AESTIMUM 78, Giugno 2021: 83-104

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A mixed method study on recognizing the areas of influence by urban planners in fostering social interactions in public spaces: evidence from Iran

Keywords: *Social interactions, Public spaces, Iran, SEM, Mixed method*

Parole chiave: *Interazioni sociali, Spazi Pubblici, Iran, SEM, Mixed method*

JEL codes: *C2*, *H1*, *H7*, *R5*

Due to the negative consequences of the rapid growth of urbanization in Iran, public spaces have suffered a lot of damage in recent years. Public spaces, which are generally areas for the formation of social interactions, have distanced themselves from their original concept in recent years in Iran. The main objective of this study is to investigate the promotion of social interaction in Iranian public spaces through urban planning interventions. Data used in this study were obtained through semi-structured interviews with practitioners and researchers in urban planning and questionnaire. Thematic analysis was used to analyze the interviews and the findings of the quantitative section were analyzed through the structural equation modeling (SEM) approach in Smart PLS 3. Our findings show that promoting social interactions in public spaces requires intervention in three pillars: the built environment, urban management and citizens' demanding approach.

1. Introduction

Air pollution can seriously threaten human life. A recent estimate (Lelieveld et al., 2019) reports 800,000 people prematurely dying in Europe as a consequence of air pollution. According to the same research, the average European citizen loses two years of life due to the breathing of polluted air. In addition, the geographical concentration of deaths caused by the spreading of the COVID-19 pandemic has brought researchers around the world to investigate the potential impact of air pollution of COVID-19 related morbidity and mortality, and the results suggest that the most polluted cities have experienced relatively higher death rates (Coker et al., 2020; Cole et al., 2020; Conticini et al., 2020; Oygen, 2020).

Cities are where the consequences of air pollution are most severe because air quality is the lowest due to transport and residential emissions (European Environment Agency, 2019) and the exposure is the highest. Cities are now home to more than half the world's population, and that share is projected to increase up to 68% by 2050, with 2.5 billion people moving to urban areas (UN DESA, 2019).

The disproportionate distribution of the activities and employment on the one hand and the empiric policies adopted by state managers on the other hand in third world countries have made metropolises become the main centers of income and employment (Rafiee et al., 2009). A complicated situation that has caused a series of problems, all of which originate in metropolitan areas (Sarvestani et al., 2011). Recent developments in urbanization and the problems arising from them have caused ur-

DOI: 10.13128/aestim-10005

ban public spaces to be more significantly exposed to the adverse effects of urban development (Tayyebi et al., 2011). Physical development has exposed cities to congestion, traffic jams, reduction of recreational space, reduction of open spaces, and lack of livability. The access difficulties and traffic problems, overlapping between inconsistent activities, and extra dependency on vehicle activities city centers, are common issues of almost all developing countries such as Iran (Dadras et al., 2015).

Moreover, in the absence of efficient urban management, the physical expansion of cities and their transformation into the main centers of employment and income has led to the emergence of many economic, social and environmental problems, for example the loss of environmental capital, declining groundwater levels are the main environmental consequences of this rampant growth, while the formation of large socioeconomic class gaps along with dilapidated structures and the formation of informal settlements can be the main socio-economic of such consequences (Dadashpoor et al., 2019). In response to this unbridled growth, various theories and programs have been proposed by researchers and urban planners, from which the concept of sustainable development is amongst the most important one (Bihamta et al., 2015). Sustainable development draws our attention to the fact that merely physical development is wasteful without considering the social and economic consequences (Tayyebi et al., 2011b). One of the main areas of sustainable development is the concept of social impacts. Social sustainability is a clear emphasis on the social nature of residents that is often overlooked in the physical development of metropolises. Resulted from such emphasis, we have witnessed the emergence of various movements such as pedestrianisation and re-emphasis on paying attention to the social needs of metropolitan residents in previous decades. Because residents are social being and have social needs.

Public spaces play a key role in promoting social interaction (SI) in today's cities (Dadashpoor et al., 2019).The physical expansion of cities along with the uncontrolled migration to big cities has made the role of public spaces in the big cities of the world more than in recent years (Dadashpoor and Nateghi, 2017). Public spaces are a good place to experience a sense of solidarity, collective action and participation due to the facilities they provide to citizens (Dezhkam et al., 2014). It is in public spaces that citizens repeat civic behaviors and implement the concept of citizenship by forming new social groups. Given the importance of public spaces in the lives of citizens, returning collective activities and vitality to public spaces is one of the goals of urban planners and designers (Sakieh et al., 2015)

Studies of global experiences about public spaces reflect the fact that a public space does not simply mean a place where cars are not allowed in (Moein et al., 2018). In fact, a real public space has capabilities and characteristics that give citizens the opportunity to be present and help them to stay in space and get involved in group activities (Arsanjani et al., 2013). Such a public space requires various characteristics such as being inviting, responsive and democratic. As a result, if our definition of public space is merely an open space with green space, our project is undoubtedly lost

Conflict in the use of public spaces in Iran between new generation and the government is of great importance for social activists and urban planners (Shah-

raki et al., 2011). The new generation in Iranian society has different values and standards than those of government and Iranian cities are witnessing a huge change in cultural values and space consumption. Cities in general and public spaces in particular are witnessing these changes, and therefore reading the type of behavior of the young generation in public spaces and the reactions of the government well expresses these conflicts best (Asgarian et al., 2018). In recent years, these conflicts have entered new phases. The adoption of laws such as the ban on urban nightlife by municipalities and the prohibition of services by restaurants and cafes after the last hours of the night and the intense desire of the young generation to nightlife is a good example of such conflicts. Public spaces in Iran today are under the control of the municipality (state), and the municipality, as a symbol of governing power, designs and plans public spaces based on its interests and desires (Dadashpoor and Nateghi, 2017).In such a situation, the role of an urban planner and designer is nothing more than legitimizing the goals of government organizations such as the municipality. Urban planners, by preparing intervention plans, induce more and more government institutions in the urban space.as if they either work in the public sector, such as municipalities, or in the private sector such as consulting firms, preparing urban development plans and in both cases, urban planners are nothing more than a scientific tool in the hands of a powerful government (Shafizadeh-Moghadam et al., 2021). As a result, if the conflict between how the young generation wants to use space and the way the government prefers, is to be resolved by urban planners, it needs to change the roles that planners have already accepted and displayed

In this study, our goal is to identify areas where urban planners can increase the publicity of public spaces through intervention and planning. By publicity we mean the qualities by which an urban space can foster social interactions among users. In the following, while examining the literature review of public spaces and social interactions, we review all the articles published on this topic in recent years to determine the main areas of study investigated by other researchers and their findings. Then, while explaining in detail the methodology used, we introduce the case study and then present the findings extensively.

2. Research background

Everybody accepts that public space is significant, but the reason needs more investigation (Anderson, 2019). We realize that a high quality public space is the establishment of a harmonic society (Kärrholm and Wirdelöv, 2019). The social needs of citizens are met in public spaces (Aram et al., 2019). The best public spaces cultivate a feeling of solidarity among residents. Public spaces give citizens the opportunity for cooperation and collaboration together (Franco, 2020). It is in public spaces that the concept of citizenship becomes concrete, and citizens can move into new social groups beyond the existing invisible economic boundaries (Hopkins, 2019). It is in a public space that citizens find leisure opportunities and identify through interaction with each other (Johnston et al., 2020). Urban spaces give citizens the opportunity to

experience higher social and individual values and to recognize their place through interaction with each other (Liempt and Aalst, 2015). If we look at the services that the city provides to the citizens from the angle of the Maslow pyramid, then we can consider public spaces at the top of the pyramid (Padawangi, 2013). This perception is due to the fact that the function of public spaces is not to meet the basic needs of citizens (Kang et al., 2019), but public space helps citizens to be something more than passive citizens. So we conclude that public spaces are places for social interaction (Latham and Layton, 2019). Recent studies (Marques et al., 2020, Mondada, 2019, Qian, 2020, Vlibeigi et al., 2020, Zhang, 2020) have shown that a space formation is not a spontaneous process, but the product of the interaction and confrontation of different forces that interact with each other at different levels (Saha, 2020). Thus, the formation of public space is influenced by the various forces which determine the social capability of that public space (Ujang et al., 2018). In this study, our goal is to identify the components that affect the formation of social interactions in public spaces. Various studies have been conducted on the relationship between public spaces and social interactions. A review of these articles confirms that most of the research tried to address following issues:

1. To identify the challenges of fostering the level of social interaction in public spaces.
2. To identify the different and potential types that urban interactions may take place in public spaces.
3. And finally identifying the consequences of the enhancing social interactions in public spaces at different levels.

To show the leading challenges in improving the level of social interactions Hornecker and Buur (2006) suggest a framework that centers on the intertwining of the physical and the social, and provides concepts and perspectives for considering the social aspects of tangible interaction. In another study Wiesemann (2012) examines the way prejudices are formed and challenged by everyday experiences in public spaces. This study concludes that despite the facilitating role of public spaces in reducing racial tensions, the publicity of space in controversial cities is questionable. In this regard, Saha (2020) addresses the challenges of youth and the elderly engagement in public spaces. This study highlights the importance of edges and public civic activities in fostering interaction among younger generations. The findings of this study confirm that the unparalleled needs of different generations in public space lead to dissimilar consumption of space and thus the formation of a kind of conflict.

The second spectrum of research focuses on different forms of social interaction in public spaces. These studies address how and in what ways social interactions can occur in public space, and basically in relation to social interactions, what places can be public space. Hampton and Gupta (2008) researched the community and social interaction in the wireless cities and Wi-Fi use in public and semi-public spaces. This research revels differing strikingly uses for wireless internet and competing consequences for the society. This study deals with the role of social media in public spaces and claims that in the future, cyberspace will have a greater share of social interactions in public spaces.

Simões Aelbrecht (2016) researched the informal public spaces (referred to the fourth place) as the contemporary public settings for informal social interaction among strangers. This paper considers the fourth places as a novel category in informal social settings along with the third places (old public spaces such as streets and parks). The findings of this study states that more informal spaces built on a human scale that encourage friendly activities such as getting involved in informal group activities will replace traditional public spaces such as parks and streets in the distant future. Accordingly, the main tendency in public spaces will be towards informal behaviors and relationships. However, the role of traditional spaces such as empty parks can still not be overlooked because in metropolitan areas, public parks still play an important role in promoting local identity. In this regards, Moulay et al. (2019) researched the role of neighborhood parks in fostering social interaction and social sustainability. The findings highlight the vital role of legibility in the planning and design of public spaces for encouraging residents to stay longer in public spaces and accordingly achieving social sustainability. Social interactions in public spaces, however, are not just activities in an urban space, but depending on the ability of an urban space, another range of activities can attract citizens. In this regard, Kang et al. (2019) conclude that re-reading the historical and identity values of a space can be an incentive to attract visitors to the public spaces. As a result, social interactions cover a wide range of activities from generic activities such as playing and eating to specialized functions such as visiting historical architecture (Cerreta et al., 2010).

The third category of studies on the relationship between public space and social interactions is related to the consequences of this interaction. Research shows that the formation of social interactions in public spaces has different effects at different levels. Improving the level of belonging to the city, increasing the level of social capital, social solidarity, social sustainability and better urban management are all among these consequences. In this regard, for example Cattell et al. (2008) researched mingling, observing, and lingering: Everyday public spaces and their implications for well-being and social relations. These researchers support that social interaction in spaces result in relief from everyday life pressure, People's tolerance also increases and it is in such an atmosphere that social ties between people are strengthened and the sense of unity and oneness among citizens' increases. In another effort, Rubegni et al. (2011) investigated the role of using large public spaces in increasing social interaction among strangers. These researchers conclude that gesture-based interfaces support the natural diffusion of social interaction patterns in public spaces through the observe-and-learn model, and that sensory-motor patterns can aid social interaction in public, as they act as conversation starters between both strangers and acquaintances. Francis et al. (2012) support that the perceived quality of neighborhood public open spaces and shops are associated with sense of community both significantly and positively. This relationship is unaffected by the rate at which people use these spaces. High quality public spaces are important settings for enhancing sense of community within newcomer residents.

Social cohesion is another product of social interaction in public spaces. According to Peters et al. (2010) suggest that public parks serve a vital locality where

every-day experiences are shared different groups of people. The design of a park, the location and citizen's image of the park in combination with the cultural characteristics of various ethnic groups provide a platform for intercultural interactions. Place attachment and commitment is also being triggered as one of the results on enhancing social interaction in public spaces. According to Ujang et al. (2018) the necessity of multi-functional spaces to show various forms of social interactions. They show that street has an important role to produce group activities. However, spaces for people to sit and stay remain sparse, and are mostly consumed by extended commercial use. With the expansion of commercialization of streets, opportunities for social interaction are limited. As a result, place attachment is strongly related to the significance of the places, commercial and tourism functions. The findings of this study show that participants in public spaces are more willing to interact with their acquaintances and family than strangers. In this regards the results of Aguiar et al. (2018) also confirm the positive role of social interaction in increasing place attachment. These researchers confirm that transFORM embodies our understanding of how a responsive, cyber-physical architecture can augment social relationship and increase place attachment.

As we have seen in this section, social interactions in public spaces is a target that takes place in many forms. A review of research in the field of public space and social interaction reveals a theoretical gap that this study seeks to address. In fact, what has not been researched so far is what planning interventions are needed to foster social interactions in public spaces and how urban planners can foster enhance interactions in public spaces. As a result, the question that this research answers is that: How can urban planning lead to an increase in the level of social interaction in public spaces?

3. Methodology

In this study a mixed method approach is used to gather and analyze data. The reason for using mixed-method is to use the opinions of experts as well as users of public space together. In fact, in the first step, we want to identify areas through which social interactions can be promoted in public spaces by planners through open interviews with experts who have related research background, and in the next step, our goal is to receive feedback from the users of our public space. In other words, the findings of the first part help us to theorize, while the findings of the questionnaire show us how generalizable our theories are.

In the first part of the study, I will interview experts in urban planning and urban design to find main areas of intervention that can foster social interaction and vitality in public spaces. At this stage we asked general questions to the interviewees and allowed them to determine the direction of the interview based on their theoretical and practical experiences. Experts were asked as follows:

1. How important do you think social interactions are in public spaces?
2. What do you think is the role of public spaces in promoting social interactions?

3. How can urban planners increase the level of social interaction in public spaces?

In the next section, the goal is to verify this model through a questionnaire. The data collection tool in this section is a questionnaire designed according to 5 scales Likert from strongly agrees to strongly disagree.

For data collection, in the first part, semi-structured interview is used. Totally 25 researchers and urban planners and urban designers who have visited 15 Khordaad pedestrian street are interviewed. Number of interviewees is determined according to saturation level. In qualitative research, unlike quantitative research, the number of samples is not a function of statistical formulas. Rather, because the goal is to describe the phenomenon, sampling usually continues until a general description of the phenomenon is obtained. This stage, in which the description of the phenomenon is almost complete, is called theoretical saturation. In a more precise sense, it should be said that the characteristics of a theoretical category or class have been saturated. This happens when no more data that causes the existing theory to be developed, modified, enlarged or added to the research is included. In this case, the new data entering the research does not change the existing classification or make a proposal for a new class, that is, in fact, according to Strauss and Corbin (1997), it is these categories that are saturated.

Interviewees included those researchers who have published related articles about social interactions and public spaces and practitioners who were involved in pedestrian project of 15 Khordaad Street. All interviews were conducted in late 2018 and 2019. All interviewees know this space for at least ten years and are well acquainted with this place. The interviews were semi-structured and during the interview, the interviewees were asked what factors shape your social interaction in our case and the role that urban planners and designers might have. The interviews continued until no new knowledge was generated and the data reached a theoretical saturation level. The interviews were written line by line and read over and over again. Thematic analysis is my approach to analyze qualitative data. Thematic analysis is a method of determining, analyzing, and expressing patterns (themes) within data (Gavin, 2008). This method at least organizes the data and describes it in detail (Braun and Clarke, 2012). But it can go beyond this and interpret different aspects of the research topic. The team analysis process begins when the analyst considers patterns of meaning and topics that are of potential interest (Braun and Clarke, 2014). This analysis involves a continuous flow between the data set and the encoded summaries, and the analysis of the data that is generated. Writing the analysis starts from the first step. There is generally no single way to start studying team analysis (Joffe, 2012).

All interviews are written and manually coded though open coding, axial coding and selective coding (Braun and Clarke, 2014). Findings of the qualitative section helped us to identify areas where urban planners can intervene to improve the level of social interaction. The generalizability of these findings was later confirmed by a questionnaire filled out by our case study public space user, visitors, marketers and residents. The objective of quantitative phase was to confirm/reject qualitative findings. In quantitative phase, both descriptive and inferential statistics have been used in the analysis of questionnaires. The structural equation

modeling (SEM) is used to measure the findings of the qualitative phase. The reason for using the SEM in this research is as follows.

First, basic statistical methods consider only a limited number of variables simultaneously that are incapable of dealing with more advanced and complex theories. Using a small number of variables to understand complex phenomena is constrained, while SEM allows the researcher to statistically model and test complex phenomena (Ullman and Bentler, 2003).

The second reason is about the high importance of the validity and reliability of observation and scores of measuring instruments. In particular, measurement error has become a major issue in all similar researches and methods but t in classical statistical methods, measurement error and statistical analysis of data are done separately (Bowen and Guo, 2011). When analyzing data statistically, SEM techniques also take into account measurement errors (Savalei and Bentler, 2010)

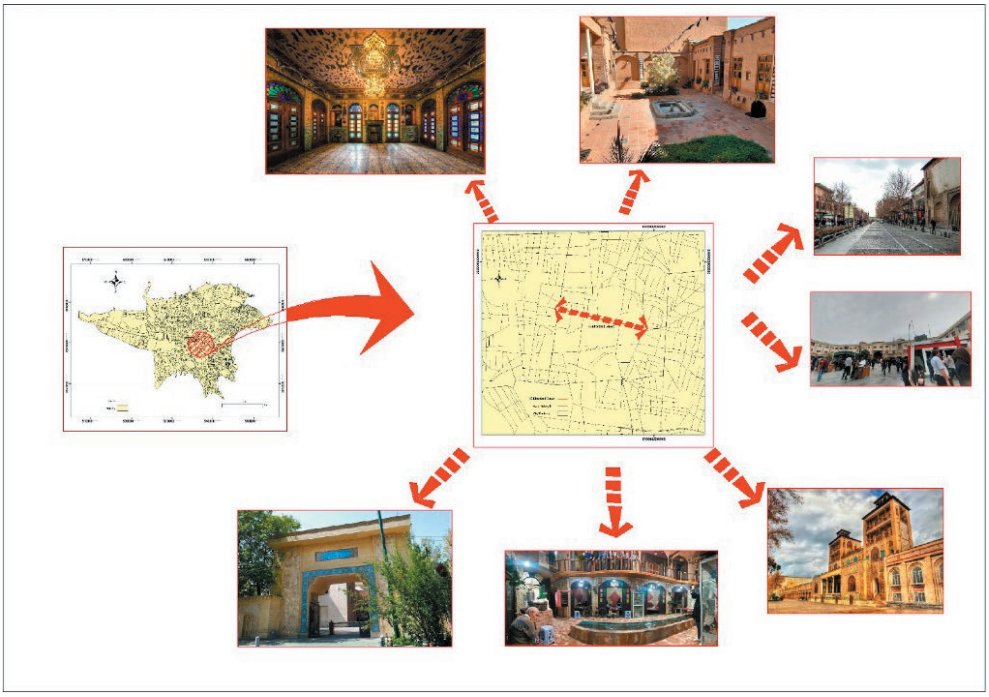
The third reason is especially related to the ability of SEM to analyze advanced theoretical structural models and finally, the simplicity of SEM is the last reason we have used this approach. With regard to above-mentioned reasons, to verify our qualitative findings, We employed SEM (Kline, 2015).The findings of both phases are presented below.

4. Case study

As we explained in the methodology section, in the qualitative stage, we interviewed urban planning and urban design experts and identified the main areas of intervention in order to increase social interaction. Our second goal was to find out how generalizable the findings of the interview were to the public. For this purpose, we turned the themes extracted from the interviews into questionnaires and made them available to the public. In this part, we wanted to give the questionnaires to those residents who visit a public space in Tehran at least once a week. As a result, we took all the questionnaires to one of the public spaces of Tehran and provided them to the users of that space. In choosing this public space, we had to choose among one of the many public spaces in Tehran that welcome the people. So to make sure the public space we choose is the best space possible, we chose the one that is most visited in a daily base according to Tehran municipality website i.e. 15 Khordaad Pedestrian Street.

Our case study consist of the users of 15 Khordaad Street in Tehran (Figure 1). This is a pedestrian site and most visited public space in Iran. A pedestrian street with old bazar Tehran, one palace of Pahlavi era, two historic plaza and old restaurants of Tehran along with all on the edges. This project is one of the most important pedestrianisation projects in Iran. Firstly, this site attracts a wide range of citizens regardless of their socioeconomic background, as a result, our participants cover virtually all socioeconomic groups of citizens. This site is also historically, economically and spatially important due to its location and history. There are many motivations on this site that attract different groups of people to this space on daily/weekly or monthly basis. The old and traditional bazaar of Tehran, which

Figure 1. 15 Khordaad pedestrian location in Tehran and Famous side spaces.



is two hundred years old, along with the traditional architecture of the city, along with the existence of historical squares and also the best restaurants in this site all around the pedestrian site in which cars are not allowed in, has made this space the most attractive public spaces for citizens.

5. Results

Our qualitative Findings support that the main areas of urban planning intervention in public spaces to improve the level of social interaction include three main areas. These three areas are intervention in the place characteristics (built environment), urban management and citizens' tendencies, respectively. Each of these includes the three tasks of an urban planner. Urban planning in this approach is no longer just a tool in the hands of urban authorities to legitimize the policies, but on the other hand, urban planner is more of a lawyer for the people who pursues democratic demands by mediating and negotiating with policy makers to maximize the public benefit from public projects. While another task of the urban planner is to raise the level of awareness of citizens about citizenship rights. Finally, the interventions of the city planner and designer through small and large urban projects cause better communication between citizens and the urban space.

As a result, the historical and social values of the urban spaces are identified, and people have the opportunity to recognize their historical memories, and more democratic spaces are formed. Consequently, increased urban vitality and social interaction within the research area is closely dependent on three main themes: place characteristics, urban management, and citizen approach.

For coding, the whole interview was written line by line. A semantic code was then assigned to each sentence or word that could potentially have a specific meaning. Semantic units were divided into sub-categories based on similarity, and finally sub-categories form the main categories (place characteristics, urban management and citizen tendencies). An example of coding is shown in the Table 1.

Sub-categories of place characteristics are sense of place, service provided on the site, functions within the place, environmental aspects, and identity of the place. Urban management includes six sub-categories which are: participation, space organization, services, sustainability, and control and traffic management. Finally User characteristic. This theme has three sub-categories which are: sense of user toward space, user's functional preferences, and user's collaborative preferences. Place characteristic invites and attracts citizens to come and stay in urban spaces. A place with appropriate environmental features such as shade, maintenance against harsh sunlight, and heavy rain has the minimum requirements for hosting citizens however these qualities are not enough. Each place has a specific identity. Identity is in close relation to the background and history of space. Our

Table 1. Example of coding in qualitative phase.

Part of interview	Semantic coding	Sub-categories	Main categories
Urban space planning should be such that citizens can recognize their collective memories in space. I mean these memories of the historical values that our urban spaces have in Tehran.	Revive collective memories through space planning	Sense of place	Place characteristics
Promoting social interactions in our public spaces requires not only design interventions but also a shift in urban management approach toward public spaces. Urban management should increase the level of public participation in those decisions that affects citizen's lives.	Increasing level of public participation in decisions that affects the built environment	Participation	Urban management
The formation of social interactions and democratic urban spaces requires the promotion of public awareness of citizenship rights. One of the tasks I envisage for urban planners is to be present in cyberspace and raise public awareness about it, which leads to a desire to participate in decision-making among the people.	Increasing citizen's intention for participation in urban management decisions	Collaborative preferences	Citizens

case is a historic and cultural one. Historic sites are places that hold memories and identity of a nation within themselves, therefore planners should advertise them within such public spaces. If we build a new modern shopping center in a historic site, in fact, we destroy all citizens' memories and their belongings to space.

One of our interviewees says:

"This traditional bazaar brings my childhood memories back to me, I always came here with old friends to relive my childhood memories" (I19).

Expressing the importance of the environmental features of the space, one of the participants says:

"If you pay attention, all the people are sitting under the trees in front of which the street theater is running" (I34).

Finally, every space should provide the required services for users. These services include restaurants, outdoor fast foods, edges for sitting, places for photo taking, and other innovative and creative services that seem interesting for users. If we want to invite people to public space, we should have a plan for them. Here is where we see the importance of place organization. Space should be organized. An unorganized space is not suitable for time spending.in our case, many interviewees believed that the presence of vendors decreases the quality of space and it is crystal clear that people don't like to spend time and have interaction in such places. A planned space gives the citizen the opportunity to get to know the sense of place and to identify with it. A historical space takes the citizen to history, while spaces designed with natural elements give the citizen the opportunity to experience naturalistic feelings. The identity of a place, sense of a place, functions, environmental features, and services of a place are all sub-categories of urban management. The importance of urban management is that the space is shaped through authorities decisions and later shape the citizens. Urban management approach toward space determines where to be active, where to be safe, where to be appropriate for the criminals, were to be attractive for couples and were to be inviting and this happens through land use planning and environmental planning. Accordingly, security is the product of the existence of active uses in a public space. Security, which is the basis for the presence and interaction of citizens, while many active spaces such as restaurants and cafes are not allowed to operate in the late hours of the night in Tehran. Now, to test the accuracy and generalizability of our qualitative findings, we will test them though questionnaire.

At the end of the qualitative section, we identified areas in which urban planners and designers can increase the level of social interaction in public spaces. This identification is based on interviews with experts, so our approach in the qualitative sector has been an elitist one. Now we want to see if these identified areas meet people's expectations. And whether there is a correlation between elite views and public expectations. As a result, each main-category and sub-category identified in the qualitative section is provided to the public in the form of a questionnaire. All participants had a history of using the public space we were looking for and visited it at least once a week. At first, all of them were explained that this is a scientific questionnaire and they expressed their desire to participate in this research. In designing the questions, an attempt was made to make the questions

Table 2. Reliability and validity of study structures.

Research Structure	No. of questions	Cronbach's alpha	CR index	AVE
Place characteristics	1-25	0.799	0.797	0.8203
Sense of place	1-5	0.787	0.782	0.5992
Physical features	7-10	0.793	0.790	0.8022
Environmental features	11-15	0.788	0.784	0.7866
Identity of place	16-19	0.859	0.853	0.8021
Functional features	20-24	0.821	0.829	0.8199
Urban management	25-54	0.833	0.839	0.5759
Participation	25-29	0.834	0.839	0.8022
Space organization	30-34	0.715	0.713	0.7846
Services	35-39	0.712	0.715	0.8420
Sustainability	40-44	0.805	0.809	0.5703
Control	45-49	0.899	0.898	0.8428
Traffic management	50-54	0.845	0.843	0.5807
User characteristics	55-69	0.788	0.789	0.5990
Collaborative preferences	55-59	0.875	0.878	0.6109
Functional preferences	60-64	0.885	0.884	0.6744
Sense of user	65-69	0.823	0.825	0.6630

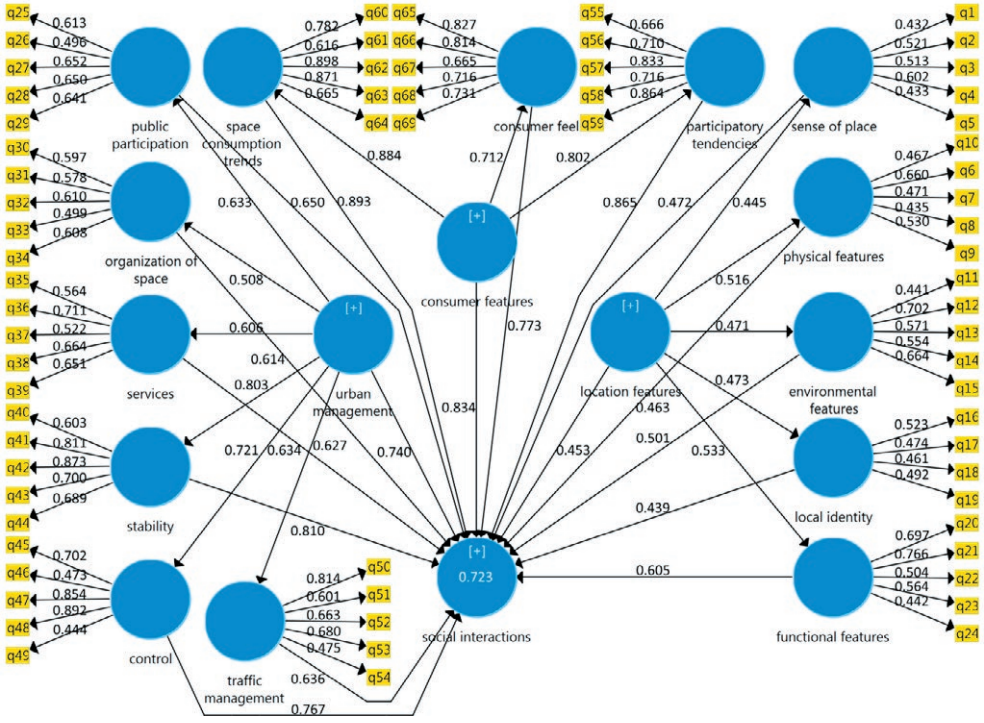
as simple and understandable as possible, and no specialized sentences were used that were incomprehensible to the general public. At the beginning of each questionnaire, while explaining the purpose of the study, participants' demographic information such as age, sex and education were asked.

Totally, 390 questionnaire are distributed in our sample from which 47.9% of respondents (184) were male and 52.1% (200) were female. In Partial Least Square (PLS), we test reliability of structures first. The most used index for establishing reliability is Cronbach's alpha and acceptable value for this index is at least 0.7 (Wong, 2013). According to Table 2, Cronbach's alpha is more than 0.7 for all structures which is favorable moreover, we also used average variance extracted (AVE) for estimating convergent validity. Minimal value for this index should be 0.5 for each structure (Ringle et al., 2014).

As it is shown in Table 2, all values for AVE are between 0.5703 and 0.8428. This shows that convergent validity for all structures are acceptable. As follows to assess the accuracy of model produced in qualitative phase, confirmatory factor analysis (CFA) is used. In CFA, it is necessary to connect all latent variables together.

In the standard estimation mode, the factor loads are shown. The larger the factor load is and the closer to one, that is, the better the observed variable (ques-

Figure 2. Factor loads of study constructs in standard mode.



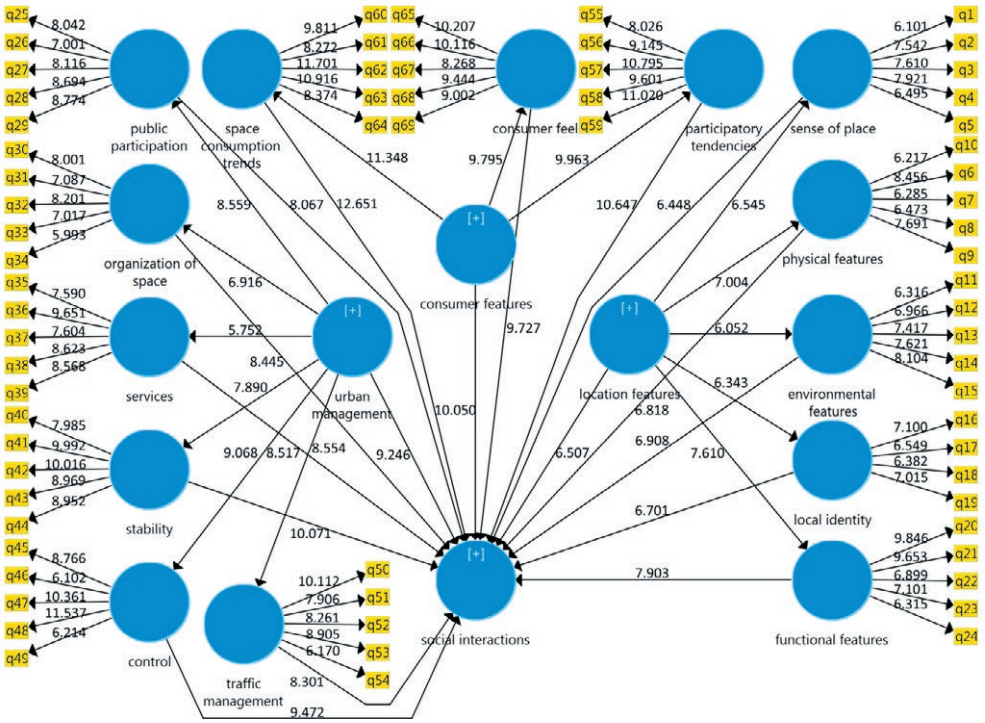
tion) can explain the latent or hidden variable. If the factor load is less than 0.3, a weak relationship is considered and ignored. A factor load between 0.3 and 0.6 is acceptable and if it is more than 0.6 it is very desirable. As shown in the Figure. 2, all factor loads are of accaptable value

The p-value associated with a 95% confidence level is 0.05. If T-value is between -1.96 and +1.96, p-value will be larger than 0.05, and we cannot reject our null hypothesis. In Figure 3, we see that the T-value for all of our structure are higher than 1.96. This confirms the accuracy of our model.

Now, for measuring the difference between the discrepancy between observed values and the values expected under the model, we used goodness of fit (GOF) index. GOF shows how much the model designed by the researcher is supported based on real data (Jung and Schindler, 2017). In other words, it shows the compatibility of the experimental findings with the theoretical findings. The theoretical finding in this study is what we obtained in qualitative phase while experimental findings refer to what we implemented based on data collected in quantitative phase. We calculated GOF through following formula:

$$GOF = \sqrt{\overline{Communalities} \times \overline{R^2}} \quad (1)$$

Figure 3. T-values for study structure.



In this formula, $\overline{Communalities}$ show shared values average for each structure and $\overline{R^2}$ shows average value of variance for endogens structures of model. In PLS three values i.e. 0.01, 0.25 and 0.36 are defined as weak, average, powerful for GOF respectively. In Table 3, GOF values are shown.

GOF value for this model is calculated as 0.36 which shows high goodness of fit. In the standard estimation mode, the factor loads are shown. The larger the factor load and the closer to one, that is, the better the observed variable (question) can explain the hidden variable. If the factor load is less than 0.3, a weak relationship is considered and ignored. A factor load between 0.3 and 0.6 is acceptable and if it is more than 0.6 it is very desirable.

In the case of significance, the Value must be greater than 1.96 or less than -1.96 in order for the relationship between each question and the desired variable to be significant (Wong, 2013). If the T Value for all questions is greater than 1.96, then the relationship between the questions and the variable is significant and therefore the questions are a good explanation for the variable (Sarstedt and Cheah, 2019). As follows, we According to Tables 4 and 5 construct T value and factor loads are also acceptable for our hypotheses. Moreover Correlation coefficient (R) is a statistical tool for determining the type and degree of relationship of one quantitative variable with another quantitative variable (Li and Deng, 2019). Cor-

Table 3. Assessment of GOF index.

Variable	Confirmed variance	Shared value	GOF
Sense of place	0.81	0.812	0.36
Physical features	0.82	0.820	
Environmental features	0.56	0.587	
Identity of place	0.74	0.805	
Functional features	0.78	0.788	
Urban management	0.81	0.797	
Participation	0.82	0.849	
Services	0.85	0.829	
Sustainability	0.53	0.550	
Control	0.74	0.800	
Traffic management	0.79	0.785	
Collaborative preferences	0.81	0.797	
Functional preferences	0.82	0.899	
Sense of user	0.84	0.820	

relation coefficient is one of the criteria used to determine the correlation between two variables. The correlation coefficient indicates the intensity of the relationship as well as the type of relationship (direct or inverse). This coefficient is between 1 and -1 and if there is no relationship between the two variables, it is equal to zero. These indexes measure the equality of our model.

Finally, in order to check the accuracy of our quantitative analysis, we use composite reliability and Cross validated redundancy along with average variance extracted. Composite reliability (sometimes called construct reliability) is a measure of internal consistency in scale items, much like Cronbach's alpha (Ringle et al., 2014). It can be thought of as being equal to the total amount of true score variance relative to the total scale score variance. Cross validated redundancy is the indirect prediction of the omitted data points of indicators of the dependent latent variables by the constructs that are predictor of the latent variables (Wong, 2013). It is a measure of the predictive relevance of the model in regard to the dependent latent variables. While AVE is a measure of the amount of variance that is captured by a construct in relation to the amount of variance due to measurement error (Chung et al., 2020). According to Table 5 all of these values are acceptable in our study.

6. Discussion

Public spaces in today's world have a special role in meeting the social needs of citizens. These spaces, due to the opportunities they provide to the citizens,

Table 4. Hypotheses testing in SEM.

Relation between variables	T Value	R	Factor load	Result
place characteristics and SI	6.507	0.453	0.453	Supported
Sense of place and SI	7.448	0.472	0.472	Supported
Physical features and SI	0.618	0.463	0.463	Supported
Environmental features and SI	6.908	0.501	0.501	Supported
Identity of place and SI	6.701	0.439	0.439	Supported
Functional features and SI	7.903	0.605	0.605	Supported
Urban management and SI	9.246	0.740	0.740	Supported
Participation and SI	8.067	0.750	0.650	Supported
Space organization and SI	8.445	0.614	0.614	Supported
services and SI	8.517	0.734	0.634	Supported
sustainability and SI	10.071	0.810	0.810	Supported
control and SI	9.472	0.767	0.767	Supported
Traffic management and SI	8.301	0.636	0.636	Supported
User characteristics and SI	10.050	0.834	0.834	Supported
Functional preferences and SI	12.651	0.893	0.893	Supported
Sense of user and SI	9.727	0.773	0.773	Supported
Collaborative preferences and SI	10.647	0.865	0.865	Supported

Table 5. Model quality criterions and the level of acceptance in PLS.

Study variables	Model quality Criterion		
	Cross validated redundancy (0 =<)	Composite Reliability (0.7 <)	Average Variances Extracted (0.5 <)
Place characteristics and Social interaction	0.003	0,825	0.631
	0.000	0.870	0.645
Urban management and social interaction	0.005	0.843	0.585
	0.001	0.822	0.573

meet the needs that the home and work environment are unable to meet. As a result, a public space is an important part of a city's social life that ensures its social sustainability. Such an environment, given the capabilities and opportunities

it provides to citizens, increases social solidarity and social capital and creates a strong belt against the damage of metropolitan life.

This research was an attempt to recognize the role of urban planners in production of urban spaces and the role that planners can play in improving the level of social interaction. This study investigates the components and characteristics that urban planners and designers should pay special attention to in city plans for public spaces in order to contribute to the social sustainability of cities. In the first place, this research sought to expand the existing theoretical literature in the field of public spaces and social interactions and to increase the boundaries of knowledge. As we have shown in our research background, the question of what realms planners can use to intervene to improve the level of social interaction has not been studied in a comprehensive manner. As a result, the findings of this study can be useful for both designers and urban planners as well as managers and practitioners.

Here, however, it is necessary to pay special attention to some limitations. In Iranian context and with the limitation of laws and principles, we know that an urban planner or designer has a lot of problems when planning a public space. For example, in the case of the 15 Khordaad pedestrian space, as we know, the domination of the government over the space production institutions makes the task of planners difficult to shape the urban space toward the desired form. Urban plans are usually regulated by a lot of manipulation of managers and upstream institutions and expert considerations form a small part of the space.

The domination of political powers on all space production manners results in a monopoly of space in which space turns into an area for advertising government values rather than a platform to observe the will of public. Many of the rights mentioned under the planned interventions in this study are not officially recognized by the governing body, including the rights of gender heterosexuality and any demand that runs counter to government values may not be available in public. Accordingly, one can claim that the majority of public spaces within such limitations are not democratic and a nondemocratic space can never be public.

In addition, issues such as nightlife that contradicts government law cannot be put on the agenda by planners. Government policy on space is so strict and firm; "space is a powerful stream to advertise my value". Such attitudes clearly show that the publicity of public spaces in Iran is still far from its ideal definition, and public spaces are still point of contention between people and governments. This conflict and contradiction makes public spaces an arena for expressing political protests which we witnessed in previous years.

It seems that in such tensional situation, the task of urban planners should be to stay away from government institutions and play a facilitating and mediating role between the people and the government. Moving towards more participatory practices and planning based on public will and needs is actually what this study sought to support. Our aim in using a mixed-method was to show that elitist ideas and theories cannot work without public approval, and that the basis of any idea about space is illegitimate until it is approved by the public court. According to our findings, our suggestion to other researchers is to research the following topics:

1. Identify the challenges of promoting spatial democracies in public spaces due to the conflict between government values and beliefs of social groups and develop operational strategies.
2. Evaluate the role of urban planners in resolving the conflict between the nation and the government at the urban level and turning the urban space into an arena for public activities.

7. Conclusion

The purpose of this article was to identify areas where urban planners and designers can improve the level of social interaction in urban spaces through intervention. Our findings, if the qualitative and quantitative phases in this study were examined in detail, show that these areas include spatial characteristics, urban management and citizenship tendencies. As a result, we know that these three areas involve changes that affect the role of the urban planner.

First of all, the city planner role is now in the hands of the city principles as an employee. They design the space according to the demands of the city managers and authorities. In other words, an urban planner or designer tries to put a scientifically and legitimately cover on the demands of city managers. Such an approach is not able to meet the social and civic needs of residents, and the result of this approach is nothing but the continuation of the status quo. However, our findings more than anything else confirm the fact that the urban planners should change the direction and work in a new format and play the role of advisor and mediator between people and managers. In this new paradigm, an urban planner must be able to notify citizens and make them aware of their rights and benefits from urban life.

Planners must negotiate and mediate with city managers to change their approach to the issue of space production and make them support the idea that the social values of urban space are no less than economic values. Unfortunately, what we have witnessed in recent years regarding the production processes of space in Iran is that space has become a commodity more than ever, and as a result, the decisions that are made about it have an economic flavor. It is also necessary for urban planners to recognize such importance in designing process to shape the spaces in a way to increase social interaction. They should focus in designing place to preserve the historical and traditional values of the space, and to recognize the identity values in order to improve the involvement of citizens in the urban space.

Our findings in this study are similar to those Fusco Girard and Nijkamp (1997) and Cerreta et al. (2010) and confirm their findings. Our proposal is to change the roles that city planners have to play, and to move the role of the planner out of a legitimate tool for urban management decisions and to turn them into a mediator and negotiator. Our research shows that in order to foster social interaction through urban planning, planners must take on new roles at different levels. These three levels include citizenship level, physical level and managerial level. At the managerial level, the planner should be able to encourage city au-

thorities to be more participatory, sustainable and accountable through mediation and advocacy planning. The urban planner should ask for more participatory and responsive methods on the municipal agenda through negotiation with managers and raising citizens' awareness. This is in fact an attempt to move from urban management to urban governance, where city managers make more participatory decisions, are more accountable, and are more transparent. This idea brings the city closer to what the citizens want. The second level of intervention of urban planners is related to the built environment. In this study, we used the term place characteristics because we believe that every built space has unique features and the task of the urban planner is to introduce these features to the citizens. Public spaces actually contain historic values that has been passed down from previous generations to the present day. As a result, social interactions in an urban space require proper identification and communication with space, and without recognizing these values, citizens in urban spaces feel alienated. The third area in which an urban planner must change role is related to citizens. Undoubtedly, social interactions require more interactive citizens who are aware of their citizenship rights and intend to participate and play a role in urban projects. Urban planners must come out of their offices and keep citizens aware of their forgotten rights through different Information networks.

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