

# Identifying Effective Factors in Transformation of Khajoo Bridge into a Successful Linear Public Space Based on Jan Gehl's Criteria

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## ABSTRACT

Khajoo Bridge in Isfahan is one of these successful historical examples. Taking it as a sample, we have tried to identify reasons \_ with an aim to find proper applicable approach\_ behind the preservation of liveliness in this bridge in past and present .To begin we first explained the meaning of city design and criteria of desirable city space according to Jan Gehl ( a famous Danish architect, sociologist, and urban design consultant). Then we searched, studied and analyzed related documents and observations for better understanding of functions and liveliness of Khajoo Bridge. our comprehensive researches showed that elements used in designing and building of the khajoo bridge have been in agreement with Jan Gehl's criteria of desirable place (protection, comfort, joy). Evaluation of functions and personality of Khajoo Bridge during different eras also revealed that, by employing humanity, culture and architecture, design of the Khajoo Bridge is most harmonious with the third criteria of Jan Gehl for a desirable place (joy). Taking this approach (joyous-entertaining-life giving) has contributed to the sustention of the Khajoo Bridge in many years.

**Key words:** Isfahan, City space, Bridge, Khajoo Bridge, Social life.

## INTRODUCTION

The modern style of architecture has had many influences on Iranian urban designing, leading to belittling of quality in linear city spaces in favor of quantity and ease of transportation. What were not considered in new approaches were the soul of living and daily happening in city spaces; in fact successful city designing has to consider both physical and spiritual factors of daily living in each of the city structures.

Bridges are one of the linear city spaces that are underrated in modern architecture, being acknowledged only as a connector of two sides and ignorant of human's presence. In contrast, Iranian

traditional architecture has always valued presence, passage and settlement of humans in bridges. Kashkaan bridge (related to Sasanian dynasty), Menjil safavid (Farshid Nik et al., 2004) bridge ,Shahrestan Bridge, Allahverdikhhan bridge ,and the most complete one Khajoo bridge are among successful samples of this thoughtfulness (Moravej et al.,2013).

Khajoo Bridge, unlike nearby newly widened Bozorgmehr bridge, has been a vital part of the Isfahan in different eras and has preserved its dynamicity and liveliness in different ways in concordance with changes in political, social, and financial situations . Paying attention to not only the act of passing but to human' presence and physical

conditions is the difference between Khajoo bridge, as a flourishing sample, and other soulless structures (like Bozorgmehr bridge).

To fully understand the reasons behind the preserverness of the Khajoo Bridge, following questions should be answered:

- What different roles have Khajoo Bridge played during different times?
- Is it possible to find any kind of basic similarity and coordination in various roles and function of Khajoo Bridge?
- How to utilize these strength points in other city structures and spaces?

To answer these questions, one needs to know about the true meaning of city spaces and quality enhancing factors as well as past and present functional history and story Khajoo Bridge, from past years up to now. we have investigate our objective observation (observation done in 2012-2013) as well as related historical documents, newspapers, poetry, and travel stories to understand public's feelings, opinions, interests and points of view (Rapaport., 2005).

In the following we first reviewed the history of the bridge from past up to today's situation (2012-2103) and remained heritage and documents are evaluated. Then we compared different circumstances and behaviors of Khajoo Bridge to shed a light on key factors of Khajoo bridge prosperous survival during centuries.

## MATERIALS AND METHODS

Our study is of basic-applied type with descriptive-analytic approach. Related documents and objective observations are utilized to evaluate dynamicity and living of Khajoo Bridge in different times and identification of meaning and characteristics of a desirable city place.

### Base of research

There are numerous definitions for the term of "city space". In this study we have specially focused on social aspects of the "city design" according to Jan Gehl's theory and his definitions and criteria for a desirable place. Our sample study was also-as mentioned before- the Khajoo Bridge.

Although this historical masterpiece is mentioned in many books and documents, Khajoo Bridge have never been a subject of comprehensive study and analysis of functional dynamicity and liveliness in historical periods.

### Definition of city space

City spaces are acknowledged in the category of open and public places .These places lodge citizens and are symbol of group living. City spaces are approachable by people and host un-programmed social encounters (Pakzad., 2010) and the more they provide peoples with their needs, the more affluent they are. To describe city and city spaces, many theories and approaches exist; one of these approaches is social approach. Jan Gehl1 is among those who employ social themes for description of city spaces. He believes that it is possible to have an influence on functionality, number of visitors, and quality of social encounters by considering proper designing amid local, social, and constitutional limitations. His main idea is that while low quality spaces only host unavoidable necessary encounters, on the other hand, high quality spaces expenses not only more various events but more frequent (Carmona et al.,2012). He insists that to create an ideal city space-a place that provides people with all elements of happy and comfortable living- most of following factors should be afforded:

- A. Protection: Protection against motor accident, crimes and violence, and against adverse weather conditions
- B. Comfort: ease of walking, standing, and stopping. Comfortable places to sit and chat, entertainment facilities, versatility for different activities.
- C. Joy: being able to make people enjoy good weather conditions, landscape and positive feelings (Gehl., 2010).

### Introduction of Khajoo Bridge

This bridge was constructed as a symbol of glorious society at the time of second king Abbas in Safavid dynasty because of unsuitable physical features of previous built bridges (Vahid Ghazvini., 1950), construction of new neighborhoods (Della Valle., 1991), (Chardin., 1966) and need for appropriate access .In addition to its hilarious

looking, Khajoo Bridge meets many functions and services and contributes to many social activities and important city events and carnivals. The book "living bridges" acknowledges the Khajoo Bridge in the category of "life giving bridges" (Royal Academy of Arts., 1996).

During the construction of the bridge , on the western bank of the river, royal citadels and palaces were assembeled.by closing the orifices of the bridge, beautiful lake would form (Blunt ., 2005), (Jaberi Ansari., 1942) and royal family could enjoy and entertain themselves (Vahid Ghazvini., 1950).A mansion was also built in the middle of the bridge to be a palace on water (Hillenbrand., 2010) making it possible for the kings and royal family to enjoy festivals and celebrations (Shamloo., 1992) After times , the role of Isfahan in political geography of Iran was weakened and according to remained documents ,this bridge was a place for social events and carnivals.

#### **Explore the behaviors**

Our understanding of each space and its current soul of living depends not only on related physical aspects but to events happening there. To study these events we need to explore behavior and events happened at the bridge during different epochs.

#### **Explore happened behaviors and events from written documents**

To explore current of life in past and present and social events being witnessed by Khajoo Bridge, written documents are a great asset. In the following we have reviewed most important events hosted by Khajoo Bridge.

#### **Explore happened behaviors and events from written through observations**

Another method to recognize the current of life in any place is to observe daily living of people and take photos to document these connections and interactions (Pakzad., 2010) therefor we documented our observations by taking photographs<sup>2</sup> of the bridge and the nearby environment in different hours of the day, on different days of the weeks and even in different seasons. For better and easier introduction of the physical features of Khajoo bridge, we have divided the structure into three part as shown in the section(1).

As mentioned above, we can divide daily behaviors and events ever happened in the bridge into three category: the events that are no more practiced, the events and behaviors that saved their existence during the times and events and tradition that did not exist in the past and are new. these changes in the traditions and functions are directly due to changes in political, social, and economic conditions, as an example, the agricultural farms has given their place to official offices, trading centers and residential complexes, so water orifices in the level 2 of the bridge's plan which once were used as a water drainage for farms are now used as a place to rest and revel in.

There are also preserved function and behaviors from past to now , like hosting ceremonies and festivals, live music and singing shows, boating, a place for people to gather, smoking, being visited by travelers and tourists, and playing a role of parkland for citizens. These sustained activities can be explained according to Gehl's criteria as the following:



**Fig. 1: Khajoo Brige, From the authors**

**Table 1: Behaviors and events noted in the bridge according to written documents, From the authors**

<b>Reference</b>	<b>Witnessed Behaviors in history book</b>	<b>Era</b>
(Hillenbrand., 2010)(Shamloo., 1992) (Vahid Ghazvini., 1950)	Place for official Celebration Place for Accommodating special internal and external guests	SafavidDynasty
(Vahid Ghazvini., 1950) (Shamloo., 1992) (Shamloo., 1992)	A place for settlement of king and his companion, a place A place for live music and singing for royal night parties	
(Hillenbrand., 2010)(Shamloo., 1992) (Hillenbrand., 2010)(Shamloo., 1992) (Tavernier., 1974) (Sansone., 1964)	Golrizan (flower throwing)ceremony Cheraghan(firework) ceremony Changing the river into a reservoir (artificial lake) and Boating	
(Hillenbrand., 2010)(Shamloo., 1992)	As a place for king and his companion to watch and enjoy official celebrations/ festivals	
(Hami., 1993) (Chardin., 1996)	Drainage divide A place to walk and spend leisure time	
(Tavernier., 1974), (Kaempfer., 1984)	A place to watch seasonal flood and nearby environment	
(Gylantez., 1992)	Serving as an entrance root to Isfahan by Mahmood Afghan	Afghanis
(Khajegi Isfahani., 1989), Farhang newspaper,issue47,10th of Jumada al-Thani,1297 AH (Rajae., 2005) (Jaberi Ansari., 1942) , Sobhe Omid newspaper, issue 10,14 <sup>th</sup> Shahrivar 1300 SH (Rajae., 2005) (Jaberi Ansari., 1942), (Khajegi Isfahani ., 1989), (Jenab., 1992) (Jenab., 1992)	Hosting ambassadors from other countries  place for live music and singing  Cheraghan ceremony  changing the river into a reservoir(artificial lake) and boating	Qajar dynasty
(Rene Dallemagne., 1956), (Curzon., 1971)	As place to walk and spend leisure time	
(Browne., No Date), (Dosersi., 1983)	As a place for king and his companion to watch and enjoy official celebrations/festivals	
(Jaberi Ansari., 1942), (Richards., 2000), (Wales., 1980), (Rene Dallemagne., 1956), (Curzon., 1971) (Curzon., 1971), (Browne., No Date)	A place to watch seasonal flood and nearby environment  A place for smoking(hubble bubble, water pipe)	

(Dieulafoy., 1992)	Accommodation	
(Browne., No Date), (Richards., 2000), (Al-Isfahani., 1989), (Holster., 1976) (Curzon., 1971), (Olivier., 2000) Akhgar newspaper, issue 1212, 12 <sup>th</sup> Bahman 1315 SH. (Rajae., 2005), (Holster., 1976)	A place for people of Isfahan to seat and rest parkland Part of the road to the Fooladshahr	
(Richards., 2000), (Flandin., 1945) Farhang newspaper, issue 420, 18 <sup>th</sup> Rabi' al-thani 1304 AH. (Khajegi Isfahani., 1989) (Pope., 1986), (Mahmoodian., 1969)	As a entrance /exit point to Isfahan A place for army/police maneuver  A place for people of Isfahan to seat and rest	
(Hedayat., 1963) (Pope., 1986), (Nikzad., 1956) Farhang newspaper, issue 278, 3rd Muharram 1302AH (Rajae., 2005) (Renovation and development of Isfahan the Municipal Archive of pictures., 2012)	Singing shows Parkland Focus of tourism  A place for demonstration	Pahlavi Dynasty
(Etemad ol-Saltaneh., 1978), (Loti., 1992) (Rajae., 2005) (IMNA News agency., 2012), (IRNA News agency., 2012)	As a entrance /exit point to Isfahan Motorway Hosting social festivals like green day festival, kite running festival in the children day	After Islamic Revolution Of 1978
(MEHR News agency., 2009) (MEHR News agency., 2009)	Singing show A place to dance	

1-protection: As Gehl's believes, protection has three parts, protection against motor-car accidents, protection against crimes and violence and protection against adverse weather. The first measure to provide these elements of protection was to find a proper location for the bridge. The Khajoo Bridge is constructed in the way between the downtown of the Isfahan and the Fooladshahr and as result, frequent passage of crowds from this root guaranties the safety. In spite of the fact that this reason no longer plays an important role due to progression of the city, placing a police station on the northwest of the bridge, lighting systems and glorious night life of the bridge still provides high level of security and safety against violence and crimes. The other contributing factor to the protection is the physical features of 3-level plan of the bridge. This unique design divides the bridge into different sections, making the people feel safe while passing the rivers the bridge looks like a shelter. To minimize the effect of the adverse weather, the bridge's

structure employs direction of the wind and water, especially in the second level, to introduce a pleasant condition for pedestrians mainly in the summers.

2-comfort: The main role of the bridge was and is to facilitate the passage between two sides of the river. Beside this function, physical features and beauty and liveliness embedded in the water stream, have made the bridge into a favorable place for walking, sitting, sightseeing, chatting, rendezvous, singing, and playing.

Physical factors contribute to the fascination of the bridge are wide, clear, eye catching field of view and landscape, responding different needs of visitors (individual visitors or groups), providing platforms with suitable height for people to sit, considering different passages for different purposes (fast passing from the third level and slow passing from both rooms of the third level and near the water flow in the second level) and widening of

the bridge in second level ( the width of the bridge increases from the 11.7 meters in the third level to 24.5 meters in the second level.

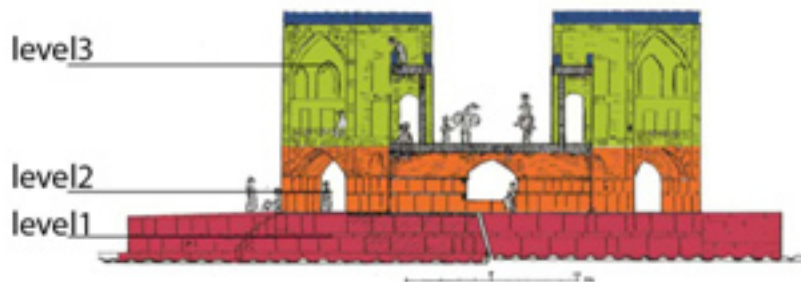
3-Joy: The third and most important of Gehl’s criteria-as he believes- is joy. He deduces that first and second criteria are prerequisites of third criteria. In his theory what changes a structure or a city space into a fascinating enjoyable place is a combination of 3 components: proper scale, pleasant weather conditions and ability to induce positive feelings in visitors.

Historical documents from Safavid epoch show that the aim behind the designing of first and second levels of the bridge was to optimizing water flow and forming an adorable landscape, however , although some elements are added later( like some of the doors and wooden pieces ) employed architectural scales are totally humanized . The design of the bridge also takes advantage of wind and water flows to bring positive feelings to visitors especially in the summer.

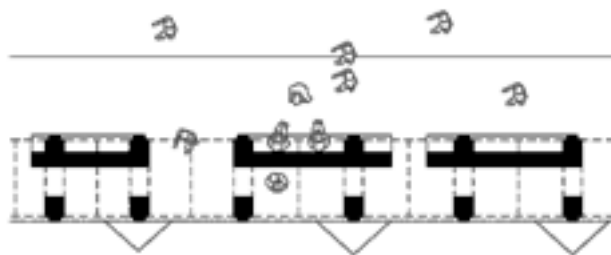
Amid all the mentioned characteristics, we believe that what distinguishes Khajoo bridges from other similar constructions and linear city spaces is the beautiful, unique, and awesome feeling,

inspired by the whole complex. This feeling, also roots in the culture of Isfahanis which forms their behaviors toward the bridge. One of the practiced tradition sustained from past up to now is singing. People of Isfahan are used to sing and walk on the banks of the Zayanderood River. Ibn Hoghel describes the Isfahan in the 4th AH century as the following: “people from far and near places gather and celebrates the New Year in bazaar and enjoy themselves in 7 days. Male and female singers and entertainers warm up the ceremonies in palaces and elsewhere” (Ibn Hawqal., 1966). Holster also mentioned that “Isfahanis are somehow different in comparison with other Iranians, they are always happy and noisy and sing while walking or riding and some rich people brings singers with themselves in their travels and trips(Holster., 1976). Walking in Charbagh’s streets and parklands of Zayanderood river is also routine among people of Isfahan and is their main leisure activity from past up to now (Ansari., 2000)), although less frequent now, singing has always been a part of walking for Isfahanis men. Since Khajoo bridge neighbors the Zayanderood, all these traditions are practiced even more regularly in the bridge especially by families who spend their spare time around the bridge at summer. It is noteworthy that all these traditions are compatible with cultural fundamentals, making the Khajoo Bridge

**Table 2: Some of the observations from the east part of the khajoo bridge, From the authors**



**Section 1: Diagram of different levels of the Khajoo bridge .( From the authors)**



plan 1: In plan dividing of spaces related to the 3rd level

Table 3: Observed behaviors of the people in each levels of the bridge. (From the authors)

Explored behaviors of the people toward the bridge	First level	Second level	Third level
Trying to find hidden places(how water passes the bridge)	x	-	-
short and long stop and rest( group or individual)	x	x	x
Children playing (group play or individually):	x	x	x
(Stone skipping, water splashing, bicycle riding and running through columns and rooms).	x	-	-
Singing	x	-	-
Families gather separately.	-	x	-
Groups of families gather.	x	x	x
Tourists visit.	x	x	x
Photographing (portrait, landscape).	x	-	-
Eating, resting, enjoying.	x	-	-
Sightseeing ( water stream and local environment ) .	x	x	x
Passage( usual passage for some people or occasional passage for some pedestrians, bicycles).	x	-	-
friendly chatting .	x	-	-
Boating.	x	x	x
Smoking.	-	x	x
Rendezvous(using signs on the bridge as a guide).	-	x	-
Hosting official, special ceremonies .	-	x	-
Filming TV shows/series.	-	x	-
Visiting stone lion statue and its decorations.	-	x	x
Stopping/resting (listening music/sightseeing).	-	x	x
Showing curiosity to different parts of the bridge.	x	x	x
Chat.	-	x	-
Making imaginary fabulation of the bridge according to the old stories, myths and folklore culture <sup>[1]</sup> .	-	x	-
Dancing.	-	x	-
Exercising, usually in the morning.	-	x	-
Sleeping.	-	x	-
Wandering in the rooms <sup>[1]</sup> .	-	x	-
Rendezvous.	-	x	-
Group and individual singing( making a circle and sing).	-	x	-
Eating food ( routine meals, leisure eating).	-	x	-
Smoking tobacco in the form of hubble bubble, drinking tea.	-	x	x
Parking bicycle and resting.	-	x	x
Singing individually.	-	-	-

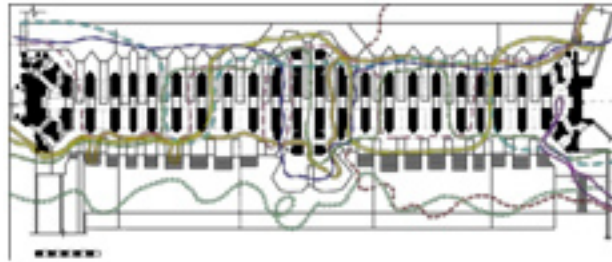
**Table 4: comparison between documented behavior and events in the history with our observations from Khajoo Bridge, (From the authors)**

<b>Documented behaviors, events, traditions related to the Khajoo bridge</b>	<b>Our observation</b>	<b>In history documents (history books)</b>
Hosting royal family ceremonies.		
Golrizan (flower throwing) ceremony.	-	×
Cheraghan ceremony (fireworks).	-	×
Swimming around the bridge.	×	×
Boating.	×	×
Bicycle riding, jumping on platforms.	×	×
Dancing.	×	-
Giving mysterious and holy features to the bridge according to some old stories and imaginary signs.	×	-
Exercising (usually in the morning and in uncrowded times).	×	-
Sleeping.	×	-
Stopping and watching the bridge (watching the bridge from the outside environment).	×	-
Stopping and watching the landscape.	×	×
(watching the around environment from the bridge)	×	×
Smoking(pipe, cigarette, hubble bubble).	×	×
Wandering around the bridge.	×	×
People gathering in ceremonies, occasions.	×	×
Rendezvous, place for friendly chats and talking.	×	×
Showing curiosity to find hidden places, finding more about the river flow.	×	-
Individual/group gathering of families.	×	-
Place to enjoy eating meals or snacks.	×	-
Night life of the bridge.	×	-
Singing, playing music.	×	×
Playing (children playing, water splashing).	×	-
Staying, accommodation.	×	×
Group /individual sitting and resting.	×	×
Selling toy, snacks.	×	-
Water drainage for agricultural purposes.	-	×
Motorway.	-	×
Passage for pedestrian walk and sometimes for bicycles and motors.	×	×
As a road to Fooladshahr for pedestrian.	×	×
Entrance/exit point.	-	×
Tourism site.	×	×
Paying attention to the decoration and parts of the bridge like the stone lion statue.	×	-
Filming location for TV shoes( as a symbol of Isfahan).	×	-
Hiding in the superficial water channels.	-	×
Washing carpets and cloths.	-	×
Police/army maneuver.	-	×



**Table 5: How Khajoo Bridge fulfill Gel's criteria, From the authors**

<b>Khajoo Bridge's solution</b>		<b>Gel's criteria</b>
<b>protection</b>	proper protection for pedestrians against accidents	Physical characteristics of the bridge has created different passages for different application in order to create a safe traffic ( triple division of the plan in the third level)
	Protection against violence and crimes	In the past, the bridge was a part of the way to Fooladshahr, hence routine presence of people on the bridge had made it a safe place.
	Protection against	Nowadays, the bridge is provided with a proper lighting systems and a police station is located on the west-north of the bridge.
<b>comfort</b>	Comfortable walking	Most of the spaces in the bridge are open spaces, which makes the conditions difficult for people in the cold weather, in addition, 6 room like spaces of the bridge are not available for general use. However, water flow and extended shadows make it a pleasant place in summer.
	Ease of stopping and staying for a while	Comfortable environment for walking, fascinating design, Although the main function of the bridge is to connect to sides of the river, however the attractive environment and pleasant atmosphere makes it an enjoyable experience to walk on the bridge.
	Comfortable walking	Different parts of the bridge are suitably divided and places for rest are predicted in different part of the bridge.
	Possible to watch the around easily	The physical features of the bridge besides platforms predicted and placed in various parts of the bridge prepare a comfortable sitting for visitors.
	Possible to start and continue a conversation ,chatting comfortably	Beautiful landscape, eye catching lighting of the bridge in the nights, wide field of view without any blockage.
	Giving oppurnity to visitors to play ,explore, and leisure activities	Different parts of the bridge with different functions are divided in the way that each division is provided with privacy and at the same time could make connection to other parts easily.
		The environment is suitable place for physical activities, playing of the children and leisure activities.
<b>joy</b>	Scale	The whole bridge and its elements are in complete coordination with dimension, sense, motion, size and function of the human beings.
	Being possible to enjoy good pleasant weather conditions	Dynamic and balanced connection between the bridge and related environment especially in the winters.
	Inducing positive feeling	The design of the bridge is in complete concordance with cultural elements, making the whole structure and related landscape to the marvelous combination of architecture, environment and water.
	Adhering to aesthetics' roles	



plan 2:Wandering of the visitors in the rooms of the 2nd level

a place for giving life to historical and cultural identity .it can be assumed that people approach the bridge with entertainment intentions<sup>33</sup>

Entertainment includes category of voluntarily actions with the aim of enjoyment.( Vafa., 1993)

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