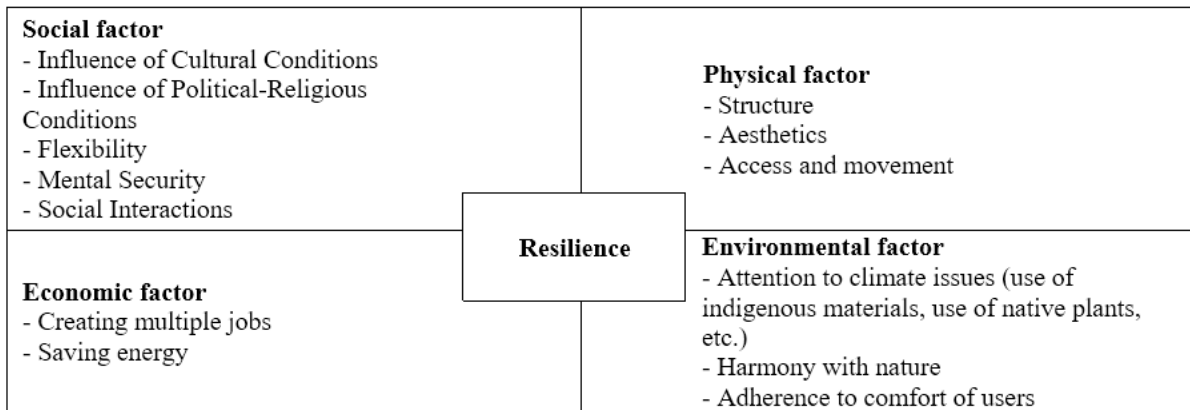


Fig. 1. Sub- factors extracted from users’ perspective. Source: authors.

Table 1. The main reasons for choosing Chaharbagh Abbasi Street from users’ perspective. Source: authors.

Resilience	The main reasons for choosing
Physical resilience	Going to work (Access and movement) Readability of the street due to direct geometry structure (Access and movement) The greenery of the street because of the tall trees
Social resilience	The variety of uses on this street provides right to choose for users*. (Flexibility) Walking in this street gives a different feeling. (Sense of belonging) The presence of people at different times of the day gives me a sense of security. (Mental security) Chaharbagh means my childhood memories, I used to walk around this beautiful street every day to get to school. (Memorability) Traditional mood dominating on part of street’s look (Impact of cultural-identity conditions) This street provides me the opportunity to pause*, stop, and connect with other people. (Social interactions)
Economic resilience	The variety of uses on this street provides right to choose for users.* (Multiple uses) Proximity to the place of residence (Energy saving)
Environmental resilience	Existence of pause spaces* (Enjoying comfort) Shading of trees on the streets (Enjoying comfort and attention to climate) Boulevard and middle sidewalks (enjoying comfort) Increased interest in the street when the car was not allowed to enter the street to run a subway and I felt more at ease. (Enjoying comfort) Increased interest in the street on Tuesdays (car-free Tuesdays) and no car-related noise pollution (Enjoying comfort) Walking down through middle of the street gives me a sense of being in nature. (Harmonization with nature and environment)

* Comments are placed on more than one factor

(survival needs) and spiritual human’s needs are considered to fulfill their desires.

The year 1006 Hijri was the year when Shah Abbas decreed to build this street (Chesney, 2006, 68). Today, Chaharbagh Abbasi is one of the main historical streets of Isfahan, which is located between the upper and lower Chaharbagh. This study investigates the characteristics of Chaharbagh Street from the mentioned four factors of resilience (physical, social, economic and environmental) during the Safavid and Qajar era and the sub-factors of each of these factors are derived from the analysis of the respondents’ point of view. In the end, solutions are represented for achieving and strengthening each of these factors .

Physical dimensions

• Physical structure

The physical structure of the street in the 17th and 19th centuries can be discussed in two parts of

artificial and natural elements. Chaharbagh Street is a broad and geometrically straight avenue. All passages in the urban space before the existence of Chaharbagh, basically have not body designed or have not mentioned them. But in Isfahan’s Chaharbagh all components of the urban space are designed and this design is not only the architectural design, but also a part of the urban body one. Chaharbagh’s mansions were designed as two-floor buildings with a three-part and symmetric structure on either side of the street, and on the ground floor, a path was opened through the mansion into the garden, and the second floor has porches facing the street (Ahari, 2006, 52). Another distinguishing point of physical design of the Chaharbagh was its bodies designed specifically for use in street-related functionality, not for private functions of the garden’s dwellers behind the mansion’s entrance. Artifacts of this street include trees, green spaces, ponds and madis, and remained buildings and gardens in the street are the courtyard of the Kheymehgah Garden, the Chaharbagh

Table 2. Effective proposed measures to improve Chaharbagh Abbasi Street from users’ viewpoint. Source: authors.

Resilience	Effective proposed measures
Physical resilience	Street protection and restoration Consolidation of abandoned monuments Water flowing into the street
Social resilience	Use of abandoned buildings Identifying and performing ceremonies on historical and religious occasions
Economic resilience	Bike transportation to reduce energy consumption Livening up and energizing the streets throughout the day
Environmental resilience	Promoting clean transportation (bicycles, horse and gharry, etc.) Pedestrianizing the street to create a comfortable environment for users

Table 3. Users’ demands from Chaharbagh Street based on studies conducted by Isfahan Municipality Planning and Research Deputy. Source: Mehr News Agency, November 11, 2016.

User	Percent	Desires of users
Tourists	70	This street should be dedicated to the cultural and artistic uses such as cinema, theater, music and concert venues, handicraft shops, galleries and bookstores.
Tourists	71	Chaharbagh should be a symbol of Iranian identity and culture.
Citizens	78	This street can be a hub for handicraft.
Citizens	65	Interested in watching street theater, street music, Ta’zieh, Pardekhani and similar activities in Chaharbagh
Citizens	70	Welcomeing pedestrianization of Chaharbagh Abbasi
Business people	63	The Chaharbagh Abbasi can be turned into a street that is dynamic for 24 hours a day

School of Isfahan and the Hasht Behesht. Today, the remaining parts of the Kheymehgah garden's courtyard in the corner of the Kheymehgah that are attached to the Bolbol Garden called "Shahid Rajaii Park," have been abandoned and are being demolished (Gholipour, Aminpour & Bahramian, 2012). Isfahan's Chaharbagh School is also located at the east of Chaharbagh Street. Boland Bazaar is located at the north, and the Madarshah Caravansary at the east of the street.

The remains of the Hasht Behesht garden and its remains of pavilion were officially handed over to the Ministry of Culture and Art on September 6, 1964, its major repairs were initiated by the Archaeological Department and since then these repairs still continue (Honarfar, 1972, 14).

• Aesthetic factors

From an aesthetic point of view, increasing the quality of mental image and creating health values are two important factors. The existence of trees and water ponds in this street has met the aesthetic need of individuals.

One of the elements of survival in the city is Madis. The three branches of Madis on the street entered in gardens and streamed into a water stream (Fig 2). Also, the existence of ponds in the palace of Hasht Behesht and Bolbol garden confirms this. Historical sources also refer to the ponds on this street. The number of these ponds in the Chardin itinerary is seven, four of which are large (Chardin, 1996, 120) and in the Jemli Careri itinerary is four (Careri, 1968, 67) and probably he considered large ponds on this street (Gholipour, 2013, 39).

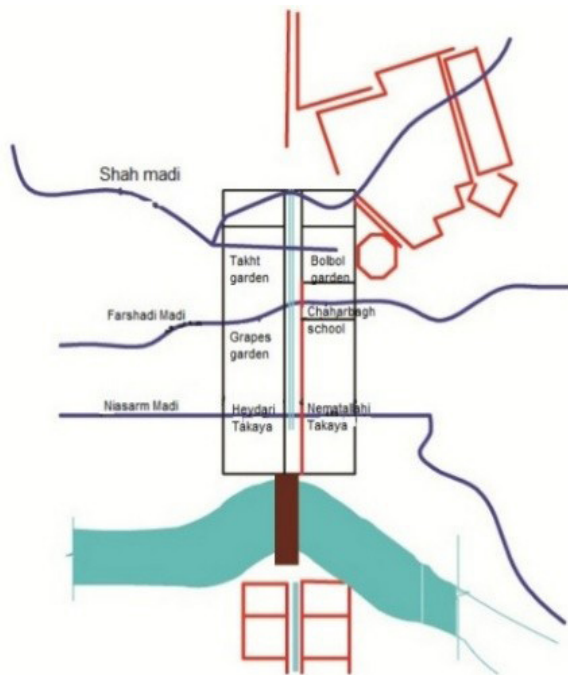
Tourists who visited Isfahan during Safavid era expressed that they saw two rows of sycamore trees in Chaharbagh Street (Kaempfer, 1984, 196; Careri, 1968, 67). Four rows of sycamore trees was a common fact between most of tourists that have visited Isfahan in Qajar era (Dieulafoy, 1999, 499; Norden, 1977, 117; Holtzer, 1976, 78). However, Norden has also pointed to the presence of poplar trees. In the "history of the Abbasid world" it is mentioned to cedar, sycamore, pine and juniper trees (Turkaman, 1971, 545), and in Rozat Al-Safavieh to poplar, sycamore and Toaba

trees (Jonabadi, 1999, 761). Also Figuera, one of the first tourists who visited Isfahan during the Safavid era, referred to other trees (Figueroa, 1990, 221). Using these information from historical resources and itinerary it can be inferred that there were other trees besides the sycamore during construction and after while replace by sycamore or the number of other trees are so small that it does not attract attention and after a certain period of time in the Qajar era no trace of other trees has been seen (Gholipour & Heydar Nattaj, 2015, 13). Fig. 3 shows a view of Chaharbagh Street in the Qajar period.

The main demolitions of this street and the overall structural change of this street occurred during Shahandeh, the mayor of Isfahan during Shah Pahlavi (Haghighatbin, Ansari, & Pourjafar, 2007, 26). Currently this street has four rows of trees and there is a wide paved sidewalk in the middle of the street with two lanes for bicycles and pedestrian paths on both sides of the street. There are no traces of street ponds (Fig. 4). In the ongoing renovations, the middle plan of the Chaharbagh Abbasi sidewalk was also developed according to the country's heritage standards. It consists of six ponds and a waterway related to the Safavid era (Young Journalists Club, April, 2019). No cars and motorcycles allowance down the street is another measure in recent renovations (Fig. 5).

• Access and movement and organization of neighborhoods

The design of a new and extensive urban street (Chaharbagh), which has not been existed in urban planning and urban development until then, makes the concept of zoning for the first time used in the organization of the Iranian city (Habibi, 1996, 9). In addition, Zayandeh-Rud river and Chaharbagh Street have drawn social boundaries and real demographics among the city. Thus, the Chaharbagh pattern represents the social system and the relation between power and society (Walcher, 2008, 685). Chaharbagh Street was used as a highway in its time and in terms of performance, it connected the southern part of the Dolat-khane Safavid to the upper part of the city that was the Hezar Jarib Garden. Currently, this street



1. Madi Niasarm (mehmankhaneh darvishan Nematollahi - mehmankhaneh darvishan Heydari)
2. Joeye Shah (entered the pond in front of the Bolbol garden)
3. Madi Farshadi (Chaharbagh school- Takht garden)

Fig. 2. The Madis that pass through the Chaharbagh Avenue and its gardens. Source: authors.



Fig 3. Chaharbagh Street, Qajar era, Source: Holtzer, 1976.

connects from the north to the lower Chaharbagh Avenue, from the south to the Zayandeh-Rud river and from the east and west to multiple streets.

Social factor

Changes essential to create a sustainable future are always the boundary of the social culture of any society

and it requires change and revision of disparate social patterns. Also it needs values, as well as the restoration of beliefs, traditions and patterns that grow in the historical culture of a society and are consistent with sustainable thinking. The first step in this process is a definite guarantee of meeting the basic needs of society (Sahraei, 2016 cited by Elkington, 1997). Attention to social aspects in resilience are as equally important as physical infrastructure in crisis management (Lucini, 2013, 255). Since social activities occur in the place, therefore the relationship between location and physical



1. 5 m wide sidewalk
2. Garden including row of trees with 2.5 m wide
3. 8 m wide road
4. Garden including row of trees with 3.5 m wide
5. 2 m wide bike lane
6. 6 m wide walking path (48 m street width)

Fig. 4. Uses around Chaharbagh Street. Source: Archive of Urban Development Deputy, 2012.



Fig. 5. View from the river to Chaharbagh Abbasi Street. Photo: Soudabeh Gholipour, 2019.

characteristics with social resilience is undeniable. In fact, revitalizing a place does not necessarily mean its physical revitalizing; but reviving the prevalent activities and human relationships in the past can precede reviving the meanings attributed to it and thus the sense of that place (Haghighi, Yazdanfar & Behzadfar, 2015, 33).

• **Impact of Cultural Conditions**

The culture and traditions of each community influence its type of architecture. Attention to urban identities and memories also inspires a sense of belonging to citizens. One of the Iranian's beliefs is placing value on their personal life and their dignity as well as the self-esteem and these beliefs have made Iran's architecture to be an introverted architecture. "Architects even have honored introversion in extroverted buildings such as pavilions in gardens" (Pirmia, 2003, 36). Another belief of people was paradise and they have tried to create a small paradise on the earth. The gardens and urban green spaces in this street have achieved the concept of an ideal - Islamic city which is as an allegory of eternal paradise to achieve a new and identifiable urban landscape (Ansari & Haghghatbin, 2008, 81). The Qur'an also mentions the vastness of Paradise as well as its walls and doors, and enclosure and the presence of walls and doors is one of the characteristics of the Chaharbagh's margins, which is also mentioned in tourists' descriptions. One way to achieve a sense of belonging to environment is pedestrianization of the streets. "Walking spaces are essential in terms of perception of spatial identity, sense of belonging and perception of beauty; and by attracting a wide range of social groups reinforce the sense of integration, the direct interaction of citizens with different insights, feelings, desires, and tendencies" (Ghorbani & Jamkasra, 2010, 60-62) which pedestrianization is being done in this street.

• **Impact of political-religious condition**

Chaharbagh had played a structural and principal role in representing the characteristics of the Safavid government as the first independent national government and the Shi'a-Iranian government (Ahari, 2006, 55). Chaharbagh Street, with a well-thought

and suitable physical design, is quite successful in displaying the achievements of the city and creating an environment for public rituals; a feature that according to Kostov is a feature of public space (Ahari, 2011, 9). The long, straight path of the street made it possible to perform parades and rituals (Ahari, 2006, 54). Creating a space to demonstrate the national co-ordination and the religion of the Shi'a-Iranian government shows a new concept of urban space. The performances performed on Chaharbagh Street, besides filling people's leisure time, provided the sense of unity and integrity under the support of the first independent national government in Iran (ibid, 56). Also in celebrations and ceremonies that can shape event life, important parts of collective memories are made (Ahari, 2011, 7).

• **Flexibility and different functional features**

Multifunctional urban spaces enhance the diversity feature which is necessary to absorb disturbance and recovery time (Sharifi & Yamagata, 2016). Various activities have been taken place on this street, and the function of the street as a place for leisure and spending leisure time has prevailed over other functions. It is a functional characteristic that distinguishes Chaharbagh Street from previous examples, and makes it not only the recreational space of the Safavid dynasty, but also poses as a place of recreation and leisure for various urban social classes (Ahari, 2006, 53). Flower celebration, Eid Ghorban (Dellavaleh, 1969, 521-522), Abpashan ceremony (Alami, 2008, 61), Women's Day on Wednesdays (Dellavaleh, 1969, 903), preparation of taverns and coffee shops for poor drinker and addicted gathering (Jonabadi, 1999, 761), educational and religious function in two Tekyeh Daravish Heidari and Nematollahi Gardens near Sioseh -Pol Bridge (Tavernier, 1984, 394) and so on are some of activities which had been done on this street. However, the incongruity of some activities together created an unpleasant scene for this street. For example Dr. Wales, who traveled to Iran during the rule of Nasser al-Din Shah Qajar, mentioned that the presence of fruit and hookah stands around and

beside the school gate on the street diminished the effect of the school (Eshraghi, 1999, 279). Other functional features of this street have included the connection between the neighboring elements, especially the royal gardens. In present, there are a variety of commercial, cultural, religious, governmental and green spaces on the street.

• Mental security

The sign of a successful urban area is that everyone can feel secure in the streets filled with strangers (Behzadfar & Ghorbanian, 2008, 19; cited by Jacobs, 2007). A sidewalk must be alive day and night. 24-hour streets are not only more fun and entertaining, but also safer because of the benefits of citizens surveillance on street (Kashanijo, 2014, 77). Nowadays, widespread presence of people on the street creates mental security, as in the past. Outdoor small shops and cafes on the street are among the activities that have been expanded in recent renovations (Fig. 6) and streets filled with outdoor cafes provide greater security. As a result, they are used by people of all ages, genders, and social classes (Montgomery, 1997, 100). Providing such a level of psychological security also seems to facilitate the presence of women on the street (Wekerele, 1980, 208).

• Social interactions

The importance of social communication in the city is such that even in a society with high vulnerability and strong social communication, back from disaster situation occurs sooner, so in this case in spite of high vulnerability, resilience is high (Shaw et al., 2014, 194). In the city of Isfahan during the Safavid era, social relationships, solidarity and the bonding of citizens in every neighborhood or street - including Chaharbagh Street - were largely shaped by neighborhood factors and people gathering. These relationships reinforce their social interactions through the daily and constant contact and interaction of citizens in shaping their shared destiny (Kajbaf, 2003, 440). In fact, the design of open spaces in the architecture of our cities in the past has been aimed at reviving the concept of life

and social interactions and responding to the needs of the people of that time. Currently, pausing spaces on this street provide opportunities for social interaction.

Economic factor

Sustainability in the economy can be defined as creating fair and balanced development of human society and guaranteeing the benefit of all human beings over time without damaging biological, natural and cultural resources. Architects have also paid attention to the economy as a means to achieve a higher goal in the past. Economically, maintenance costs are lower due to the compatibility of plants with the climate and fruit trees are also a factor in profitability; and today increasing profits can also occur through attracting visitors.

• Energy saving

One way to promote the economic factor is preventing the energy waste, energy renewal, and using green planetary in spaces. Also, the use of climate-friendly materials and technologies has played an important role in saving energy, which is in common with the environmental factor. In the gardens' walls of this street, the use of clay and mud as major materials which are commensurate with the climate, confirms this street's attention to the problem of energy in past architecture.

• Creating multiple jobs

Chaharbagh Street was one of the main centers of Isfahan in addition to amusement, and numerous



Fig. 6. Outdoor Cafes on Chaharbagh Abbasi Street. Photo: Soudabeh Gholipour, 2019.

commercial activities were carried out on this street. Siveri in his book entitled *Iran in Safavid-era*, states: “Chaharbagh like Naghsh-e-Jahan square was a meeting place and a center for commercial and social activities” (Ansari, 2003, 40). In fact, one of the features of this street is the attention to humans and economic benefits to them. For example, it can be pointed out to a location known as Asiab near Zayandeh-Rud river as seen on the map of Seyed Rezakhan and this is another advantage of the Madis which has created a water-dependent occupation. The presence of handicraft stands on the street is also one of the measures in recent renovations that have been demanded by street users (Fig. 7).

Environmental factor

From the environmental point of view, reducing pollution and increasing the air quality of the city by creating green spaces is a factor for environmental protection. “Patterns of development should be pursued that are less damaging to the environment and have the potential for continuity. Therefore, it should be sought to create conditions that are coordinate with the environment and create sustainable environment” (Etemadi, 2006, 48). Making a balance between development and environment in developing safe and livable places is one of the key ways to foster and extend resilience (Fema, 2000).

• Attention to climatic issues

The traditional architects paid attention to climatic condition of region and chose the direction of the building, used materials and so on according to each region.

• Use of native materials in architecture

The floor of this street has been paved; and rubbles in Zayandeh-Rud river have been used in two medium and relatively large sizes for carpeting of lime floor that have been palced in limestone surfaces with special skills (Khalili, 2003). Most visitors have also referred to grid, clay and mud walls of Chaharbagh Street (Bedoen, 2000, 218; Chardin, 1996, 118; Sanson, 1998, 66).

• Use native plants on the street

Due to their ability to adapt to the local weather, native plants are suitable for warm and dry climates.

Some features of these trees are: plants with low water requirement, drought resistance, longevity, four seasons and consistent and low-expected plants. Sycamore trees are used on this street. The sycamore is a great beautiful tree with an independent canopy trunk and strong branches that make it suitable for shading and very hydrophilic and in places where the water passes by, has rapid growth. The sycamore has been used on this street despite the need for permanent water; because the water was present at the bottom of these trees and the issue of shading was more important for this street, which was the place for passage and tourism.

• Harmonization with nature and environment

Traditional architects provided a rational solution to integrate the artifacts into nature by analyzing the surrounding nature. All palaces and entrances of this street were built in close relationship with nature.

To create Chaharbagh Street, the Safavid government placed an artificial axis which was perpendicular to the Zayandeh-Rud river without damaging the old Seljuk city, in perfect harmony with the natural environment and the river, and turning Isfahan to a garden city. Providing water supply is essential for the sustenance of any garden or green space in the first phase. The Safavid government by recognizing this principle , and the concept of location and site identification, using Zayandeh-Rud river water and sloping of ground and creating streams or Madis from Zayandeh-Rud river, spread water to all parts of the city, including the Chaharbagh Street (Haghighatbin et al., 2007, 23). The most important effect of Madis has been to create



Fig. 7. Handicraft Stands on Chaharbagh Abbasi Street. Source: Gholipour, 2019.

sustainability in the greenery of street, surrounding gardens and numerous gardens in the city.

- **Commitment to comfort of users**

In an ideal society, the relationship between human beings and the environment must be such that no other is subjugated. Providing users with comfort and meeting their needs is the most important goal of achieving popular architecture. For this purpose, considerations such as maximum use of natural light in space, shading, elimination of various pollutants such as air, sound and light, intelligent temperature regulation and the use of landscape and green space are important in design. Indeed, spending hours in the heart of nature and green spaces can be a way to achieve peace.

This street as one of the most important resorts in Isfahan was filled with people who came to relax and enjoy the day (Ehteshami, 2003, 9). Chardin described strolling down this street very pleasant and charming in the evening for nine months of the year (Chardin, 1996, 121), and Kaempfer also found the shade of trees on both sides of the street appropriate for resting and staying away from the scorching sun, for this purpose some of the pavement of the street was also carved with polished stones (Kaempfer, 1984, 215). In recent renovations, setting up a special lane for bicycle and electric cars in Chaharbagh has resulted in more organization and discipline for travel and provided greater comfort and relief for people and tourists (Figs. 8 & 9).

Table 4, present the characteristics of Chaharbagh Street in the historical era, perceptions and preferences of contemporary users of this street, extracted from the analysis of respondents' views in 2017, along with ongoing renovations.

Discussion

The issue of sidewalk expansion in cities and increasing the share of pedestrians in the urban transport system is not as a recommendation by urban management officials to citizens; but it is provided in the form of legal plan in pedestrian chart, strategic plans and pedestrian master plan. These projects are either executable or running.

Pedestrian master plans as a complement to urban master plans are common in major cities in Europe, the US and Canada (Moeini, 2015, 204). Indeed, one of the ways to preserve the ancient texture and social revitalization of urban centers is to give serious and practical attention to the organization of sidewalks and pedestrian traffic by removing car domination from historic areas of cities and return into the late 1940s. (Habibi, 2001, 44).

In a study that evaluates the results of sidewalk implementation in Tehran, the Sepahsalar pavement is managed by public participation, and it is in a good position and it can be said that the participation of people has been effective in their satisfaction. In some other cities of Iran, construction of sidewalks has also been considered, for example, Tarbiat Street of Tabriz in the central texture of Tabriz city has been converted to a sidewalk for many years. In a study which has been written about this street to further understanding the spatial and temporal origin of sidewalks, these results suggest that the organization of this axis in the central context of the city has brought it into line with sidewalk expansion policies (Ghorbani & Jam Kasra, 2010, 55).

Chaharbagh Street in the Safavid era was also designed as a pedestrian center with the idea of creating recreational and sidewalk urban space and with the arrival of cars in the city and the creation of vehicle lanes, the street has lost some of its original features. The pedestrianization operation is currently underway. The sidewalk implementation plan of this street will bring back old memories to Isfahan's citizens and tourists. Today, Chaharbagh with conservation of some of its historic physical features, including wide sidewalk passages, greenery, plantain trees, Bolbol gardens and monuments has valuable pedestrianization feature.

The factors obtained in resilience of this street are in line with the factors proposed by the users of Isfahan's Qeysarieh bazaar, which are found in another study. Also, in a study called social resilience of Jolfa in Isfahan neighborhood, six general components are categorized that have three components of identity, flexibility and social in common with the present

study. In the study, evaluation of traders' attitude towards the durability of the historical and cultural values in the conservation of Bazaar, the decrease in the sense of belonging to the Bazaar among the traders, the heightened inclinations towards the renovation in sense of substituting the conventional traditional qualities with the modernized types of elements and so on have been identified as lack of historical-cultural resilience and if in the future planning of the Bazaar will not be paid attention to culturally and socially regenerated, Bazaar customs will gradually be forgotten (Razeghi & Derakhshani, 2015). In this study, the reasons why users choose this street can be found in the social factor

Conclusion

From passers' responses about the reasons for choosing this historic street and effective measures for upgrading it, four sub-factors have been extracted of physical, social, economic and environmental factors.

The results of each factor can affect other factors as well, for example diversification of user in addition to economic factor, diverse groups of citizens attract into the street, and vitality and social interaction between different groups are their outcomes. Also, the existence of mental security guarantees the presence of citizens and the conservation of community life in the street. The presence of pauses' space also gives users the opportunity for social interaction in addition to their sense of comfort

and the existence of Madis, in addition to being environmentally friendly, creates a sense of aesthetics. Since the conclusions of this study suggest that the reasons for choosing this historic street and the users' expectations of its safety measure are in line with the historic features of the street, it can be acknowledged that planning for the reconstruction of historic streets based on their historical features can be effective in resilience and making decisions regarding the conservation of historic streets. Most of reasons for using this street suggested by pedestrians are related to social and environmental factors, respectively, and it can be concluded that these two factors are in a more favorable position than the other factors. They also demanded more actions on the social factor (Preferences).

In the physical resilience factor, users have mentioned the accessibility of the street and its greenness and demanding for street protection and restoration, consolidation of abandoned monuments and water restoration on the street. All of these features and actions are in line with the historic features of the street. In the social resilience factor, users have mentioned a variety of uses, relationships with others, experiences of different feelings and old memories and have demanded for using abandoned monuments and setting up ceremonies for various religious and historical occasions. All of these features and actions are in line with the historic features of the street. In the economic resilience factor, users have mentioned the variety of uses and proximity of the street to their place of residence and demanded that the street be lively and dynamic with 24-hour activities of shops and elimination of transportation. The different



Fig. 8. Electric Car Traffic Route in Chaharbagh Abbasi Street. Photo: Soudabeh Gholipour, 2019.



Fig. 9. Chaharbagh Station for bicycle loans on Chaharbagh Abbasi Street. Photo: Soudabeh Gholipour, 2019

Table 4. Characteristics of Chaharbagh Street in historical period, perception and preferences of contemporary users of this street. Source: Authors.

properties	Historical period	Perceptions of users (contemporary period)	Users' preferences
Physical	Four rows of trees (Qajar)	Four rows of trees	-----
	Two rows of trees (Safavid)		
	Stream of water in the middle and bottom of trees and ponds	-----	Restoration of streams and ponds and permanent presence of water on the street
	Organizing New Neighborhoods- Geometrically Direct (Readable)	Geometrically Direct (Readable)	-----
	Gardens and pavilions around the street	Preserving some of the monuments around the street (Madarshah complex, Hasht Behesht)	Conservation of some monuments
Social	Urban perspective or identity or concept of ideal-Islamic city (example of the immortal paradise) -----	The sense of being in nature Parks and green spaces (example of the immortal paradise) Traditional street mood	----- Conservation of some monuments Performing street theater, Ta'zieh, Pardehkhani and etc.
	Holding urban celebrations	memorability	Interested in viewing street theater, street music, ta'zieh, Pardehkhani* and similar activities
	Performing theater and tour de force, speakers, and storyteller (Kampfar, 1986)		
	Attendance around 24 hours (mental security)	Attendance around 24 hours (mental security)	24-hour street activities
	A space for social relations between people, courtiers, tourists	A space for social relations between people, tourists	-----
Economic	Recreational, cultural, commercial and social activities	Various commercial, cultural-religious applications, government agencies and green spaces	Cultural-artistic activities, craftsmanship, street theater performances, ta'zieh, Pardehkhani ...
Environmental	Transportation (pedestrian, vehicle, animal)	Air and noise pollution from vehicles	Promotion of clean transportation (bicycles, horse and gharry, etc.)
	A place to rest and have fun	A place to rest and have fun	-----
	Shading trees	Shading trees	-----
	Full harmony with the natural environment and the river	The sense of being in nature	Revitalizing streams, ponds, and the constant presence of water on the street
	Use of paving on the street floor (Rubble from Zayandeh-Rud river) Brick as the dominant material for walls and buildings	-----	-----

* Iranian ritual theater

uses and non-passing of the car match with the historic features of the street. In the environmental resilience factor, users have also mentioned the presence of pauses space, mid-street sidewalks, tree shading, a sense being in nature, and the absence of noise pollution by not allowing cars to cross the street and demanding for the promotion of clean transportation. All of these features and actions are in line with the historic features of the

street. The results also show that although some of the physical structures of space change over time, what keep cities and spaces alive over time are the characteristics of human and social life, and the restoration of activities and social features of the place play a more prominent role in revitalizing a place than merely physical revitalizing of that space. Table 5 presents some effective measures to improve the resilience of Chaharbagh Street.

Table 5. Effective measures to improve resilience of Chaharbagh Street. Source: Author.

Resilient factors		presents some effective measures to improve the resilience of Chaharbagh Street.
Resilient physical factors	Physical structure	Revitalizing ruined historic buildings on this street Conservation and restoration of street Control over form, materials and ... on the marginal street construction
	Aesthetic factors	Revitalizing ponds of the avenue and flow the Madis in this street
	Access and movement and organizing neighborhoods	Accurate planning to create suitable alternative routes and resolve traffic problem by converting Chaharbagh Street to pavement Proper access to public transport Adequate parking on surrounding streets
Social factors	Impact of cultural conditions	Commuting with horse and gharry (in progress) Attention to Iranian identity and culture in body and activities and ... Conservation of monuments to revive the historical identity Designing new collections with historical patterns Pedestrianizing the street
	Influence of political-religious conditions	Performing Ta'zieh and appropriate ceremonies
	Flexibility and different functional features	Use of abandoned mansions
	Mental security	Existence of welfare services with 24-hour activities Appropriate street lighting
Economic factors	Energy saving	Promoting clean transportation (bicycle, carriage, etc.)
	Creating multiple jobs	Center for crafts More attention to cultural and artistic uses of this street
Environmental factors	Harmonization with nature and environment	Treating the trees and the greenery of the street (brick, etc.)
	Attention to climatic issues	Use of native materials in architecture (carpet bricks, etc.) Use of native plants in the garden
	Commitment to Comfort of the users	Preventing vehicle traffic on the historical axis of Chaharbagh Abbasi (in progress) and reducing noise pollution caused by vehicles Suitable placement of furniture

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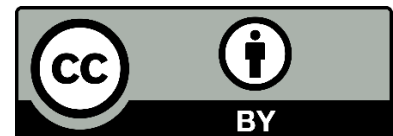
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