

Study on the Effect of Open Spaces in Residential Neighbourhood for Social Interaction

KV Riyapradeep, Prof. Jayprakash Chadchan, Prof. Ashik S, Dr. Shilpa Madangopal

¹Student, School of Architecture, CHRIST(Deemed to be University), Bengaluru

²Professor, School of Architecture, CHRIST(Deemed to be University), Bengaluru

³Assisant Professor, School of Architecture, CHRIST(Deemed to be University), Bengaluru

⁴Associate Professor, School of Architecture, CHRIST(Deemed to be University), Bengaluru

Abstract

This study investigates the influence of open-space design within residential complexes on social interaction among residents in suburban Bangalore. Open spaces, encompassing parks, courtyards, pathways, and semi-private communal areas, are vital in shaping socio-spatial dynamics, fostering community engagement, and enhancing psychological wellbeing. A mixed-methods approach was adopted, combining direct field observations, structured questionnaires, and spatial analysis of Brigade Panorama (gated high-rise) and Serenade Layout (open plotted development). Observational data focused on frequency, type, and duration of social activities, while survey responses captured residents' perceptions, preferences, and satisfaction levels. Findings reveal that neither extreme centralization nor complete dispersal of open spaces optimally supports social interaction. Instead, a hybrid design approach, combining central community greens with distributed semi-private spaces, creates balanced opportunities for both planned and spontaneous interactions. The study establishes that thoughtful planning and design of open spaces significantly influence the quality and frequency of social interactions in residential settings, offering guidelines for architects, planners, and policymakers to create communities that encourage interaction, inclusivity, and well-being.

Key Words: open spaces, residential complexes, social interaction, urban design, community engagement, spatial configuration, suburban housing, Bangalore.

1.INTRODUCTION

Residential architecture constitutes a framework within which social life unfolds, functioning as a socio-spatial system that mediates interactions among residents, regulates degrees of privacy, fosters community identity, and influences psychological well-being. Open spaces

within these environments occupy a critical position in this system. Far from being leftover or residual areas between buildings, open spaces serve as active social instruments—they form transitional zones between private dwellings and collective life, facilitate informal exchanges among adults, enable children's play, support physical and recreational activity, and cultivate a shared sense of belonging. The design, accessibility, and spatial quality of these areas are pivotal in shaping patterns of social interaction.

In the context of contemporary Indian cities, particularly in rapidly urbanizing and suburban regions of Bangalore, residential development has evolved along divergent trajectories. The two prominent typologies are gated high-rise communities and open plotted layouts. Gated communities often feature concentrated amenity cores, controlled access points, and internalized security measures, while open plotted layouts depend on a network of streets and dispersed public spaces to mediate social life. Both typologies integrate open spaces, but the spatial configuration, accessibility, hierarchy, and experiential quality of these areas differ significantly. The ways in which these differences influence residents' social behaviour—frequency of interaction, diversity of social groups, and quality of engagement—remain relatively underexplored within Indian architectural research.

Understanding these dynamics requires a multi-dimensional approach. Open spaces can be analysed not only in terms of their physical extent but also through qualitative parameters such as comfort, microclimatic conditions, visibility, seating provision, and the presence of activity nodes. Historical precedents in Indian urbanism—such as the shared streets of traditional neighbourhoods, courtyards in vernacular housing, and temple precincts—highlight the importance of spatially integrated, communal zones that naturally foster multigenerational interactions, informal social gatherings, and strong neighbourhood identities.

However, modernization, densification, and the rise of vertical high-rise typologies have altered these patterns, often leading to privatization of open spaces and formalization of social exchange .

Urban design and architectural theorists have consistently emphasized the behavioural impact of spatial configuration. Elements such as the arrangement of buildings, network permeability, line-of-sight, and landscape integration influence how people occupy and utilize space . Open spaces that combine comfort, safety, and opportunities for activity tend to sustain higher occupancy rates and more meaningful engagement. Conversely, spaces that are poorly designed, inaccessible, or overly controlled may inhibit social exchange, reducing opportunities for community bonding and informal contact .

In suburban Bangalore, the contrast between gated communities and open plotted layouts offers a valuable analytical lens. Gated developments tend to concentrate interaction within controlled, internalized spaces, prioritizing security and curated amenities. Open plotted layouts, in contrast, rely on decentralized streets, pocket parks, and shared plots to act as social mediators, encouraging spontaneous encounters and a more distributed sense of community . By examining these divergent patterns, this research aims to establish a clearer understanding of how spatial organization, accessibility, and qualitative characteristics of open spaces influence the frequency, diversity, and quality of social interaction among residents.

The study is situated within the peri-urban growth corridor of Bangalore, a metropolitan region that has undergone rapid spatial and demographic transformation over the past two decades. Peripheral areas that were once characterized by agricultural land, village settlements, and low-density housing have increasingly been absorbed into the expanding urban fabric . This transition has produced a suburban condition marked by moderate residential density, improving but still evolving infrastructure, and strong dependence on private vehicular movement. The selected study locations—Brigade Panorama in Kengeri and Serenade Layout in Kumbalgodu—represent typical examples of this growth pattern. Both areas are well connected to major transport corridors yet retain characteristics of emerging suburbs, such as mixed land use, ongoing construction activity, and heterogeneous resident populations.

From a climatic perspective, Bangalore enjoys a relatively moderate tropical climate that supports outdoor activity for much of the year. Unlike cities with extreme heat or cold, the city's thermal conditions generally permit

regular use of outdoor residential spaces, particularly during early morning and evening hours when temperatures are most comfortable . This climatic advantage increases the potential significance of open spaces as everyday social settings rather than merely seasonal amenities. However, comfort is not automatic; microclimatic design plays a decisive role in determining actual usability. Features such as shaded seating, tree canopy, permeable ground surfaces, and well-connected pedestrian pathways significantly influence whether residents choose to occupy these spaces for extended periods .

Culturally, residential life in Indian cities traditionally extends beyond the private dwelling into semi-public and shared domains. Everyday practices such as doorstep conversations, informal street gatherings, children's outdoor play, and community festival celebrations have historically contributed to strong neighbourhood cohesion . Increasing nuclear family structures, longer work hours, digital modes of socialization, and heightened concerns regarding safety—particularly for children and women—have reduced the spontaneity of neighbourhood interaction in many developments . At the same time, the rise of gated communities reflects a growing preference among some residents for controlled, predictable environments. This has introduced a tension between traditional open neighbourhood culture and newer models of privatized residential living .

The primary aim of this research is to examine and evaluate the effect of open spaces in residential complexes on social interaction and to develop design recommendations that enhance community engagement while maintaining appropriate levels of privacy, environmental comfort, and perceived safety. The study addresses the critical gap between regulatory provision and lived spatial performance, generating evidence-based insights that can guide architects, planners, and developers toward more socially effective residential design strategies.

2. RESEARCH OBJECTIVES

2.1 Conceptual Foundations

Social interaction in residential environments emerges from a complex interplay between spatial configuration, environmental comfort, and socio-cultural behaviour. Built form does not mechanically determine human interaction; however, it strongly conditions the probability, frequency, and quality of encounters . Three spatial attributes consistently identified in literature as

critical to interaction are proximity, visibility, and environmental comfort.

Proximity refers to the physical distance between individuals and activity nodes. When residences, pathways, and open spaces are located within comfortable walking distance, the likelihood of casual encounters increases. Neighbourhoods with dispersed amenities often experience reduced spontaneous interaction because movement becomes more purposive and less socially incidental. In contrast, compact layouts with shared circulation corridors tend to generate more frequent visual and physical contact among residents.

Visibility plays an equally important role. Spaces that are visually permeable—meaning they allow people to see and be seen—encourage a sense of safety and social awareness. Visual connectivity between dwellings and open spaces enables passive surveillance, which supports both security perception and informal social engagement. Conversely, visually fragmented environments often discourage prolonged outdoor occupancy.

Environmental comfort encompasses thermal comfort, shading, seating provision, noise levels, and overall spatial quality. Even well-located and visible open spaces may remain unused if they are climatically uncomfortable or lack supportive amenities. Comfort determines dwell time, which in turn influences the depth of social engagement.

A key conceptual influence in this domain is Jan Gehl's idea of "life between buildings," which emphasizes that architecture must support not only necessary activities (such as movement) but also optional and social activities. Necessary activities occur regardless of spatial quality, while optional activities—such as sitting outdoors or casual conversation—occur only when environmental conditions are favourable. Social activities, which depend on the presence of others, emerge most strongly when optional activities are well supported. This layered understanding highlights why simply providing open space area is insufficient; the qualitative design of that space determines whether it becomes socially productive.

2.2 Theoretical Models

Several theoretical models provide essential frameworks for understanding social interaction in residential environments. Clarence Perry's Neighborhood Unit Concept represents one of the earliest systematic attempts to organize residential planning around social principles. Developed in the early twentieth century, the model proposed that neighbourhoods should be structured around a central core containing schools, parks, and community facilities, all located within comfortable

walking distance of residences. Perry emphasized the importance of shared open spaces as organizing elements that promote regular social contact among residents.

Jane Jacobs' theory of social life in public spaces provides a more dynamic and behaviour-oriented perspective. Jacobs argued that vibrant communities depend on active public environments characterized by continuous pedestrian presence and mixed activity. Her concept of "eyes on the street" underscores the importance of natural surveillance generated by residents overlooking public spaces. According to Jacobs, safety and social interaction are mutually reinforcing processes: when spaces are lively and observable, people feel secure enough to occupy them, and their presence further increases safety.

Oscar Newman's Defensible Space Theory further explores the relationship between territorial definition and social control. Newman proposed that when spaces are clearly demarcated as semi-private or community-owned, residents develop a stronger sense of responsibility toward them. This sense of ownership encourages monitoring, maintenance, and informal regulation of behaviour. However, excessive enclosure and restricted permeability can limit interaction with the broader urban environment, potentially reducing diversity and openness.

2.3 Empirical Studies

International research on residential open spaces consistently demonstrates that physical design variables significantly influence space utilization and social interaction patterns. One of the most consistently identified predictors of space use is seating availability. Studies conducted in Europe and North America show that open spaces equipped with flexible seating support longer dwell times and encourage both solitary and group activities. Seating placement near circulation paths increases incidental interaction, while seating located in isolated corners tends to remain underused.

Research in Indian neighbourhoods highlights how shaded streets, courtyards, and temple-adjacent spaces historically functioned as active social arenas. Contemporary studies in Indian metropolitan regions reveal emerging challenges such as privatization of space, gated security regimes, and reduced street-level interaction. These findings contextualize global theories within local realities and reveal patterns unique to rapidly urbanizing suburban contexts.

Typology-specific studies examine how different housing forms produce distinct spatial-social outcomes. Studies on gated communities indicate that controlled access and defined boundaries enhance perceived safety and maintenance quality. Centralized landscaped parks and

clubhouses often become focal points for organized social events. However, excessive internalization may limit interaction with surrounding neighbourhoods and reduce incidental cross-community engagement

2.4 Research Gaps

The literature review reveals several important gaps that justify the present study. First, although theoretical models linking spatial configuration to social behaviour are well established, there is limited empirical validation within contemporary Indian residential contexts, particularly in rapidly urbanizing suburban areas. Second, many studies focus either on physical design analysis or social perception surveys, but relatively few integrate both with direct behavioural observation. Third, comparative research between gated and open residential typologies remains scarce, especially studies that examine how differences in permeability, spatial hierarchy, and open-space distribution affect everyday social interaction. Fourth, planning practice continues to emphasize quantitative open-space provision rather than qualitative social performance.

Table -1: Demographic and Residential Profile of Respondents

Category	Sub-Category	Percentage (%)	Count (n=12)
Age Group	18-30	83.30%	10
	31-50	16.70%	2
Type of Dwelling	1 BHK	8.30%	1
	2 BHK	58.30%	7
	3 BHK	33.30%	4
Duration of Stay	Less than 1 year	50.00%	6
	1-5 years	25.00%	3
	More than 5 year	25.00%	3

Table -1: Usage Patterns and Social Impact of Open Spaces

Survey Question	Most Frequent Response	Percentage (%)
Most Used Open Space	Seating / Sit-out areas	41.70%
Preferred Time of Usage	Evening	58.30%
Frequency of Interaction	Sometimes	50.00%
Primary Type of Interaction	Casual conversations	83.30%
Perception of Design/Access	Well-designed and accessible (Yes)	66.70%
Community Building	Agree (that spaces help build community)	58.30%
Top Desired Improvement	Increased greenery	41.70%

Survey results from 12 residents show 83.3% are aged 18-30, with most living in 2 BHK units (58.3%). Half have resided less than a year. Seating areas are most used (41.7%), mainly evenings (58.3%). Social interaction is occasional (50%), largely casual (83.3%). Despite 66.7%

rating spaces well designed, 41.7% seek more greenery to strengthen community bonding. (Fig.1)

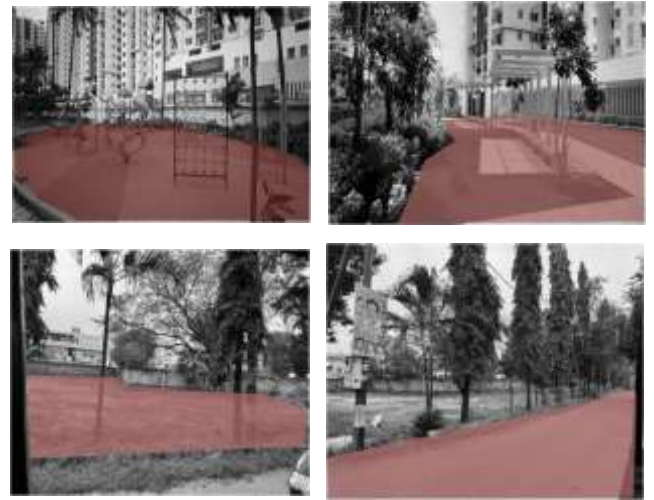


Fig -1: Spaces at Brigade Panorama and Serenade Layout Research Design and Strategy

The study adopts a comparative case study research design to systematically evaluate how different residential typologies shape patterns of social interaction. A comparative approach is particularly appropriate because it enables controlled examination of contrasting spatial environments while maintaining consistency in the broader urban context. The research focuses on two representative residential environments located within suburban Bangalore: Brigade Panorama (gated high-rise) and Serenade Layout (open plotted development).

The study follows a cross-sectional research design, capturing behavioural patterns during defined observation windows rather than tracking long-term temporal change. However, to improve reliability and account for temporal fluctuations, observations are conducted across multiple time slots within the day (morning, afternoon, and evening periods). This temporal sampling helps capture variations related to work schedules, school timings, and leisure use of open spaces.

Selection of Case Studies

Brigade Panorama was selected as the representative example of a large-scale gated high-rise residential development in suburban Bangalore. Developed as a master-planned community, the project is characterized by controlled entry and exit points, developer-managed common amenities, vertically organized residential blocks, centrally planned recreational open spaces, and clearly demarcated private and semi-public zones. The

spatial structure reflects prevailing private real estate development models targeting primarily middle and upper-middle-income households. Serenade Layout was selected to represent an open plotted residential typology, which continues to form a significant portion of Bangalore's suburban expansion. Unlike masterplanned gated enclaves, this layout exhibits street-oriented housing frontage, incremental and individually developed dwelling units, distributed and often informal open spaces, porous access and public street integration, and mixed edge conditions between private and public realms .

Both sites are located within accessible distance, allowing repeated site visits across varying time periods. They contain clearly defined and observable outdoor open-space systems, and are situated within suburban Bangalore, reflecting the broader urban condition that frames the research.

Data Collection Methods

The research employs a mixed-methods approach integrating quantitative measurement with qualitative interpretation. Primary data collection includes:

Behavioural Observation: Systematic behavioural observation is conducted within identified open spaces to record actual patterns of use. This includes documenting number of users at different times of day, age group distribution (children, adults, elderly), types of activities (play, conversation, walking, solitary sitting, group gatherings), duration of stay, and spatial clustering of users. Behavioural mapping techniques are employed to visually plot user positions on site plans, revealing zones of high and low interaction intensity.

Questionnaire Survey: A structured questionnaire is administered to residents in both case study sites to capture subjective perceptions and experiential dimensions. The questionnaire gathers information on perceived safety within open spaces, comfort levels (thermal comfort, seating adequacy, shade availability), accessibility and convenience, frequency of use, sense of neighbourhood belonging, satisfaction with open-space design, and perceived impact of open spaces on social interaction. Both closed-ended and scaled-response questions (Likert-scale ratings) are included to allow quantification of perceptual data.

Photographic Documentation: Site photographs are taken to visually record spatial conditions, activity settings,

landscape quality, and edge conditions. These images support later analysis and serve as evidence for observed behavioural patterns.

Variables and Parameters

Physical variables refer to the measurable spatial attributes that potentially enable or constrain social interaction. These include open-space area and distribution, seating density and placement, node distribution and activity focus points, visibility and natural surveillance, pedestrian connectivity and movement network, and landscape provision and environmental comfort.

Social variables capture the observable and perceived behavioural outcomes occurring within the spatial framework. These include encounter frequency, age diversity of users, dwell time in open spaces, types of activities observed, and resident perception of safety and comfort.

Data Analysis Techniques

Collected data are analyzed using descriptive statistics, comparative tables and matrices, behavioural mapping data coding, and spatial analysis outputs derived from GIS tools. Qualitative interpretation complements quantitative findings by examining spatial qualities such as degree of enclosure, edge activation, visual permeability, and transition spaces between private and public realms.

RESULTS AND DISCUSSION

Spatial Characteristics and Usage Patterns

The comparative analysis reveals distinct spatial characteristics and corresponding usage patterns between the two typologies. At Brigade Panorama, the gated high-rise typology reveals a structured and amenity-oriented model of social interaction. Centralized landscaped greens, recreational facilities, and clearly defined activity nodes concentrate social life within designated zones. These spaces benefit from controlled access, consistent maintenance, organized programming, and strong territorial definition. Observational data indicate longer dwell times in amenity zones and positive perception scores related to safety, maintenance, and environmental comfort.

Survey results from Brigade Panorama indicate that 58.3% of respondents are in the 18-30 age group, with 58.3% residing in 2BHK units and 33.3% in 3BHK units. Regarding open space usage, 41.7% prefer seating/sit-out areas, while 25% each prefer parks/gardens and pathways. The preferred time of usage is predominantly evening (58.3%), followed by night (33.3%). Significantly, 83.3% of social interactions consist of casual conversations, with 58.3% agreeing that open spaces help build community sense.

However, the strong inward orientation and separation from surrounding urban fabric reduce incidental interactions beyond the resident group. Movement within such developments is often purpose-driven—towards specific amenities—rather than organically dispersed. While interaction intensity may be higher within designated nodes, the diversity of spontaneous street-level exchanges appears comparatively limited.

Conversely, the open plotted environment represented by Serenade Layout demonstrates a distributed and street-oriented interaction pattern. Social exchanges are embedded within daily circulation along pedestrian routes, compound edges, and semi-private front-yard thresholds. Rather than occurring in formally designated communal nodes, interaction is woven into routine activities such as walking, informal gathering at entrances, or children playing near residential fronts. This typology supports continuous, low-intensity engagement that fosters familiarity networks and strengthens neighbourhood awareness.

However, the absence of structured communal amenities, seating infrastructure, shaded gathering zones, and environmental control mechanisms limits the potential for prolonged or organized group activity. Perceived safety and comfort—particularly for vulnerable groups such as children and the elderly—are more variable and depend heavily on informal surveillance and resident participation.

Comparative Analysis

The comparative analysis reveals that each typology possesses distinct strengths and constraints. Gated developments excel in delivering controlled, well-maintained, and comfort-oriented social environments but may restrict spontaneous street-level interaction. Open plotted layouts encourage organic and continuous social presence yet may lack the infrastructural support and

security infrastructure required for diverse and prolonged engagement.

Key findings indicate that social vitality depends not solely on the quantity of open space but on its spatial positioning, accessibility, edge activation, and relationship to pedestrian networks. Visibility, seating provision, and overlap between movement and activity zones emerge as critical spatial determinants of interaction intensity. Similarly, perception factors such as safety and comfort significantly influence whether residents choose to engage socially, even when physical space is available.

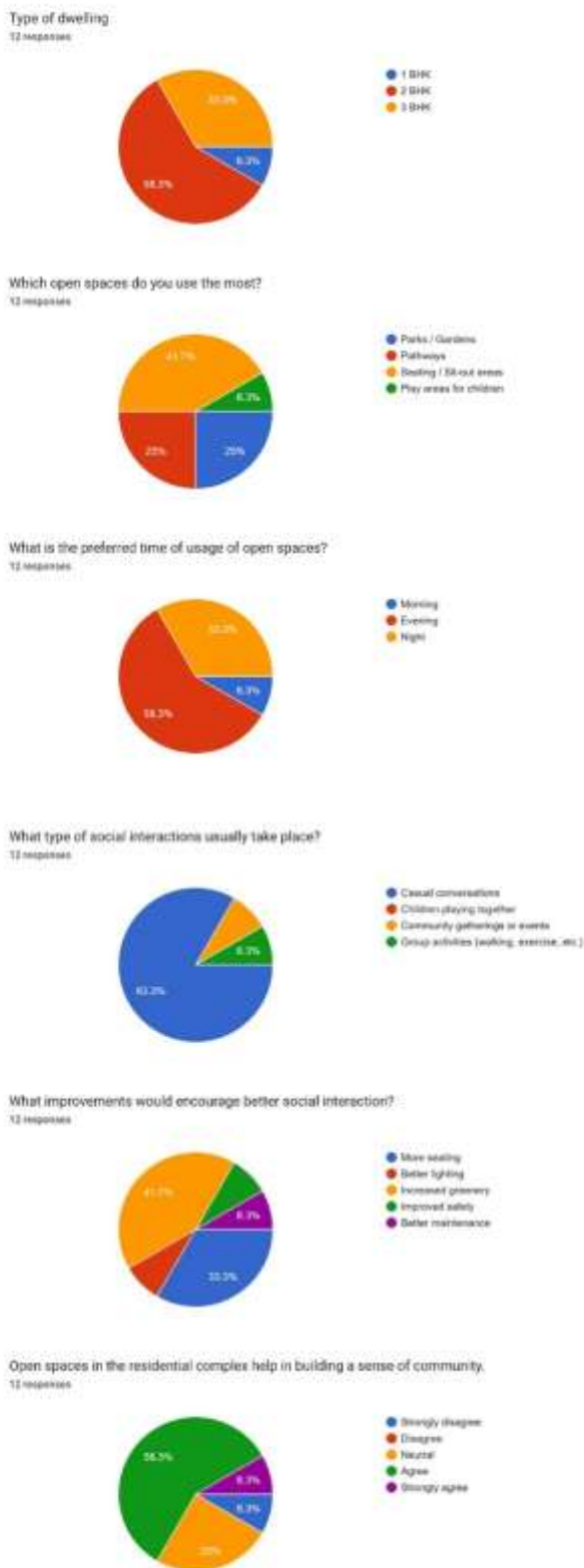
Survey data regarding improvements needed show that 41.7% of respondents desire increased greenery, while 33.3% want more seating. Better lighting (16.7%), improved safety (8.3%), and better maintenance (8.3%) were also noted. Regarding interaction patterns, 50% of respondents reported interacting with other residents "sometimes," while 33.3% answered "yes" and 16.7% answered "no."

Interpretation of Findings

The interpretation demonstrates that spatial configuration plays a decisive role in shaping social behaviour within residential environments. The built form structures movement patterns, visual connections, activity nodes, and degrees of accessibility, all of which directly influence opportunities for encounter, gathering, and community formation.

In controlled gated environments, spatial organization is centralized and inward-oriented. Residents tend to interact in designated activity areas rather than along circulation routes. The presence of controlled access and managed common areas enhances psychological security, particularly for children and elderly users, thereby increasing willingness to occupy outdoor spaces.

Charts



3. CONCLUSIONS

This research establishes several critical conclusions regarding the relationship between open-space design and social interaction in residential complexes. First, spatial configuration strongly determines the type, frequency, and quality of social interactions among residents. In

gated highrise developments, centralized parks or community plazas encourage organized, planned activities but may limit casual encounters between residents from different parts of the complex. Conversely, distributed open spaces in open-plotted layouts facilitate informal and spontaneous interactions embedded within daily routines.

Second, social interaction is shaped not only by the quantity of open space but also by its quality and design characteristics. Factors such as adequate seating, shaded areas, sightlines, activated edges, and pedestrian connectivity influence how people use these spaces, for how long, and with whom. A large plaza may remain underused if poorly shaded or isolated, while a small street-facing green area with benches and clear visibility can attract frequent, diverse interactions.

Third, different residential configurations offer distinct advantages that are complementary rather than mutually exclusive. Gated communities provide enhanced safety, controlled environments, and amenity-focused interaction spaces, which encourage scheduled social activities. Openplotted layouts excel in fostering neighbour familiarity, incidental encounters, and informal cohesion, where street life and proximity to homes naturally promote social engagement. Finally, the findings indicate that combining elements from both typologies can maximize social vitality.

Design Recommendations

Based on the empirical findings, several design recommendations emerge for architects, planners, and policymakers:

Implement Distributed Open-Space Systems: Residential developments should adopt a hierarchical open-space network that includes both centralized communal amenities and smaller, street-integrated semi-public spaces. Centralized spaces support organized social interaction, group activities, and community events. Meanwhile, informal street-facing spaces encourage incidental encounters, short-term gatherings, and neighborhood familiarity.

Provide Adequate Seating, Shade, and Landscape Features: Availability of seating, shaded zones, and landscaped areas is critical for encouraging prolonged dwell time and comfort. Designers should integrate flexible seating arrangements, movable benches, shaded

pergolas, and green pockets along movement paths to accommodate diverse activities.

Maintain Visual Connectivity and Pedestrian Permeability: Visibility and connectivity are crucial determinants of both perceived and actual safety. Open spaces should be visually accessible from multiple vantage points, with clear sightlines across nodes, pathways, and edges to encourage use and passive surveillance.

Design Semi-Public Thresholds: Entry courts, front yards, and transitional spaces between private dwellings and public areas function as semi-public thresholds, facilitating casual social interaction among neighbors. These spaces allow brief greetings, informal conversation, and low-intensity encounters, which strengthen neighborhood familiarity.

ACKNOWLEDGEMENT

The author gratefully acknowledges the guidance and support of Prof. Jayprakash Chadchan, Professor at School of Architecture, CHRIST (Deemed to be University), for his constant inspiration and encouragement throughout this research. Sincere thanks to Dr. Anitha Suseelan, Head of Department, and the entire faculty of the School of Architecture for their valuable support. The author also extends appreciation to the residents of Brigade Panorama and Serenade Layout for their participation in surveys and interviews, without which this study would not have been possible.

REFERENCES

- https://cus.ubt-uni.net/wp-content/uploads/2024/11/JanGehl-Life-Between-Buildings_-Using-Public-Space-2011-Island-Press.pdf
- https://www.petkovstudio.com/bg/wp-content/uploads/2017/03/The-Death-and-Life-of-Great-American-Cities_Jane-Jacobs-Complete-book.pdf
- <https://www.scirp.org/reference/referencespapers?referenc eid=1226050>

- https://www.tc.columbia.edu/faculty/ate11/facultyprofile/files/EricksonHighsmith_TCRcord_OnlineFirst.pdf
- https://streetlifestudies.wordpress.com/wp-content/uploads/2017/06/1980_whyte_small_spaces_book.pdf
- <https://www.brigadegroup.com/residential/deliveredprojects/brigade-panorama>