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RESEARCH PAPER

General Architecture

The physical factors affecting the social livability of gated communities: a case study of gated communities in Tehran

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Abstract

Despite negative perspectives on their consequences, gated communities continue to spread in cities for structural reasons such as globalization and economic neo-liberalism. Hence, there is a need to find a way of achieving a better balance between these and social factors to make these communities more livable. Together with economic market perspectives, livability principles might offer a solution for mediating the social consequences of gated communities. This research aimed to examine the physical factors influencing social livability of gated communities and identify the degree of their prominence. To collect the data, four gated communities in Tehran were selected through cluster sampling. An analysis of 258 questionnaires and observation of the physical features of the gated communities indicated five physical features affecting social livability of gated communities. The results showed that mixed uses had the biggest effect on the social livability of gated communities followed by mixed housing, accessibility, walkability and sociability respectively. Although it might be impossible to put a halt to the expansion of gated communities in the short run, attempts can be made to attract different classes of people to these communities through mixing different uses and prevent from the fragmentation of gated communities. Well-connected and walkable streets help many daily activities occur within walking distance promoting the security of the neighborhood. Designing sociable public places where everyone is welcomed without any type of exclusion or limitation increases social bonds within gated communities which in turn promotes resident's sense of community.

Keywords: *Gated communities; Social consequences; Livability: Social livability; Planning.*

1. INTRODUCTION

Today, planned communities with hard and controllable boundaries, that is, gated or enclosed communities have become one of the dominant types of housing in big cities [1-2]. They are residential settlements separated from the larger urban environment by walls and gates. In fact, gated communities symbolize an urban entity physically and socially differentiated from the surrounding urban area [3]. The rapid growth of these communities is so high that Zaiotti refers to the emergence of a phenomenon named 'gated community syndrome' in cities [4]. Spread all over the world, gated communities are no longer a phenomenon specific to developed countries. They are rapidly growing in developing countries such as Iran as well.

The rapid growth of gated communities has contributed to a negative view of the social consequences brought about by these communities [5-8]. Within this perspective, gated communities are viewed as a sign of great inequality dividing the city into different segments [9], limiting individuals' experience of the city, causing loss of public life, and giving rise to social inequalities [10]. However, despite these negative views on gated communities, it is unignorable that there is an increase in demand to live in such developments [6, 11]. Neither the demand in the housing market nor the negative consequences of gated communities can be denied. Hence, it is necessary to find a way to achieve a balance and make these settlements

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livable since gated communities have the potential to become even more prevalent in the landscape of cities in coming decades.

Closely related to quality of life, livability is a crucial element to the long-term prosperity and development of neighborhoods [12]. A livable city is one that provides for its residents' social, cultural, environmental and economic aspirations [13]. Although social consequences seem to be "the most often discussed effects within the literature on gated communities" [11], few studies have investigated social aspects of livability in gated communities. Hence, this study aimed to examine the factors affecting the social aspects of livability in gated communities and identify the degree of their prominence. Due to agreement with economic market perspectives [14], livability principles can offer a solution for mediating the social consequences of gated communities.

2. GATED COMMUNITIES: DEFINITION AND SOCIAL CONSEQUENCES

2.1. Definition of a gated community

Housing literature offers no single definition of a gated community yet there appears to be consensus over the concept despite different terms being used to refer to it. For example, these communities are known as 'common-interest developments' and 'private neighborhoods' in the United States [15], 'enclosed neighborhoods' and 'security villages' in South Africa [16-17], and 'enclosed condominium states' in Singapore [18]. Our observation and interviews show that in the Iranian housing market, 'residential community' is the most common term used among real estate agents and house buyers to refer to gated communities. Each of these terms might highlight one of the particular features of gated communities. However, all gated communities have similar physical features and are considered a residential development with walls, fences, or boundaries that prevent or discourage outsiders from entering the community [6, 19]. Gated communities are often equipped with access controlling mechanisms such as security guards or surveillance cameras [20, 21]. Another important characteristic of gated communities is having a board of directors elected from among the residents which oversees the common properties and lands of the community and regulates contracts, conditions and limitations for living in such places [6].

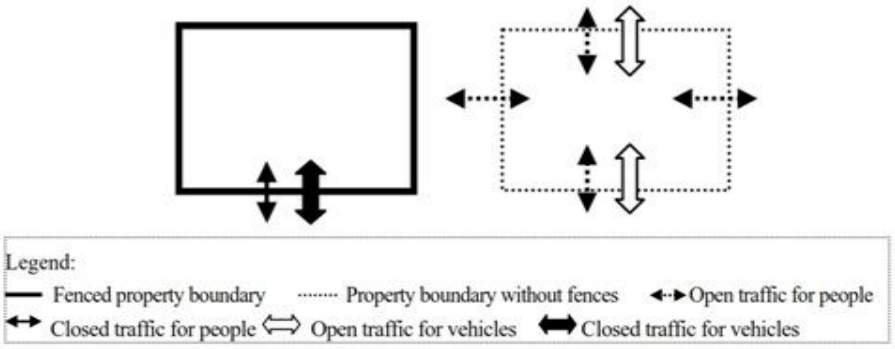

Fig. 1 The concept of a gated community (left) and a non-gated community (rigth) [22]

2.2. Gated communities in Iran

Having become part of the process of urban housing development, in Iran, gated communities are based on the creation of self-sufficient, planned, and privately owned residential communities. The origin of gated compounds in Iran dates back to Sassanid cities which used walls and gates to control access and separate privileged social classes from the rest of the population. However, it seems that the modern gated communities first appeared in Iran during the early 1960s following the enforcement of the third (1963-1967) and fourth (1968-1972) Reconstruction Plans of the country. During this period, as housing proved to be a major issue, housing provision by the private sector burgeoned. The target profile was an emerging social class being formed due to the economic and political changes of the early 1960s. Encouraging the construction of apartment buildings and communal settlements, establishing enclosed communities for specific groups (public servants), and increasing the capital of the Iran Mortgage Bank to enable it to give more housing loans to the private sector were the main policies adopted in the fourth Reconstruction Plan [23].With the formation of the new social class and the entry of the private sector into the housing market, gated residential communities became a marketing opportunity and a means of attracting particular markets for private housing developers. The developers of large-scale projects started their research considering this reality and the needs of the new social class. Although the first gated community of the country appeared in Tehran in the 1960, today, gated communities have increased their market share not only in big cities but also in smaller cities of the nation.

2.3. *Social consequences of gated communities*

The social consequences of gated communities have raised doubts among academics and researchers with regard to the appropriateness of these communities as a

housing development strategy. Those against gated communities emphasize the social costs of gated communities. According to Grant such "enclaves threaten decades of progress towards greater social integration and accommodation of diversity" [24]. Blakely and Snyder state that the expansion of gated communities has led to many physical and social problems in urban areas [6]. Social differentiation leads to the fragmentation and segmentation of the society. Similarly, Davis defines gated communities as a form of segregation and militarization of public space [25]. Based on the literature, Roitman mentions "(1) Stimulation of social tensions between the inside and outside, (2) The elaboration of "others" as dangerous, and (3) Encouragement of urban social segregation" as the negative social consequences of gated communities [11]. Landman indicates that gated communities "have the potential … to be detrimental to long-term urban sustainability". The negative consequences of gated communities can be summarized as a decreased sense of community, perceived fake security, social exclusion and urban segregation [3].

Sense of community

The literature shows that gated communities can both increase and decrease sense of community. Some believe that these communities encourage sense of community especially where there are important recreational facilities because in such developments individuals share more activities [11]. However, many researchers have questioned the accuracy of this. For example, studying the gated communities of Johannesburg, Beal et al. failed to find much evidence for a strong sense of community among those living in close proximity [26]. A reduced sense of community together with conflicts between neighbors might lead to negative relationships. In addition to having an effect on the notion of local participation and the daily management of the area, it has been suggested argued that this trend, might negatively influence urban democracy [3].

Safety and security

Findings on whether or not gated communities really reduce crime and improve security are mixed. While some studies show a decrease in crime, others report only a temporary decrease and some indicate no change [27]. Blakely and Snyder state that gates and fences are not impermeable to dangerous criminals and these barriers do little to curb the crimes committed by residents [6]. Gated residential communities might also cause crime displacement [1]. Making the residents of the surrounding communities use 'fencing' as a way of protecting themselves too. This process may in the long run have a negative impact on urban sustainability [3].

Social exclusion

Gated communities enable those with financial resources to avoid common services and public spaces. Many residents are only concerned about protecting themselves and their neighbors. This represents a critique of the resulting segregation and social exclusion [19]. Neighborhoods have always been able to exclude certain classes through discrimination and house prices. Nevertheless, now, as Blakely and Snyder have pointed out, through gates and walls, neighborhoods are able to exclude not only the unwanted new residents, but also the usual pedestrians and the residents of surrounding neighborhoods [6]. It is argued that this could have a negative influence on urban sustainability in terms of solidarity and social coherence, thwarting attempts to create livable cities, and urban democracy [3]. Gated communities might also discourage interaction and add to the problems of creating social networks which provide an opportunity for social and economic activities [28].

Fragmentation and urban segregation

Gated communities segregate a particular area physically from surrounding areas and creates settlements with controlled access within the urban fabric. Barriers and physical separation might not only cause physical exclusion but also increase social segregation. This issue has an effect on urban sustainability in terms of social coherence, sustainable urban access, and sustainable urban life [3].

3. ENVIRONMENTAL PLANNING FOR LIVEABILITY

Livability principles are largely in harmony with market-oriented economic perspectives. They can be thought of as improvements within the framework on which the market functions [14]. Based on this observation, various aspects of livability guidelines could be used to avoid the negative social consequences of gated communities, since despite awareness of their adverse consequences, this could lead to an increasing demand in the housing market for living in such developments [1, 20]. Gated communities will continue to be built unless demand for living in such communities falls. The use of social aspects of livability principles might therefore help to reduce the negative consequences of gated communities supported by improved design and planning within the market framework.

3.1. Definition and history

The notion of livability is closely associated with social welfare and represents features that make a place more fit for living [29]. The Oxford Dictionary defines a livable place as a place 'fit to live in' [30]. Wheeler reviews the definitions of livability and defines a livable neighborhood as one that is "pleasant, safe, affordable, and supportive of human community" [14]

The movements initiated during the 1950s and 1960s formed the empirical and theoretical basis of environmental planning to achieve livability. Since the 1970s, different movements of traffic-calming and bicycle planning in the United States and Europe have tried to

improve urban livability through reducing traffic and establishing more human-friendly street environments [ibid]. Since the 1980s, feminist perspectives on environmental design have emphasized livability, scrutinizing the urban environment from the view of women, children and the elderly. A series of international conferences entitled 'Making Cities Livable' commenced in 1985. In the 1990s, the Congress for the New Urbanism (CNU) in the United States sought to improve the livability of neighborhoods by recovering many traditional features of large and small old cities of America and crafted a set of useful principles [31]. Looking at livability from different perspectives, these movements all help to understand how cities can be made more livable and their agendas overlap to a large extent indicating a synthesis of environmental design knowledge around the concept of livability [14].

3.2. Dimensions and elements

According to Wheeler the major elements of a livable residential community include:

An attractive, pedestrian-oriented public realm; low traffic speed, volume, and congestion; decent, affordable, and well-located housing; convenient schools, shops and services; accessible parks and open space; a clean natural environment; places that feel safe and accepting to a diverse range of users; the presence of meaningful cultural, historical and ecological features; and friendly, community-oriented social environments [14]

As these elements are broad and embrace various aspects of livability, this study, with its focus on the social consequences of gated communities as the most often discussed outcomes in the literature, is concerned with those elements related to social livability [11]. According to Landry a livable city is one that provides for its residents' social, cultural, environmental and economic aspirations [13]. She describes social livability as based on low levels of deprivation, social cohesion, and collective spirit [13]. It seems that the social aspects of livability are therefore related to the social consequences of gated communities. The principles of New Urbanism, the principles of successful public spaces [32] together with the principles of smart growth have been used widely to implement livability and create sustainable neighborhoods [33] . The principles of New Urbanism, successful public spaces, and smart growth form the theoretical foundations of the present study.

The principles of New Urbanism are among the most common strategies adopted to make societies livable. The Charter of New Urbanism lists 27 principles for guiding development activities, general and planning policies, and urban design [33]. Walkability, connectivity, mixed uses, different housing types, and traditional neighborhood structure are principles related to social aspects of residential community livability [31, 34]. Based on New Urbanism principles, walkability and the connectivity of street networks result in the occurrence of many daily activities within walking distance, reduce the number and length of automobile trips, and encourage walking. Mixed uses and variety in types of housing can attract people belonging to different age groups, cultures, races, and income levels and strengthen social and civic bonds which are crucial to a livable community. The traditional structure of the neighborhood, that is, a discernable center and edge, public space in the center, quality of public space, range of uses, and densities within a 10-minute walk, increases face-to-face interaction.

Based on the studies conducted by Projects for Public Space Inc., public spaces deemed successful and livable by individuals have four key qualities: (1) Access and linkages, (2) Uses and activities, (3) Comfort and image, and (4) Sociability. In other words, these spaces are easily accessible, connected to the surrounding area, include a wide range of activities for users, foster a feeling of safety, are clean and attractive, have enough benches, and above all, provide hubs for social interaction [33].

The Smart Growth Network provides a series of 10 principles for creating and maintaining livable communities five of which relate to social aspects: (1) mixed land uses, (2) compact building design, (3) creating a range of housing opportunities and choices, (4) walkable public spaces, and (5) fostering sense of community [35]. Accordingly, mixed uses and compact buildings allow people to easily access daily activities, make transit viable, and support local businesses. The provision of a range of housing opportunities and choices increases the probability that families with different income levels will live in close proximity. Walkable public spaces together with the creation of distinct and attractive spaces promotes the presence of people in public places as well as a sense of community [35].

4. GATED COMMUNITIES AND SOCIAL LIVEABILITY

Studies on establishing livable gated communities are rare since, it is believed by many that these communities are harmful to the sustainability and livability of cities and, as a result, an end must be put to creating more of them. However, since structural causes such as globalization and economic neoliberalism are behind the expansion of gated communities, it seems unlikely that they will cease unless these structural causes disappear [2, 11]. However, in some countries such as Canada [24], South Africa [3], and Qatar [36], some measures have been taken to control the negative effects of gated communities. Although these attempts have not been made for reasons of livability, the strategies used could help make gated communities more livable.

Grant delves into planning strategies used in Canada to control the wide spread of growth gated communities. Based on her review, municipalities find ways to control built form including gated communities even in the absence of targeted policy. He states that in Canada, where there are no policies limiting enclosure, municipalities and planners look for other ways to control this type of development. For example, the policies limiting the height

of fences and walls along the public streets and requiring the creation of permeable street networks might be used for this purpose. Negotiated development agreements help planners come up with mechanisms to discourage gating by developers [24]. Based on the principles of New Urbanism and smart growth, Ayla Al-Shawish proposes a set of nine principles for making gated communities in Doha more livable: promoting mixed-use developments, creating a mix of housing types, increasing density, ensuring connectivity and accessibility of street networks, creating a pedestrian-friendly public realm, providing pockets of accessible green spaces and parks, activating spaces for greater safety, and creating a neighborhood identity [36]. Using SWOT analysis, Kalantari et al. reviewed the regulations and laws related to gating in Iran [37]. The elimination of multiple decision-making entities and establishing a centralized entity for the affairs of gated communities, using the existing spatial potentials to facilitate communication between the residents inside and outside gated communities, and putting an end to the rapid and out of control growth of gated communities by orienting the tendencies to invest within the community are among the most prominent strategies proposed by Kalantari et al. to mediate the negative effects of gated communities [37].

Based on the review of livability indicators and the possibility of applying their social aspects to gated communities, we identified the physical features affecting the livability of gated communities. Table 1 shows that a livable gated community, socially, is characterized by five dimensions: mixed uses, mixed housing, accessibility, walkability, and sociability. The higher the quality of these dimensions in a gated community, the higher the degree of its livability. These five dimensions correspond to the four dimensions of the negative consequences of gated communities, that is, decreased sense of community, perceived fake security, social exclusion and urban segregation.

Table 1 Dimensions of Social Livability and Their Definition

Construct	Dimension	Definition
Social Livability	Mixed uses	Promoting compatible mixed uses and variation in the land uses of gated communities
	Mixed housing	Creating a mix of different houses, sizes, and prices within gated communities to bring together different groups of people
	Accessibility	The physical and functional capability of gated communities to be used by different users without any limits or physical barriers for children, the elderly, and those physically disabled
	Walkability	Decreasing the functional distance between buildings and services to facilitate walking and create appropriate spots for chance encounters
	Sociability	The degree of social interaction occurring in the public spaces of a gated community which depends on the functional quality of public spaces in gated communities to support voluntary social activities

5. RESEARCH METHODS

5.1. The study area

The statistical population of the study included the gated communities located in Tehran. Lack of relevant preliminary information on these communities in Tehran posed a major problem to the authors. Despite the emergence of gated communities in the early 1960s in Tehran and their increasing growth, this type of housing is not recognized as a unique and different type of housing in Iran. The censuses taken thus far offer no details on the number, distribution patterns, and the number of the residents of gated communities in Iranian cities. To address this problem and improve the external validity of the research study, we used cluster sampling which is an appropriate method for sampling neighborhoods and communities [38]. Cluster sampling in this study involved three stages. The clusters in stage one were "urban districts", in stage two "gated communities", and in stage three "the residents" of gated communities.

Stage one in sampling

Tehran is the most crowded city and also the capital of Iran which based on Tehran Municipality administrative divisions contains 22 districts. In stage one, districts 1, 3, and 6 were drawn randomly from the 22 districts of Tehran (Fig. 2). These three districts represented 10 percent of the population of Tehran and they could be a representative sample of the statistical population.

Fig. 2 Districts 1,3 and 6 of the 22 districts of Tehran

Stage two in sampling

In stage two, the number of gated communities was identified through collecting data from district municipalities and the real estate agencies in the area. To this end, first, based on the definition adopted, the municipalities and real estate agencies were provided with the four features of gated communities and were asked to provide us with a list of the communities corresponding to the features. The features were:

- Impermeable boundary and controlled access to the community
- Shared private ownership of common spaces and private access to them
- The presence of private facilities and amenities for communal use of residents
- The presence of a common code of conduct to regulate behaviors and activities

A list of gated communities in each district was prepared through the data collected from district municipalities and three real estate agencies in each district. Based on the list prepared, there were eight gated communities in district 1, 12 gated communities in district 3, and seven gated communities in district 6. Other communities in the area did not have these four features simultaneously.

Through probabilistic sampling, two gated communities in district 3, one gated community in district 1, and one gated community in district 6 were selected. The number of the communities selected equaled, at least, 10 percent of the total number of the communities identified in each district which ensures that the sample represented the population well. The communities selected include (1) Atisaz community in district 1, (2) Eskan community in district 3, (3) Noor community in district 3, and (4) Vanak Park community in district 6. The following is a brief account of these communities.

Atisaz: Connected to the east by Chamran Highway, Atisaz is located in northwestern Tehran. The Atisaz project was designed by two French and Italian firms and its construction which began before the 1979 Revolution by an Iranian company ended after the revolution. Atisaz is located on a 12-hectare plot of land. Services and facilities located in the center separate the two phases of the project. Situated in the southern part of the scheme, phase one contains nine apartment blocks with a total of 1208 dwelling units. There are three buildings types in this scheme which differ substantially in height, locally referred to as 10, 20, and 30 story buildings. The number of dwelling units varies in each building depending on building type and height – as the height increases, the number of flats on each floor decreases. Atisaz is managed by a board elected from among the residents. The boundary of the community is walled and gated to control access and prevent outsiders from entering.

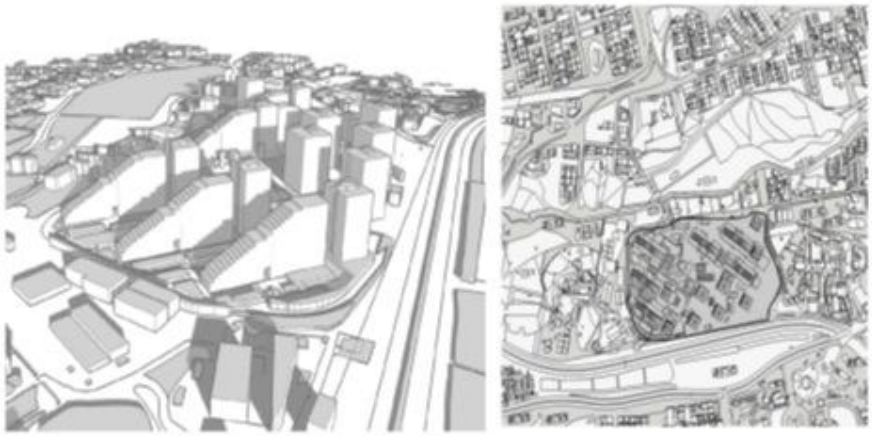

Fig. 3 Atisaz gated community in district 1, Tehran

Eskan: Eskan residential community is located in inner Tehran. Eskan, occupying a 0.8 hectare plot of land, was designed by an Iranian firm named Eskan and constructed by an American firm in 1974. This community includes three apartment blocks connected to each other by a park and services floors. There is a total of 270 dwelling

units in these three blocks and four flats on each floor except for the services floor and the 23rd floor which includes two large penthouse flats. Flat sizes and areas differ on each floor. The community is managed by a management committee elected by the residents. There is also a security system in each tower to closely monitor all those who enter the building. The flats are owned privately and the residents share the costs of security measures and maintenance. There is a community hall, 60 shopping units, 30 business units, three banks, and a restaurant in Eskan community.

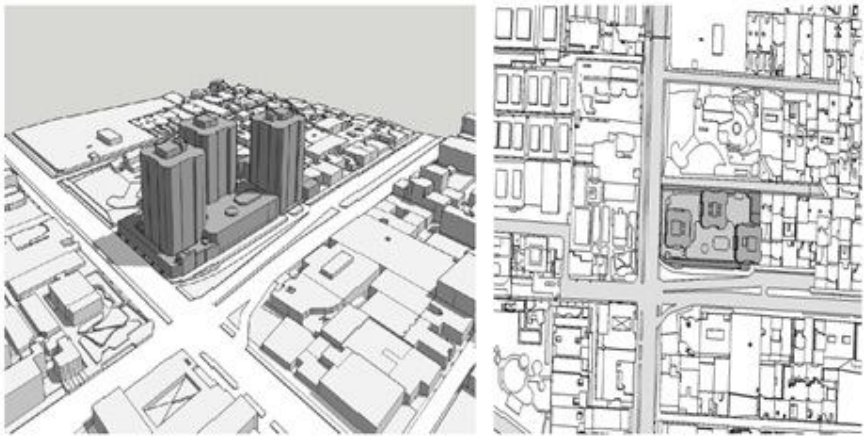

Fig. 4 Eskan gated community in district 3, Tehran

Noor: Noor residential community is located in district 3 next to Niayesh Highway. Designed by an Iranian firm, this community contains 12, at most 5-story, buildings. Public spaces, a playground, and sitting

facilities were also observed within the community. The scheme includes three different flat sizes: 70 m2, 120 m2, and 130 m2. A managing committee elected by residents supervises the maintenance of the buildings and the behavior of residents.

Fig. 5 Noor gated community in district 3, Tehran

Vanak Park: Vanak Park residential community consists of two 24-story and three 17-story apartment blocks. Sitting in District 6, Vanak Park is surrounded by Yusef Abad neighborhood to the south, Hemmat Highway and Shiraz neighborhood to the north, Valfajr residential community to the west, and Kurdistan Highway to the east. This community was designed by an Iranian firm and its construction work started before the revolution. Phase one of this project was completed in 1988. The facilities available on the ground floors of the blocks include centrally located, retail stores, shops, day care services, day nurseries, dry cleaners, banks, offices, and playgrounds. The space between the blocks is equipped with sitting facilities. The boundary of the community prevents outsiders from entering by the use of walls and fences. Movement into the community is controlled through a gate equipped with a guardhouse, CCTV, and roadblocks.

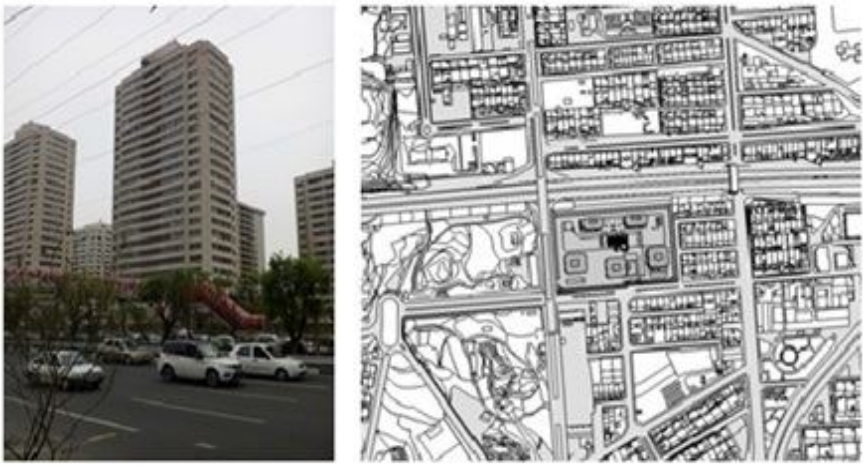

Fig. 6 Vanak park gated community in district 6, Tehran

Stage three in sampling

In the third stage of sampling, the residents of the four gated communities selected were surveyed. Based on the details received from the managing committee of each gated community, 3600 people lived in Atisaz, 870 people in Eskan, 1059 people in Noor, and 975 people in Vanak Park gated communities.

Sample size was estimated using Krejcie and Morgan's Table with a 6% margin of error [39]. Accordingly, 256 residents were selected through stratified sampling based on Table 2. Overall, our sample size exceeded 200 respondents which according to Pedhazur [40] enabled us to have greater control over beta weights and standard error variation in data analysis. In order to increase the potential return and reduce the number of incomplete questionnaires, 15 additional questionnaires were distributed in each community.

Table 2 Sample size based on the communities studied

Gated community	Statistical population	Statistical sample	Questionnaires distributed
Atisaz	3600	142	150
Vanak Park	975	38	45
Eskan	870	34	40
Noor	1059	42	45
Sum	6504	256	280

5.2. Participants

The participants of the study included 258 individuals living in gated communities (139 males, 119 females). 65 percent of the respondents were 30 to 40 years old (mean=34). Regarding marital status, 63 percent were married and 37 percent were single. Regarding employment status, 34 percent were employed, 27 were housewives, 23 percent were students, and 16 percent were retired. Regarding home ownership, 67 percent were home owners and 33 percent were tenants.

5.3. Data collection

To collect the data, we used both observation and questionnaires. Through observation data was collected on the physical features and services of the communities. Table 3 illustrates the features of each community in details. To collect data on residents' evaluation of their place of residence, a questionnaire was used. Table 4 represents the four variables of the study along with the method used to measure them. To measure the reliability of the scale used, Cronbach's alpha was calculated. Twenty two questionnaires were distributed among the respondents to calculate Cronbach's alpha which came to be 0.8 indicating that the questionnaire enjoyed high reliability.

Table 3 Physical features of the studied gated communities

Physical and environmental features	Atisaz	Vanak Park	Eskan	Noor
First occupancy	Phase one,1977	Phase one, 1988	1980	1996
Number of residents	3600	975	870	1059
Land plot area (m^2)	120000	33700	8000	26000
Number of blocks	23	5	3	12

Number of floors	10, 20, 30	17, 24	23	At most 5
Total number of dwelling units	1.208	440	270	326
Total number of business units and offices	56	23	30+60	1
Flat sizes (m^2)	80, 140, 200, 250	110, 155, 215	180, 260	70, 120, 130
Ground covered by buildings	40%	30%	100%	35%
Gross population density (persons per hectare)	567	472	1250	462
Floor area ratio (FAR)	120%	130%	1000%	180%
Per capita space (m^2)	157	56	60	47.5
Available open space	35%	40%	0%	30%
Services	Parks, green space, banks, clinics, day nurseries, playgrounds, shopping centers, restaurants, dry cleaner's	Football pitches, basketball courts, outdoor swimming pool, playgrounds, shopping centers, banks, restaurants	Supermarkets, banks, dry cleaner's, shopping center, indoor playground, community hall	Supermarkets, ATM, banks, playgrounds, green space, shopping center

The questionnaire included 42 questions on respondents' demographic information and different aspects of gated communities. The questionnaire consisted of closed-ended items as follows: Section 1 asked about the demographic information of respondents including: age, gender, marital status, home ownership (owner or renter), and length of residence; Section 2 measured the extent to which they were satisfied with the variables "mixed housing", "accessibility", "walkability", and "sociability of places". The level of satisfaction was measured due to the fact that, in the literature, livability is closely associated with social wellbeing and fitness for living. In the closed-ended questions, respondents were asked to indicate how much they agreed or disagreed with statements such as: "I can easily ride a bike in this community as there are special bicycle lanes" with answer categories: 1=very little, 2=little, 3=somewhat, 4=quite a bit and 5=to a great extent.

The questionnaires together with a letter from the management committee of the community were delivered to residents in envelops door to door. The letter from the managing committee gave an account of the purpose of the study and asked the residents to fill in the questionnaires. In order to ensure that each family took part in the survey only once, the questionnaires were geocoded. In other words, all envelops were coded geographically and based on home locations. Approximately, 55% of the respondents filled in the questionnaires and delivered them to the managing committee. Fourteen days after the date of early distribution of the questionnaires, following a request by the authors, the managing committee sent a reminder letter to the individuals who had not yet answered. As a result, the total number of completed questionnaires rose to 271. After reviewing the questionnaire responses and putting those incomplete aside, the final number of questionnaires analyzed came down to a total of 258.

Table 4 Physical features of the studied gated communities

Construct	Dimensions	Indicators	Data collection method
Social livability	Mixed uses	The presences of mixed uses in the community (business units, apartments, public facilities)	Observation
	Mixed housing	Housing types Price levels for housing Diversity of households from all age ranges, income groups, and cultures	Observation Questionnaire
	Accessibility	A hierarchy of roads Interconnected street network Interconnected bicycle lanes Well-connected public spaces Uncontrolled access to public spaces for all residents	Observation Questionnaire
	Walkability	Public amenities positioned within 5 to 10 minute walking distance Walkable human scaled public realm Separated car, bicycle, and pedestrian pathways Slow speed roads with traffic calming measures Marked road crossings	Observation Questionnaire

Sociability	Diversity in optional and social activities No kind of exclusion Accessible green areas and parks Accessible public playgrounds Accessible public outdoor space Sense of place	Questionnaire

6. RESULTS

The stepwise regression analysis showed that:

- **Step 1**: in the first step, the variable "mixed uses" was added to the model. The R for this variable was 0.567 and the R^2 was 0.368.
- **Step 2**: in the second step, the variable "mixed housing" was added to the model. The R and the R^2 rose to 0.639 and 0.477 respectively.
- **Step 3**: in the third step, the variable "accessibility" was added to the model. The R and the R^2 rose to 0.712 and 0.502 respectively.
- **Step 4**: in the fourth step, the variable "sociability" was added to the model. The R and the R^2 rose to 0.745 and 0.534 respectively.
- **Step 5**: in the fifth step, the variable "walkability" was added to the model. The R and the R^2 rose to 0.726 and 0.523 respectively.

Table 5 illustrates R and R^2, and R^2_{Adj} values for each variable. Table 6 shows beta coefficients and significance levels for each variable.

Table 5 R and R^2, and R^2_{Adj} values for the variables affecting social livability in stepwise regression

Step	Variable	R	R^2	R^2_{Adj}	F	Priority
1	Mixed housing	0.639	0.477	0.471	55.398	2
2	Mixed uses	0.567	0.368	0.361	70.354	1
3	Accessibility	0.712	0.502	0.485	42.478	3
4	Sociability	0.745	0.534	0.512	25.316	5
5	walkability	0.726	0.523	0.504	29.148	4

Table 6 The effects of independent variables on social livability in stepwise regression

Variable	Non-standardized coefficients	Standardized coefficients (Beta)	T	Sig T	Priority
constant	2945.04	-	5.348	0.000	-
Mixed housing	35.25	0.375	0.627	0.081	2
Mixed uses	11.41	0.595	6.609	0.000	1
Accessibility	214.10	0.284	4.564	0.000	3
Sociability	321.14	0.195	2.147	0.007	5
Walkability	395.05	0.224	3.324	0.001	4

These five variables account for 70.3% of variability in social livability. Based on Table 5, the linear equation resulting from the regression analysis is:

$$Y = 2945.04 + 11.41X_1 + 35.25X_2 + 214.10X_3 + 395.05X_4 + 321.14X_5$$

Equation 1

Where,

X_1 is mixed uses

X_2 is mixed housing

X_3 is accessibility

X_4 is walkability

X_4 is sociability.

Beta values show the relative importance of independent variables in accounting for variability in the dependent variable. Results showed that the variable "mixed uses" with a beta of 0.595 had the biggest effect on social livability of gated communities. This suggests that a change of one standard deviation in the independent variable "mixed uses" equals a change of 0.595 standard deviations in the dependent variable, that is, social livability. Mixed housing with a beta of 0.375, accessibility with a beta of 0.284, walkability with a beta of 0.224, and sociability with a beta of 0.195 also affected social livability.

7. CONCLUSION AND SUGGESTIONS

Gated communities are increasingly growing in Iranian cities. Despite negative positions on gated communities, they have become a substantial part of urban housing being established on the basis of creating self-sufficient, planned, and privately owned residential communities. Due to the fact that gated communities did not appear overnight, they will not disappear in the short run and certainly will be the major landscape of cities for decades. Therefore, there is the need to look for a way to fully use the benefits of gated communities and make them more livable.

Making residential communities more livable should be one of the main goals of urban planners and designers. There is no single strategy to achieve this goal. Instead, a set of related principles and recommendations should be adopted in areas such as population, transportation, land use, environment quality, housing design, and urban design to help residents promote the social livability of their communities. Considering the physical features identified in this study, some planning and design recommendations for making gated communities more livable are:

- Creating a mix of houses, sizes, and price levels within the gated community to bring different groups of people together
- Reducing the functional distance between buildings and services to facilitate walking and create appropriate accidental meeting spots
- Providing street networks comprising different modes of transportation including walking, cycling, and driving. Walking and cycling would increase physical activity and the potential of face to face encounters
- Creating a walkable, interconnected, and human-scaled public realm
- Designing the public realm in a way that encourages social interaction and supports diversity through offering different social activities that welcome everyone without any kind of exclusion
- Designing pockets of green spaces and parks within the gated community
- Activating spaces for more safety through improving visual access to spaces in a way that the whole community could have eyes on the street
- Creating a unique identity for the gated community.

ENDNOTE

This research is based on Mohammad Jalili's PhD dissertation "The Effects of Residential Communities' Physical Boundaries on Residents' Perception of Fear of Crime and Sense of Comuunity: A Comparison Between Gated, Perceived Gated, and Non-gated Communities in Ekbatan Town" supervised by Dr Ramin Madani and Dr Alireza Einifar and advised by Dr Bruce Judd in the Department of Architecture, Faculty of Architecture and Urban Design, Art University of Isfahan, Isfahan, Iran.

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