# Creating Sense of Community in Gated Apartments in the City of Colombo

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### Abstract

*With increase in population and limitations in urban land, there is a growing demand for vertical housing resulting in a dramatic increase in the construction and the occupation of vertical housing. Such fast growing vertical housing for middle-income urban dwellers, are prevalent in many parts of Colombo and marketed as places for optimal "Sense of Community" and "Ideal Places for Living". But such identities created by developers are questionable. This paper tests the "Sense of Community" indicators in selected urban gated housing in Colombo and identifies several built environment factors that can enhance "Sense of Community".*

*Questionnaire surveys are done within three selected cases in Colombo to measure "Sense of Community Indicators". The built environment factors relevant to sense of community such as building layout, spatial relationships between dwelling units, visibility levels, circulation spaces , common spaces were observed via, questionnaires, checklists, inventories and systematic observations.*

*As a preliminary attempt to explore the sense of community in gated housing in Colombo, the study shows that visual and physical spatial integration can enhance vertical interactions among neighbours across floors. Building layouts with open corridors and central courts is more appropriate than the now commonly seen housing layouts with single linear internal corridors and types with housing clustered around lift cores. The strategic locations of common spaces and its qualities in terms of habitability facilitates interactions and better sense of community than the extent and quantity of common spaces allocated in housing.  Although findings supports studies discussed in literature review the limited qualitative data and number of cases may lay set backs to the research findings.*

 *Keywords:*    *Sense    of    Community,    Vertical    Housing,    Gated Communities, Colombo*

## Gated Communities

Gated communities are known to be a self contained communities separated from its context with restricted access to the outsiders. Gated communities may be in the form of low-rise, mid

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rise or high rise. Blakely (1999) introduces "gated community" as physically privatized areas with restricted entrances.  Gated Communities are also described as housing developments with

gates across its primary access, surrounded by fences, walls or other natural barriers that limits and restricts public access (Grant, 2004; Khalfani, 2012). Gated Communities differentiates their residents socially and physically from their surroundings through levels of security Akgun (2012) and can be discussed under three typologies namely; Lifestyle communities; Prestige communities; Security zone communities (Blakely, 1999). Lifestyle communities refer to communities focused on leisure activities, common amenities etc. Such neighbourhoods cater to communities seeking an identity, share lifestyles and security within a community. Prestige communities serve residents who expect symbol of wealth and status, separated from the common, with privacy and exclusivity in their residential environments. Security zones refer to communities with barricades, physical boundaries, such as walls and fences securing the residents from the outside. Such communities may exist as low rise, mid rise or high rise.

Although gated communities is a fast emerging neighborhood type it is observed that such neighborhoods have less social contacts among its neighbors; lack of neighborly interactions hence a lack in "sense of community". Ancell (2008) identifies three levels of needs for social sustainability namely; 1. Fundamental needs such as affordability and housing quality; 2. Intermediate needs such as transport and facilities; 3. Ultimate needs such as neighbourhood quality and relationships in the community (see figure 1.1).

Sense of Community can be discussed as an important criterion for a socially sustainable neighbourhood whether gated or otherwise. Study by  Siti Rasidah (2012) found that residents of non-gated residential areas have higher Sense of Community values than residents of gated residential areas in Malaysia. Blandy (2005) identifies four main items such as; property value; security features, leisure facilities and moving into a community as reasons for people to prefer gated communities. The preferred and important factors in descending order is identified as property value, moving into a community, security features and leisure facilities. Other factors such as easy access to city centre, quiet pleasant neighbourhood characteristics, easy maintenance, investment potentials and attractive designs are other factors that may attract buyers of gated neighbourhoods. According to studies done by Ariyawansa (2011) security, convenience, location are factors influencing the choice of gated neighbourhoods in Colombo. If such gated neighbourhoods thrive in terms of sense of community or not is questionable.

## Sense of Community and Framework for Examining Sense of Community:

Sense of community helps to build-up social interactions and relationships in every community. In literature it has several definitions and interpretations. It is described as the simplest first grouping beyond the family which has social significance and which is conscious of some local unity and sense of community and is associated with the commitment given by the members of the community to others in society (Siti Rasidah, 2012) .

Sense of community (SOC) is defined as "a feeling that members have, of belonging and being important to each other, and a shared faith that members' needs will be met by their commitment to be together" (McMillan, 1986). Four dimensions for measuring SOC are defined by McMillan (1986) such as 1. Membership; 2. Influence; 3. Integration and fulfillment of needs and 4. Shared emotional connections.
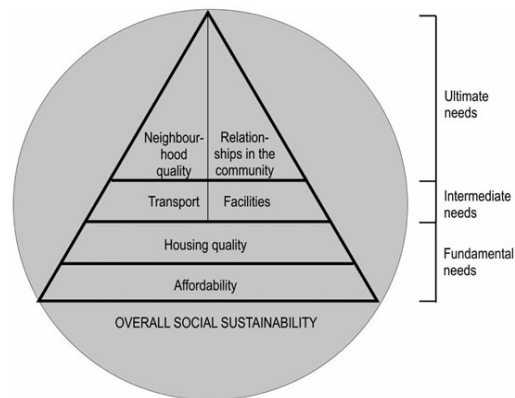
Fig 1 -Conceptual evaluation model of the social sustainability of housing.

Source: Ancell, S and Fawcette, M. T (2008) The social sustainability of
medium density housing: A conceptual model and Christchurch case
study, Housing Studies, 23(3), p. 423.

Siti Rasidah (2012) used above dimensions for measuring sense of community with a structured questionnaire. Membership refers to residents' familiarity with other residents, participation in community activity and Influence refers to interdependence among the neighbours by helping each other, value and respect for neighbours views and comments. Integration and fulfillment refers to the residents sense of belonging to the neighbourhood, trust and general outlook towards the neighourhood, if it's a good place to live in. shared emotional connections refers to the togetherness among the neighbours and living in a community, celebration of each others festivals and the participation in same, sense of care towards each other in the community. Zhang (2011) uses four items to measure SOC with three auxiliary measures such as; a) Importance of community membership; b) Attention devoted to the community; c) Feelings for the community; d) Attachment to the community. The Auxiliary measures are; a) Residential satisfaction; b) Attitude toward the community and c) The attitude toward neighbours. Zhang and Lin (2011)s' dimensions and their structured questionnaire is more complex than   Siti Rasidah et al (2012)s' dimensions and questionnaire.

Awareness of fellow residents, knowing them and developing relationships with them are also identified as important factors for sense of community by Abdul Aziz (2012). Neighbours known to each other on the same floor and other floors is also considered as indicators for SOC in a neighbourhood (Abdul Aziz, 2012).

As of the above review the indicators for SOC adopted for this study, and to be measured via a structured questionnaire is discussed in Table 1.

**Table 1: Measures for SOC**

| SOC Indicator | | Tool |
|---|---|---|
| Membership | Questions reflecting identifying others in the neighbourhood, respondent being familiar to others in the neighbourhood, respondents participation in community activities | Questionnaire survey Rated on a 5 point likert scale 1 = strongly disagree 5 = strongly agree. |
| Influence | Questions reflecting the respondents care over others property/ belongings, respect for others views, Communal participation in solving problems in the neighbourhood. | McMillan (1986) and Siti-Rasidah et al (2012) |
| Integration and Fulfillment of needs | Questions reflecting the respondents identity in the neighbourhood and sense of belonging, trust in others within the neighbourhood, if the neighbourhood is a good place to live in. | |
| Shared Emotional connections | Questions reflecting the respondents feelings/satisfaction in living within the community, sharing of important personal, religious and national events among the community, communal care for each other in the neighbourhood. | |
| Awareness of fellow residents | Questions reflecting the familiarity between neighbours, the forms in which they are known – by name, face etc, communication with them, and familiarity among neighbours of same floors and different floors. | Questionnaire survey (Abdul Aziz, 2012) |

## Sense of Community and the Built Environment Factors in Gated Communities:

Many planning and architectural challenges are faced to achieve neighbourhood ties, unity and sense of community. The interactions between vertical neighbours are different to that of horizontally placed neighbours, where the challenges for neighbourhood ties are more challenging in vertically neighbourhoods.

In vertically placed housing the modes of circulation and the access to public and communal spaces can have impact on how the communities interact and how sense of community is established. Lee (2000) found that housing size, building layout, corridor type-stairway, open corridors have impact on community livability in housing. He shows that larger housing sizes and stairway type corridors enhance community livability. Abdul Aziz (2012) used two indicators to measure the physical impact of building layout on social contact which are the visible levels between the home and outdoor spaces and the spatial relationships among dwellings. They found that housing with open corridors and clustered around large central courts had higher social contact level while housing clustered around a staircase had low social contact levels in apartment buildings.

Other factors found to affect the SOC values among neighbours are the type of tenure, people living in rented housing showed lower levels of SOC due to a lack in the sense of attachment to their homes and communities. Also the length of residence in a community had a positive

influence on SOC, where long standing residents had higher SOC levels as opposed to new comers. Those living with children were also found to have higher SOC values (Zhang, 2011).

Rogers and Sukolratanametee (2009) as cited in Siti Rasidah (2012) found that residential areas with ecological designs have a higher SOC values. They describe ecological designs having mini parks; pedestrian walkways etc. and they also state that an attractive physical environment will increase SOC. Continuous provision for visual access between spaces is also an important feature where sight lines become important for people to see spaces and use them (Gehl, 2001). This may influence the use of space and thereby interaction with others may occur.

According to Grant (2004) the avilability of amenities and facilites within an enclave may also affect the interactions with the exterior world and have implications on social integration and exchange. The self governnece possible in Gated Communities is also a factor that is found to enhance SOC among residents (Blandy, 2005).

Studies show that there are many factors both built environment related and none related, influence the SOC values among residents in Gated Communities. But the focus of this research paper is limited to discussing the Built Environment related – Building Layout indicators that have impact on SOC in Gated Communities (Table 2).

**Table 2: Measures for Building Layout Indicators**

| BE Indicator | | Data collection Tools |
|---|---|---|
| housing size, building layout, corridor type-stairway, open corridors<br><br>Lee (2000) | Number of rooms in unit/area<br>Type of corridor in plan form and sections<br>Stairway locations in plans and sections. | Checklists, inventories and systematic observations. |
| Visibility level between home and outdoor spaces, visual access between spaces, sight lines<br><br>Abdul Aziz (2012), (Gehl, 2001) | Numbers and types of opening and their sizes<br>% number of units that can be seen from the middle of the floors.<br>Visibility level between home and outdoor spaces (semi-public area) | Checklists - analysis of plans, sections and elevations |
| Spatial relationships among dwelling units.<br><br>Abdul Aziz (2012) | Residents' pathway to their unit (by plan form).<br><br>Pathways going through common spaces and their opportunity for social contact<br><br>Pathways that avoid common spaces and their opportunity for social contact | Systematic observations and questionnaires |
| | Meeting places - corridors, stairways and lifts<br>Most used type of circulation and the type and levels of communications with | Questionaire, observations, mapping |

|  | neighbours |  |
|---|---|---|
|  | Balconies, Windows and Doors as a point of interaction between the private, semi private and public spaces<br><br>Comparison of the availability and type of openings, balconies etc<br>The levels and types of communication established among residents via communication through such openings | Observations<br><br>Analysis of plans, sections |
| Common spaces, avilability of amenities and facilites.<br><br>Ecological designs and an attractive physical environment<br><br>Grant (2004), Siti Rasidah (2012) | % areas of public, semi public and private, common spaces, facilities.<br><br>The quality of the physical environment such as landscape etc. | Checklists, inventories |
| Type of tenure, length of residence, families with children.<br><br>(Zhang, 2011) | Questions reflecting owner/rented accommodation, length of residence, number of children | Questionnaire survey |

## Gated Communities in Sri Lanka

Gated communities are not an alien concept in Sri Lanka. Ancient traditional rural village settlement has some features that show elements of gated communities. Tank-fed village is margined by a fence and houses were located in a circular layout pattern with grain bins located in the middle of the circle. Two entrances are located on the opposite sides to enter the central square with a fence referred to as "Kadulla". The entrances on the opposite sides enabled a thoroughfare through the village (De Vos, 1997). The fence ensures protection mainly from harmful animals from the jungle that surrounded the village. It also restricted and controlled access into the village with limited entry focused to the centre of the village square (see figure 2).
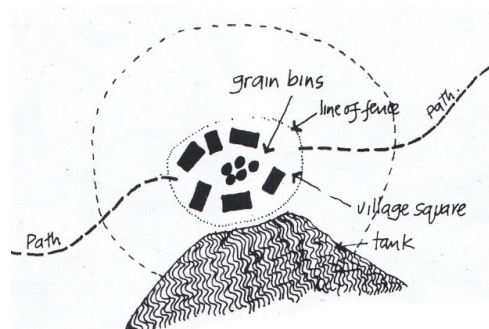
Fig 2-Tank fed village

Source: De Vos, A (1977) some aspects of traditional rural housing and domestic technology, proceeding of the National Symposium on Traditional rural culture of Sri Lanka, Department of National Museums: Sri Lanka. p. 42.

Gated communities can be found even in the colonial era. In the Dutch period they built forts to protect themselves from enemies. All common facilities were located within the fort. A clear physical boundary (rubble fort walls) and the grand entrance are most significant features. Ex-Galle fort (see figures 3 and 4).



Fig 3 -Fort Wall, Galle.
Source- Author

Fig 4 -Entrace gate,Galle Fort
Source- Author

With the open economic reforms in the 1970's a boom in the commercial and residential industry was seen. With the increased demand for land and an increase in population densities mid-rise and high-rise vertical Gated Communities emerged in Sri Lanka. The rapid growth after the 1970's created higher demands for residential buildings in Sri Lanka resulting in programmes such as "Hundred Thousand Houses Program" (HTHP), "Million Houses Program" (MHP), and "One Point Five Million Houses Program" (1.5MHP) (Niriella 2012). Incentives such as tax relief encouraged property developers to build luxury gated neighbourhoods. A great demand for low-rise condominiums was seen due to the increased migration of educated, middle income category to the city (Ariyawansa, 2011). The gated housing solution offered the middle income dwellers the security they desired. Three categories of gated communities could be identified.

**Low- rise gated community -** In the last period of 90's, a trend of low- rise gated communities were seen with Millennium City –Athurugiriya in 1999 (Niriella 2012). The Architects involvement with other professionals was seen in these developments. Two or three story

detached housing units with common facilities like shop houses, swimming pools, landscape areas, children play areas, 24 hour security service are the key features creating a new life style and way of living in Sri Lanka (see figure 5).

**Midrise apartments -** Wellawaththa area is a highest density area with gated mid-rise apartments since the 1990's (Herath 2008). Compacted mid-rise (G+7 or G+8) apartment with security, car parks in open ground floor are the main feature of that category. A high involvement of the developers is seen but the architects' involvement is rare. There aren't common facilities like children play areas and gyms. This kind of typology is seen in Bambalapitiya, Dehiwala , Kotahena, Narahenpita areas (see figure 6).

**High-rise apartment -** The high rise dwelling concept was established in Sri Lanka with Royal Park, Trillium residencies (Borella). These buildings had the involvement of architects. Open inbuilt spaces were allocated in the ground floor and they also included common facilities. Havelock city touched a new trend in high rise gated communities with large mix development and huge elevated roof gardens popularly known as "podiums". A city within the city" was their concept. Both of those are targeted luxury clientele (see figures 7 and 8).



Fig 5 -Low rise Gated Community - Millenium City ,Athurugiriya
Source:
http://www.lanka.info/Sri_Lanka/realestate/homesSale.jsp?page=12



Fig 6-Mid-rise Apartments in Wellawaththa
Source- Author



Fig 7 - Trillium Residencies (Borella)
Source:
http://www.lankapropertyweb.com/new-developments/Trillium+Residencies. Copyright 2013by lankapropertyweb.com



Fig 8- Havelock City
Source:
http://www.havelockcity.lk/recidencies/hc_ebrochure/index.html. Copyright n.d. by Mireka Capital Land (Pvt) Ltd

## Research Objectives and Method

In reaction to the development pressures and market demands, developers promoted gated neighbourhoods as ideal places for living. The sense of neighbourhood, community spirit is a point for attraction and competition among the projects. But if such neighbourhoods are really creating better neighbourhoods, neighbourhood ties and sense of community is questionable. The objective of this study is to explore the implications of built environment factors in enhancing sense of community. Table 3 identifies the research objectives and methods to achieve same.

A case study method is used to explore the SOC values in three selected cases with variation in Building layouts, in order to compare the implications of building layout indicators on SOC. Due to the limitation of time and resources a case study was done but in addition surveys within a larger number of neighbourhoods would have established better conclusions. The data and data collection procedures are primarily quantitative in nature, but a combination of qualitative and quantitative data would have resulted in more in-depth understanding of the cases and the subjects.

**Table 3: Summery of Objectives and Method**

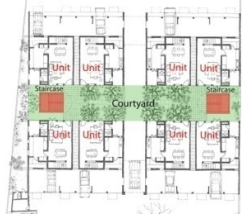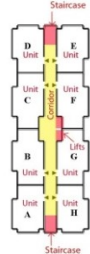| Research Objectives | Data | Data collection Method |
|---|---|---|
| 1. Understand the prevailing conditions of sense of community in gated middle-rise apartment residences. | Occupants' sense of community | Literature review established the indicators for measuring SOC in a given community and Questionnaire survey was adopted to measure same in the three selected cases. |
| 2. Examine a theoretical framework to identify – What are the Architectural Implications on "sense of community". | Architectural factors which affect SOC | Study is limited to exploring the implications of building layout and the common facilities in the three selected cases. Indicators for building layout and common spaces were established via literature review (Table 2) and measured via checklists, inventories and systematic observations. |
| 3. Identify Impact of building layout, common /public spaces on SOC. | SOC scores are tabulated as per the SOC indicators (Table 1) and data on identified building layout and common space indicators are extracted from each case (Table 2) | Comparative analysis is done of SOC scores of selected cases and the variation in building layout/common space indicators across the three cases. |

## Data, Data Collection Tools and Procedures

The study has both subjective data relevant to inhabitants' views and interactions with each other reflecting their levels of SOC which can be measured via questionnaire and also objective data which are the physical building layout and factors that can be measured using checklists,

observations, photographic surveys and inventories. The indicators as established from the literature review and the relevant data and data collection tools used are shown in Table 3.

Three cases were selected on the basis of having clear physical boundaries with restricted public accesses (gated), variation in building layout and architectural features (common spaces, circulation, accessibility, landscaping, openings/fenestrations etc), Located in same area (Colombo), Residential apartments (Not mixed land use - to avoid effect of mixed land use factor), Completed projects (at least older than 5 years after completion) and limited to only three mid-rise (G+3 to G+7) neighbouhoods since data collection from most other high rise housing was allowed. Table 4 describes the selected neighbourhoods.

**Table 4: Summary of Selected Cases**

| Selected cases | Case 1 | Case 2 | Case 3 |
|---|---|---|---|
| **Name** | Kandewatta residencies | Park west | Span Tower |
| **Location** | Nugegoda | Colombo 05 | Colombo 04 |
| **Income Group** | Middle Income | Middle Income | Middle Income |
| **Characteristics** | Central court with two staircase elements at both ends(open corridor)  | Single internal corridor  | Cluster around lift and stair case  |
| **Land area** | 60 Perch | 57 Perch | 27.2perch |
| **Year of occupation** | 2003 | 2003 | 2005 |
| **No of floors** | 3.5 | 7(G+6) | 8(G+7) |
| **No.of units per block** | 24 | 46 | 21 |
| **No of units per floor** | 12 | 8 | 3 |
| **Ground level unit** | Yes | No | No |
| **No of staircase** | 2 | 2 | 1 |
| **Split level units** | Yes | No | No |
| **Common facilities** | Not provided. | Roof terrace, gymnasium, Common hall | Roof terrace, gym, swimming pool |
| **Self governance body** | Yes | Yes | No |
| **Sample size (50%)** | 11 | 23 | 10 |

A questionnaire survey was done among the respondents of the three cases. The questionnaire measured the main components of SOC as derived from the literature review (Table 1).  Four

dimensions for measuring SOC;  Membership, Influence, Integration and fulfillment of needs and Shared emotional connections is measured via a structured questionnaire on a 1- 5 Likert scale (1 = strongly disagree, 5 = strongly agree). In addition the residents' familiarity with neighbours and frequency of use of common spaces are gathered via questionnaire surveys and observations at site.

The interviewee was the owner/occupant or his/her partner in an apartment unit. One questionnaire form was given to each unit. Survey was done on weekends to ensure availability of householders for the survey. Both door to door visits and distribution of questionnaires were done. The number of inhabitants in each case study, the sample population and their profiles are shown in Table 5.

**Table 5: Profile of Sample Population**

|  |  | Case 1 | Case 2 | Case 3 |
|---|---|---|---|---|
| **Number of occupied units** |  | 22 | 46 | 20 |
| **Sample size (Respondents)** |  | 11 | 23 | 10 |
| **Gender** | Male | 40% | 56.5% | 60% |
|  | Female | 60% | 43.5% | 40% |
| **Age** | 20-40y | 50% | 60.8% | 50% |
|  | 40-60y | 40% | 30.4% | 40% |
|  | Above 60 | 10% | 8.7% | 10% |
| **Civil States** | Single | 10% | 26.0% | 30% |
|  | Married | 90% | 73.9% | 70% |
|  | Widowed | - | - | - |
| **Employment** | Government | 20% | 13.0% | 20% |
|  | Private | 40% | 65.2% | 50% |
|  | Self employment | 10% | 13.0% | 20% |
|  | Pensioned | 20% | 8.7% | 10% |
|  | Not Employed | 10% | - | - |
| **Unit type** | 2 bed room | 33.3% | 100% | 30% |
|  | 3 bed room | 66.6% | - | - |
|  | 4 bed room | - | 52.1% | 70% |
| **Housing Tenure** | Own | 70% | 47.9% | 70% |
|  | Rented | 30% | - | 30% |
| **Length of Occupancy** | Less 1 Y | 20% | 8.7% | - |
|  | 1-5 Y | 20% | 47.8% | 20% |
|  | More 5 Y | 70% | 43.5% | 40% |
| **Children** | yes | 30% | 56.5% | 50% |
|  | no | 70% | 43.5% | 60% |

A better understanding of the inhabitants SOC levels could have been established if in-depth interviews were conducted in addition to the questionnaire survey and if also the questionnaire survey could have target a larger sample population. Also activity logs could have assisted in getting a better understanding of the resident's participation in communal activity and interactions with neighbours.

The Building layout indicators were measured using checklists, inventories and systematic observations (Table 3). The study was limited to collecting data on the building layout indicators discussed in Table 3, but there are other factors discussed in the literature review, both built environmnet related and other socio-cultural and economic factors that have not been discussed within the scope of this study.

## Findings and Discussions

**Comparison of SOC values**: The SOC values of the individual respondents are measured as per the results generated from the questionnaire. Table 6 shows the overall SOC values for each case.

**Table 6: Sense of Community Measures**

| SOC factor | | Case | | |
|---|---|---|---|---|
| | | C1=KR | C2=PW | C3=ST |
| Membership | (M) | 82% | 64.9% | 60% |
| Influence | (I) | 68.6% | 39.1% | 34% |
| Integration and fulfillment of needs | | 80.6% | 53.9% | 49.3% |
| Shared emotional connection(S) | | 65.3% | 47.2% | 42.6% |
| Average | | 74.3% | 51.3% | 44% |
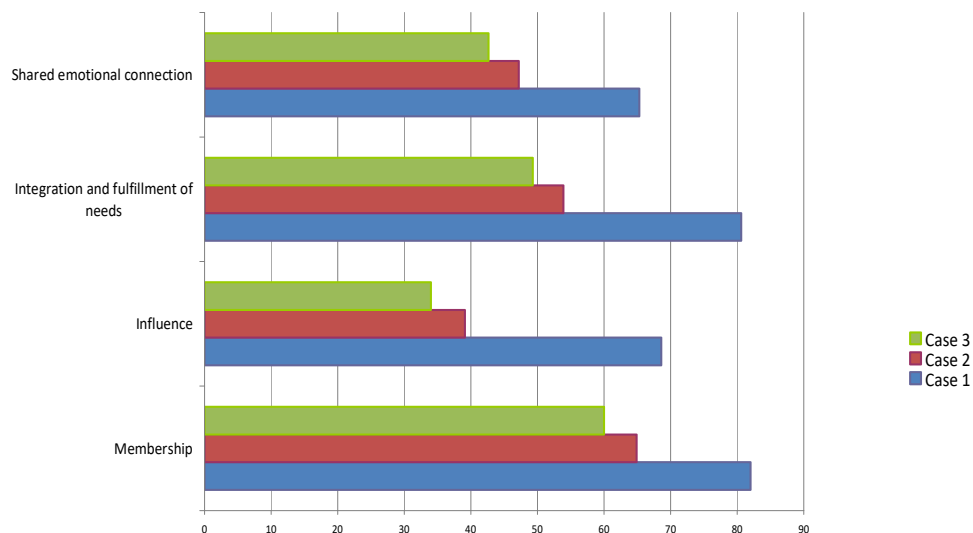


Fig 12 -- Sense of Community Measures

As shown in the results in Table 6 the total averages show that Case 01 has highest SOC and Case 03 has lowest SOC level across all four SOC dimensions, which is also displayed in Figure 12. Membership and Integration and fulfillment of needs is the most scored factor for Case 1 , 2 and 3. While shared emotional connections and influence scores relatively lower in all three cases. But the overall SOC value is significantly higher in Case 1.

When comparing the samples population profiles it shows that in Case 1, 70% of the respondents have been living in the neighbourhood for over 5 Years while in Case 2 and 3 respectively it is only 43% and 40%. This indicates that a higher level of SOC may have been established due to the long occupancy of the residents in Case 1 which supports the findings of Zhang (2011).

**Comparison of Built Environment Factors relating to SOC values:** The following section looks at the "Built Environment" factors that may explain and contribute to the comparisons made in the SOC values across the 3 cases.

- **Visibility level in the near home outdoor spaces and Spatial relationships among dwelling units:**

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Table 7- **Visibility Level in the Near Home Outdoor Spaces**

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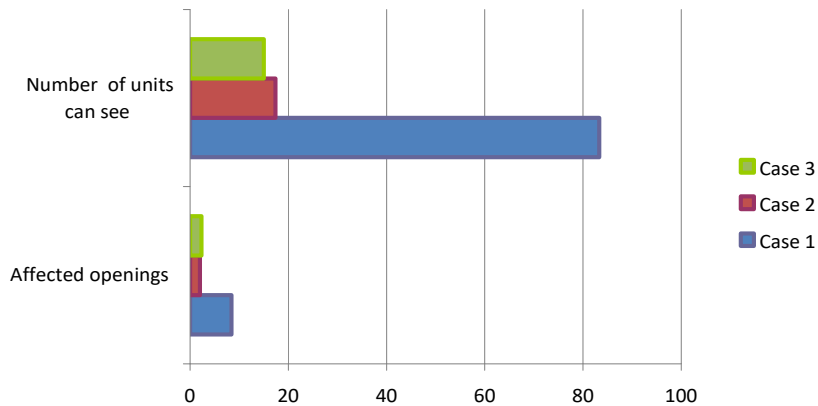| | Case | | |
|---|---|---|---|
| | C1=KR | C2=PW | C3=ST |
| Percentage of openings (doors / windows) per enclosed unit | 8.4% | 2.0% | 2.3% |
| No of units that can be seen from middle of the corridor floor(Percentage per complex) | 83.33% | 17.39% | 15% |



Fig 13 - Visibility level in the near home outdoor spaces

Case 01 shows higher levels of visibility across neighbouring units (figure 13). Percentage of opening (windows, balconies) towards the residence pathway is high in case 01 (83.33%) and balconies are mainly focused towards the central courtyard (center public space). There is also high visibility across the apartment units on same floor as well as other floors which can be visually connected via private balconies, corridors and lobbies (figures 14 – 18).

Fig 14- Balconies are mainly
focused towards the middle
courtyard – Case 1
Source- Sierra Property
Developers (Pvt). Ltd

Fig 15 - Balconies are mainly
focused towards the middle
courtyard – Case 1
Source- Sierra Property
Developers (Pvt). Ltd

Fig 16 -Visual connection with
courtyard from ground floor unit –
Case 1
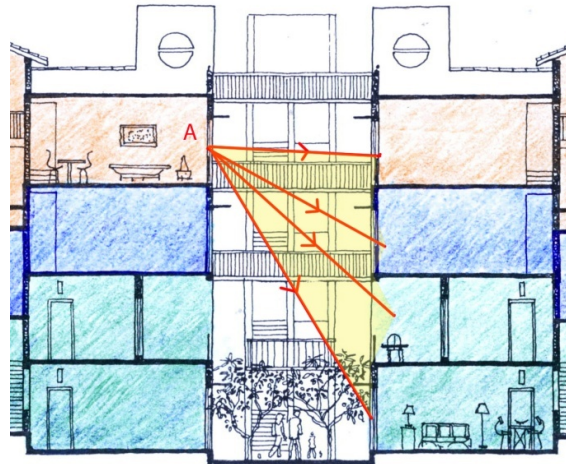Source- Sierra Property Developers
(Pvt). Ltd



Fig 17 - Vertical visible area to the point name as "A" – Case 1
Source- Author

Fig 18- Horizontal visible connections in Case 01
Source- Author

Case 02 and 03 has low percentage values for visibility level. There aren't any balconies focused towards the center pubic space (floor lobby). The main entrance door is the only opening and point of connection to the floor lobby. All balconies are focused towards the outside of the complex. So they don't facilitate any visual interactions between neighbors within the complex. There is a small light well for gaining natural light in case 03, but its size is insufficient for visual interaction between floors and its neighbours (figure 19). The visual connection can be enhanced by a larger light well that will also serve the purpose as a visual connector between neighbors.



Fig 19 - small light well - case 03
Source- Author

The corridors in case 02 are very dark (figure 20 & 21) because of long enclosed linear spaces. It's not a friendly environment for interactions. The distance between two entrances of units on the same side of each floor is high. There isn't floor lobbies connecting main entrances of the units on each floor. There is a floor lobby in front of the elevators (lifts) but it's a useless space for interactions due to dark environment and comparatively long distance to unit entrances.

Fig 20 -Entrance to floor from staircase -
case 02
Source- Author



Fig 21-Long, dark corridor - case 02
Source- Author

Above figures 14 – 21 , shows the comparisons of horizontal and vertical connections observed across the three cases explaining the possible influence on higher SOC values observed in Case 1 as oppose to Case 2 and 3. This confirms the studies of Abdul Aziz (2012) and Gehl (2001) where visual connections can attribute to high SOC.

**Availability of Public, Semi Public and Private Spaces:** The overall percentage of floor areas used for pubic, semi public and private spaces in a complex is tabulated. The interior space within the housing unit is considered as private space while balcony and lobby spaces are considered as semi public spaces. Courtyard, car park, gym, swimming pool, roof terrace, common hall spaces are considered as public spaces (Table 8).

**Table 8 – Public, Semi Public and Private Spaces**

|  | Case | | |
|---|---|---|---|
|  | C1=KR | C2=PW | C3=ST |
| Public space | 11.47% | 24% | 22.2% |
| Semi public space | 9.2% | 20% | 16% |
| Private space | 79.3% | 56% | 51.6% |
| Public :semi public :private | 11 :9 : 79 | 24:20:56 | 22:16:52 |

Case 2 has highest percentage of public spaces ( 24%) and semi public spaces(20%) as shown in figure 22, and case 03 shows second highest of public (22.2% ) and semi public spaces (16%) compared to case 01 which shows the lowest (public=11.47%, semi public=9.2%) (Fig 22). Although Case 02 and Case 03 has achieved more public and semi public spaces than Case 01, the comparison of average SOC scores show that Case 01 SOC score is higher than cases 02 and 03.

Although it is expected that a higher percentage of public and semi public spaces within a neighbourhood would foster more interactions and SOC, the study explains otherwise. The reasons could be attributed to the physical quality of public and semi public spaces rather than the square areas. Results show that creating a lot of public and semi public spaces does not necessarily help to build high SOC values among neighbors and supports studies of Rogers and Sukolratanametee (2009) as cited in Siti Rasidah (2012). Ground floor usage and split level units

help to enhance private spaces in case 01 meanwhile providing a large central courtyard which isn't available in other cases which may also attribute to better SOC levels in Case 1 . Studies done by Abdul Aziz (2012) also show similar results where housing with open corridors clustered around a central courtyard is a positive influence on SOC.
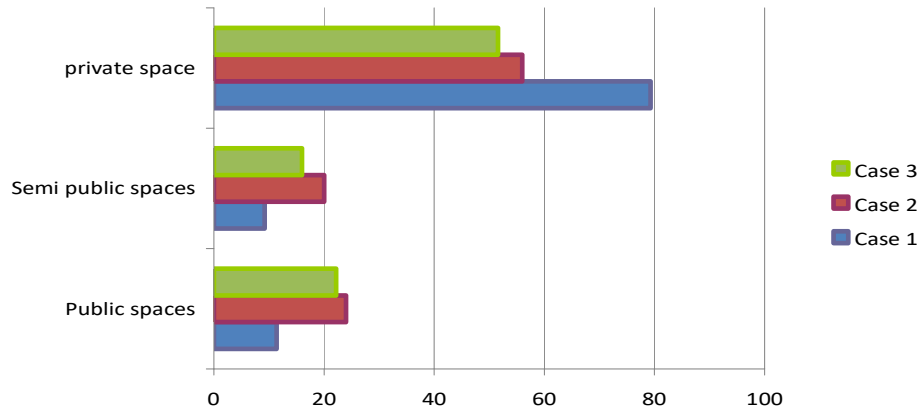


Fig 22- Spatial relationships among dwelling units

**Meeting Places:** An inventory is done of the common meeting places for neighbours. The study identifies, Corridors, staircase, lifts, courtyards and car parks as common areas where neighbours are bound to make contact with each other on purpose or by chance. The following Table 9 identify the percentage of meetings or contacts made between neighbours in each of the identified locations within the neighbourhood.

**Table 9 - Neighbors meeting places**

|  | Case | | |
|---|---|---|---|
|  | C1=KR | C2=PW | C3=ST |
| On corridor (or floor lobby) | 27.5% | 53.2% | 50% |
| On stair case | 55% | 2.1% | 0% |
| In lift | - | 100% | 100% |
| Car park | 60% | 70.6% | 75% |
| Courtyard | 100% | - | - |

Most of the occupants in Case 01, meet neighbours in the courtyard. This occurs due to the residents day to day pathways being located across the courtyard. Every occupant has to pass the courtyard in order to reach their units. The landscaped, shaded courtyard acts as a pleasant walk through for residences and chatting and greeting each other is encouraged on a daily basis. Figures 23 and 24 shows the apartment units on the ground floor and the courtyard shaded with Araliya trees, and pathway in the middle.

Fig 23 - Ground floor units' connection with pathway**.**
Source- Sierra Property Developers (Pvt). Ltd



Fig 24- Residence pathway fall across the courtyard.
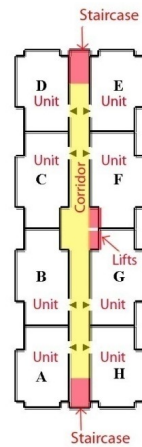Source- Sierra Property Developers (Pvt). Ltd



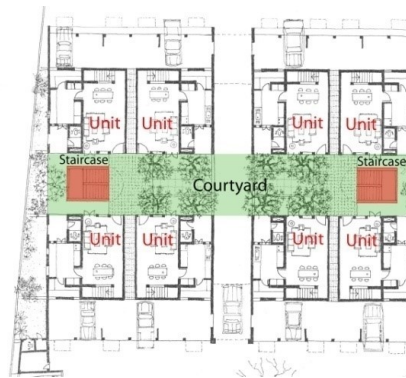Fig 9- Type 1- Central court with two staircase elements at both ends
Source- Author



Fig 10- Type 2 - Layout with Single internal corridor
Source- Author



Fig 11 – Type 3- Layout with cluster around lift or staircase
Source- Author

The residents' pathway to their units in case 01 (figure 25 and 26) clearly shows the nodes which encourage interaction between neighbors (A,B,C,D,E in case 01). Three nodes out of five are in courtyard space. Two nodes are in the floor lobbies in the first floor (figure 25).
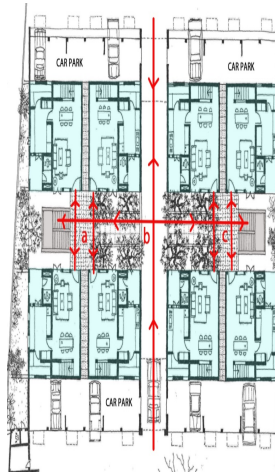
Fig 25 -  Residents' pathway to
their units in case 01 (ground



Fig 26- Residents' pathway
to their units in case 01

Majority of occupants in Case 02 and 03 meet their neighbors while waiting for the lift or while inside the lift. In both these occasions conversation other than a quick glance or greeting is not encouraged. The use of staircases in these cases is fairly low. In case 02 and 03 there is no defined pathway on the ground floor, and instead the main ground floor space is the parking space. Hence the second most common space to meet neighbors is the car park in case 02 and Case 03, while Case 01 also indicates the second most common space to meet their neighbours as the car park.

Results indicate the importance needed to be given to parking areas, to make them more encouraging for human contact and interaction. Car park is dominant all over ground floor in both case 02 and 03 (figure 27). There are no apartment units on the ground floor and residents are directed from car park to their individual floors and units.



Fig 27 - Car park is dominant all over ground floor in both case 02 and 03
Source - Author

There is no Ground floor attachment with a common court in Cases 02 and 03. The Car Park is the main feature on the ground floor hence lacks a common space for interaction in their day to day circulation. Ground floor can be utilized by shifting parking in to a basement level and creating a common floor where all will pass with more chances for interaction as residents go to their respective floors. The opportunities for creating successful nodes in the typical floors in case 02 are missed out due to the arrangement of unit entrances and floor lobbies (figure 28). Nodes A, B and C could be suggested as ideal locations for encouraging interaction on the typical floors.
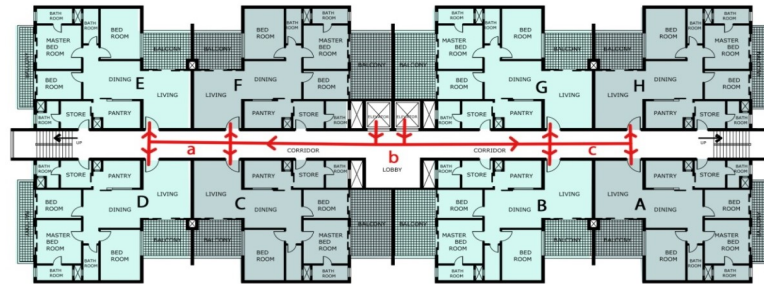


Fig 28- Residents' pathway to their units in case 02 -
typical floors

In Case 03 there are successful nodes in the typical floors which are the lobby space. But its small size and arrangement isn't helping interactions and meetings (figure 29).

In the property market; the floor area of the unit is a major competitive factor. Every property developers try to improve profit, and Case 01 is a good example for increased qualitative value of public spaces while maintaining a high percentage of rentable private space. Fewer public and semi public spaces that are strategically located can be more effective in fostering positive interactions and better SOC among the community.



Fig 29- Residents' pathway to their units in case 02
in typical floors

**Interaction with neighbours:** The interactions of the individual respondents with their neighbours are evaluated as per the results generated from the questionnaire. Table 10 shows the reaction to neighbours in each case. Results show that a majority of occupants in Case 01 talk to each other when they meet while the majority of Case 02 and 03 only smile at each other. So it's clear that residents in Case 01 have good interactions/relationships among neighbours in

comparison to those in other cases. Results are in line with the SOC value comparison of the three cases where Case 1 shows highest average SOC value.

**Table 10 – Interactions with Neighbors**

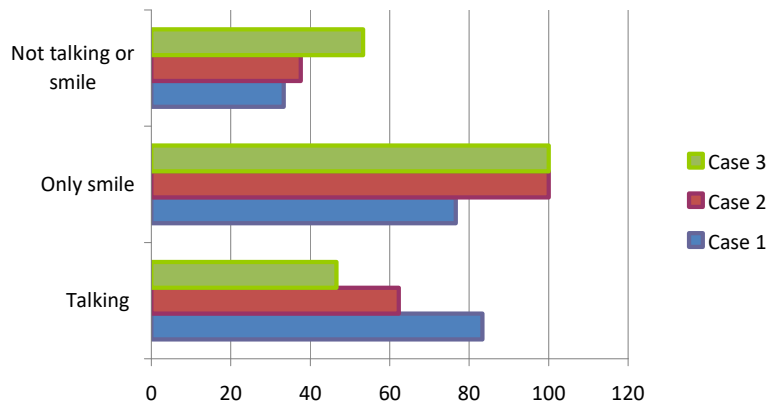| Interaction | case | | |
|---|---|---|---|
| | C1=KR | C2=PW | C3=ST |
| Talking with them(T) | 83.3% | 62.3% | 46.6% |
| Only smile(O) | 76.6% | 100% | 100% |
| Not talking or smiling (N) | 33.3% | 37.6% | 53.3% |



Fig 30- Interaction with neighbors

**Familiarity with Neighbours:** The overall familiarity with neighbours is shown in Table 11. Neighbours familiar by face and name on the same floor and on other floors is compared across the three cases.

**Table 11- Familiarity with Neighbors**

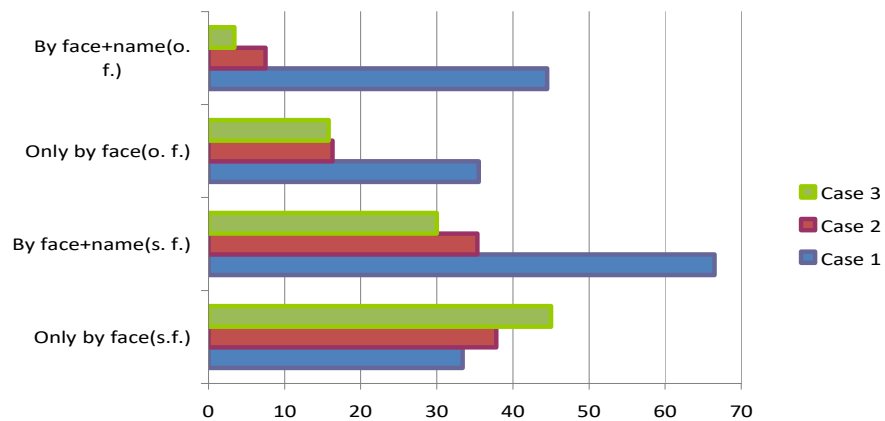| Type of Recognition | Case | | |
|---|---|---|---|
| | C1=KR | C2=PW | C3=ST |
| Only by face(same floor) | 33.4% | 37.8% | 45% |
| By face + name(same floor) | 66.5% | 35.33% | 30% |
| Average(same floor) | 49.95% | 36.56% | 37.5% |
| Only by face(other floor) | 35.5% | 16.3% | 15.8% |
| By face + name | 44.5% | 7.5% | 3.4% |
| Average(other floor) | 40% | 11.9% | 9.6% |

Fig 31 - Number of recognizing neighbors

Majority of occupants in Case 02 and 03 recognises neighbors only by name. But the majority of occupants in Case 01 recognises neighbors by face and name. So the integration between residents on same floor (S.F) is high in Case 01 compared to the other Cases. Case 01 residents show high levels of recognition of neighbours on the same floor as well as other floors. Case 02 and Case 03 residents show higher recognition of neighbours on same floor compared to other floors. Results indicate that in case 02 and case 03 the vertical social integration of residents is low. But case 01 shows high social integration of neighbours across the floors vertically and horizontally. Visibility levels observed across the cases as discussed above may explain the results in case 01, case 02 and 03.

**Usage of Balconies:** Table 12 shows the comparison of communication achieved among neighbours by the use of balcony spaces across the three cases.

**Table 12 - Balcony Usage**

|  | case | | |
|---|---|---|---|
|  | C1=KR | C2=PW | C3=ST |
| chat with neighbors  from balcony | 62% | 20% | 22% |

The occupants in case 01 show high percentage (62%) for neighbourly interactions via balconies. The orientation of balconies towards central courtyard is the main reasons for such a result (fig 32). Occupants see their neighbors from balconies and is encouraged to talk to each other. This doesn't always occur in case 01, but shows a comparatively high percentage. But in case 02 and 03, the balconies are separated by total floor height walls (figure 32). Not even half walls. So their interactions from balconies are discouraged by the design and levels of visual penetration.

Fig 32 - Balconies are totally separated by total floor height walls in case 02
Source- Author

It's important to avoid long dark corridors which discourage neighborly interactions and also harm physical health as seen in case 02. Middle open voids can be introduced as lobbies with seating and some landscape features can be introduced to enhance the quality of the physical environment (figure 33)
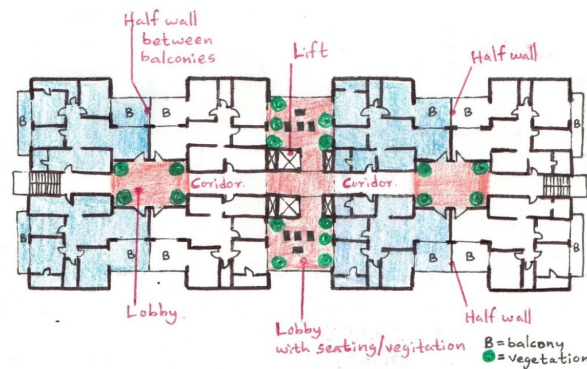


Fig 33 – Suggested layout in case 02 for enhancing SOC
Source- Author

Due to busy and independent life styles and the variations in social classes; occupants don't have free time and the need for interaction unlike in low income communities with high interdependence and common social status and backgrounds. But the levels of interactions can be enhanced by enhancing visibility level between home and outdoor spaces. The layout with central courtyards helps to achieve those requirements successfully. Balconies also act as ideal spaces to create visibility among dwellings with maximum visual access.

**Existing plan**                                    **Proposed plan**



Fig 34 - Proposed improvement to case 03 plan for enhance SOC
Source- Author

Creating nodes, planed lobby spaces, and locating main entrances open towards the lobby are essential for interaction when considering special integration in plan form. There are opportunities for creating successful nodes in upper floors in case 02 (figure 34: existing plan). But it's missed by the arrangement of unit entrances and floor lobby.  In case 03; there are successful nodes in upper floor lobby. But its small size and arrangement doesn't contribute.

When analyzing the selected cases, case 01 which has open corridor with central court is the most successful layout with high SOC scores as per the systematic observations. The challenge of the architect is to create a balance between making neighborhoods an optimums profit for developer as well as making communal ties among the residents. Number of units and area of a unit is most considered factors in property market. Case 01 is most successful in this factor too. Providing large open to sky space isn't an easy design solution in a small plot area. The best solution for achieving this is combining large number of light wells for natural ventilation and lighting to create a large central court. The deduction of buildable floor area is recovered by split level units which is a strategically solution. To avoid long open corridors which use more spaces in floor areas can be reduced by separate block wise common lobbies in both ends. This strategy is used by the architect in achieving the layout in case 01.
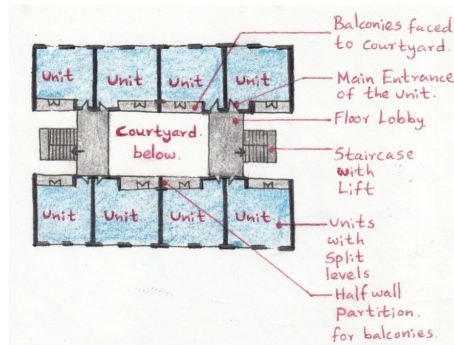


Fig 35-strategical layout for designing a more interactive layout with middle
courtyard in limited plot space.
Source- Author

## Conclusion

The study identifies the possible design considerations for enhancing sense of community in gated mid-rise apartments in Sri Lanka. Factors such as horizontal and vertical visibility of dwellings and circulation spaces enhances the interactions and familiarity among neighbours. Building layouts with open corridors and central courts have been successful in achieving better sense of community among neighbours. Also creating sub lobbies rather than long corridors leading to central lobbies have been identified as more successful. The vertical, visual and physical spatial integrations can enhance the levels of interactions among neighbours across the floors without limiting the interactions among neighbours to the same floors. The residents day to day circulation to and from their dwellings need much attention as spaces that can enhance the levels of contact among neighbours. Although it can be assumed that large extents of public spaces and common amenities can enhance the levels of interactions and social contacts among neighbours the study shows otherwise. The locations of public spaces and its qualities in terms of habitability become more important than the extent and quantity of common public and semi public spaces indicating that higher levels of sense of community can be still achieved while providing for higher percentages of private space and minimum public and semi public spaces.

This study is limited to a case study of three mid rise gated apartments (G+3 to G+7) in Colombo district with structured questionnaire survey among a limited sample population to measure SOC values. A wider sample of neighbourhoods and a qualitative approach to evaluating SOC in neighbourhoods would have generated more useful and relevant findings. Although there are several socio-economic, political factors influencing SOC among residents the scope of this study was limited to analyzing architectural implications that influence SOC. The study can be further developed by including other building layout typologies and acknowledging factors other than building layout elements that would be instrumental in creating better SOC. The study further tries to establish that SOC is important in a neighbourhood community but one could argue if it is actually necessary for the function of a neighbourhood. But the counter argument is that communal spirit, familiarity among neighbours and the identities created due to sense of community would be important criteria for ensuring a socially sustainable neighbourhood which will encourage healthy social ties within the cityscape. Such ties are important in creating not only socially healthy neighbourhoods but also environmentally healthy neighbourhoods.

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