SPATIAL HARMONIZATION THROUGH BIOPHILIC TRANSITIONAL SPACES MULTI-STAGE SENIOR HOUSING ANALYSIS STUDY

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ABSTRACT

In Indonesia, developing senior housing often takes multiple years because of financial constraints and the lack of a comprehensive plan. While this strategy allows for a stepwise improvement in the available infrastructure, it may lead to disjointed spatial configurations and uneven quality in the surrounding environment. In many cases, the absence of adequate transitional spaces has been shown to result in limited accessibility, reduced social interaction among senior residents, and weak visual and physical connections to the outside space. This study explores the role of biophilic-based transitional spaces in supporting spatial integration and improving the environmental quality of gradually developed senior housing. A case study was conducted at the Wisma Lansia Harapan Asri in Semarang. Qualitative spatial analysis was conducted through phenomenological observation to capture environmental experience. Transitional areas play an instrumental role in providing linkages between residential blocks, circulation zones, and external environments. Designing micro gardens, corridor recesses, courtyard social gardens, and gardens as buffers reinforce spatial continuity while balancing enclosure and social permeability. Such evidence has helped evaluate and refine spatial design principles in multiple housing types, including pavilions and class-setting units, aimed at improving the ambience, comfort and psychosocial health of senior residents. Design recommendations for pavilion and class-setting units refine these principles, offering flexible, non-technical criteria for architects to improve ambience comfort and psychosocial health. By addressing user experiences and environmental quality, biophilic transitional spaces enable stepwise infrastructure improvements without compromising livability, providing a model for adaptable senior housing designs.

Keywords: *Biophilic Transitional Space, Senior Housing, Spatial Integration*

INTRODUCTION

Indonesia is sitting on the edge of a major demographic transformation. This condition based on data from the (Kemenkes, 2022), which estimates that the number of senior people or seniors in 2040 will reach about 48.2 million and account for around 15.77

percent of Indonesia's total population. Senior housing is a key component of the elder care system (Mcgann et al., 2020). One key feature of senior housing is living spaces that are sufficiently spacious for both independent seniors and those requiring additional assistance (Chee et al., 2023). Research shows that the quality of the living environment is of utmost importance for residents' well-being (Vandenberg et al., 2018). A key feature of Senior responsive housing (Mcgann et al., 2020) is balancing environmental conditions with residents' needs. Senior housing needs more than just physical accessibility; it needs environmental comfort, air quality, spatial orientation, and gradual, safe socialization opportunities. Therefore, the transitional environment between private spaces, circulatory space, and outside areas has a significant impact on the spatial experience of senior residents. Thereby, Xian and Defiana (2023) show that combining vegetation with a sense of place and involving residents improves seniors' wellbeing by creating a more adaptive living environment.

Practical challenges in designing senior housing in urban areas with limited space can be illustrated through the multistage development model of Wisma Lansia Harapan Asri in Semarang. There are distinct spatial characteristics between the older and newer sections of the complex. This complex offers a range of housing units, from exclusive pavilions to Class 1, 2, and 3 rooms, each with different facilities. However, the housing layout, particularly between Class 1 and Class 3, does not yet reflect spatial continuity that accounts for health conditions. Consequently, independent seniors and residents requiring integrated care are placed in separate zones that are not yet optimally integrated. Based on field data, there are three main shortcomings. First, the building orientation and unit configuration do not support optimal airflow or natural light. This is important because senior residents are vulnerable to the effects of air pollution; an increasing proportion of the senior population can exacerbate health risks (Kim et al., 2025). Second, little greenery has been planted in the surrounding area of this building, and hard surfaces have largely dominated the housing periphery, both furthering visual barrenness in the field and increasing ambient temperature. Third, the building does not provide sufficient private space, so senior residents only have little visual and spatial connection with the surrounding environment. (Hastuti et al., 2024) discuss about properties such as vegetation, circulation quality, furniture, the microclimate, and descriptions of open spaces are essential to user comfort and activity.

The notion of adding plants in between or in front of units suggests we are looking for small, semi-private outdoor spaces. These areas have the capacity to develop into biophilic transitional spacings and buffer zones that achieve three elements: accessibility, privacy, and user management of their surroundings. While transitional spaces may improve overall environmental comfort, senior residents need sensory engagement – plants, natural light, and views to the outdoors – to support their psychological wellbeing. Previous studies also highlight the need for user-centered design of the physical environment (Mcgann et al., 2020). As shown by (Xian and Defiana, 2023), vegetation, materials, textures, furniture, and railings can create a senior-friendly residential environment that supports sustainability. Meanwhile, (Khosrowjerdi and Noshadi (2025) show that the placement of open spaces within residential complexes improves quality of life through connectivity, accessibility, and the social functions of the spaces. Nevertheless, research

specifically examining biophilic transitional spaces using a spatial-qualitative and phenomenological approach remains limited, particularly within the context of the phased development of senior housing in Indonesia. The absence of a spatial-qualitative-phenomenological approach in architectural studies is a particular concern (Marcus, 2013). Therefore, this study aims to bridge this gap through qualitative spatial analysis and a phenomenological approach at Wisma Lansia Harapan Asri.

This study has several significances. First, it helps understand how spatial configurations in senior housing can support a balance between residents' needs and the physical environment. In this study, this balance is understood as spatial harmonization, that is, the integration of relationships between residential units, circulation spaces, and outdoor spaces that enable spatial continuity, ease of access, and environmental comfort for residents. In the phenomenological approach to qualitative spatial analysis, the focus is not only on technical or quantitative aspects but also on users' spatial experiences. From an empirical perspective, this study provides spatial planning recommendations that architects and designers can apply to improve the quality of housing for senior residents, making it more adaptable and responsive. This study also contributes to the development of user-centered design principles for senior housing facilities in Indonesia by enhancing biophilic transitional spaces. The generalizability of findings from this single case study at Wisma Lansia Harapan Asri is limited by the lack of geographical diversity and varying climatic conditions. This study also did not conduct quantitative assessments of building ventilation or thermal comfort. Furthermore, this study did not delve deeply into material specifications, ideal structural dimensions, or mechanical, electrical, and plumbing systems. The sample of senior residents was also limited to residents of Wisma Lansia Harapan Asri, without comparison to other senior housing facilities. Nevertheless, the spatial-qualitative approach that aligns the relationship between users and the environment still provides important insights into the influence of housing design on the wellbeing of senior residents.

THEORY / RESEARCH METHODS

Theory Framework

Person–Environment Fit (PE Fit) in Senior Housing

Person-environment fit highlights the interplay between individual traits and characteristics of built environments, which ultimately affect the well-being and activity potential of users in built environments. For senior housing, the fit between residents' functional needs, including physical and cognitive abilities, and the spatial layout results in an improved quality of life (Mcgann et al., 2020). Older adults are nurtured with senior housing designed with their needs in mind when it comes to daily chores that require independence and peace of mind. Older adults' psychological and physical health is directly affected by the quality of their home environment (Vandenberg et al., 2018). Senior housing needs to meet the diversity in older adults' physical mobility, health, and social engagement by providing enough environmental choice that they can opt for different levels of social interaction, activity, and privacy

(Chee et al., 2023). Objective P-E fit relates to "access" (e.g., ramps, wide doorways, accessible paths), while perceived fits relate to "usability" with adaptive features such as adjustable counters (Lien et al., 2015). In terms of privacy gradients, graduated zones extend from private jeweled rooms to semi-private lounges, providing control and reduced stress (Oswald et al., 2005). Person-environment fit strives for flexibility in the environment so that older residents can interact with build environments in senior housing (Marcus, 2013) within the architectural field. These a priori solutions may include using a hierarchy of spaces, establishing a clear organization of circulation, and having a defined spatial structure that will buttress the social integration of residents (Zhang et al., 2025).

Spatial Harmonization and Biophilic Design

The concept of spatial harmonization in architecture refers to the integration of physical, functional, and experiential elements of space that result in a built environment that is coherent and easily understood by users (Mcgann et al., 2020). In senior living facilities, the importance of spatial harmonization is the construction of an environment that is stable and predictable for the users. An environment that is organized and structured aids senior residents in comprehending the spatial framework, therefore, minimizing the chances of disorientation, especially for residents with cognitive or sensory deficits, which are popularly termed dementia (Marcus, 2013). Thus, the ease of spatial configuration and the clarity of the spatial relations are essential factors in the design of senior housing (Peters and Verderber, 2022). Biophilic design, or nature-filled design, is the use of natural elements in the artificial environment. This type of design is claimed to be beneficial for people, even their health (Kellert et al., 2008). This is due to the people's innate attraction to nature. Using elements of nature, such as natural light, natural air flow (ventilation), and plants, and viewscapes may positively impact the psychological and physiological health of the users of the space (Ryan et al., 2014). In the case of senior housing, natural elements may be used to alleviate the emotional and attentional stress of residents (Xian and Defiana, 2023). Attention Restoration Theory provides that interaction with nature is a restorative behavior, regaining cognitive ability in response to periods of mental fatigue. Thus, incorporating natural elements into senior living serves a more aesthetic purpose than anything else, but can also help with the mental health of the residents (Degroff and Wood, 2013). Daylighting provides natural light, which supports circadian rhythms and reduces agitation, while visual connections to nature, for example small garden, facilitate restoration (Radha, 2022).

Transitional Space Theory in Senior Housing

Transitional spaces, in architectural terms, are interstitial spaces that have different degrees of privacy, such as between the private and social areas (Özgen, 2002). The transitional zone makes spatial experience gradual, allowing the user to adapt before switching from one zone to another. It can also be seen as an intermediary space and link between the external environment and internal life. In senior housing, transitional space is a vital social buffer that allows residents to actively engage in the mutual regulation of their level of sociability (Cao and Dewancker, 2023). Instead of small terraces, semi-open corridors and informal seating areas can serve as spaces for

residents to mingle and socialize without the pressure of having to engage in more formalized socialization. Transitional spaces can also develop into secondary territories—semi-private areas that the residents take advantage of to convey their individual personality through personalization practices. These spaces are characterized by ownership and emotional attachment to the surrounding living environment, which this study argues is evident as participants own their own words within these spaces (Al-Tarazi et al., 2024). Buffer zones (planted alcoves) promote gradual shifts in privacy through spatial gradients and varied seating arrangements in corridors provide social affordances (Peters and Verderber, 2022). Customizable planters allow furniture to become personalized, while landmarks that are color-coded to the path improve a sense of agency and spatial legibility.

Conceptual Framework

This research considers transitional space as an important spatial strategy for the design of housing environments for senior residents. Person–environment fit analysis has shown the psychosocial and behavioral needs of older adults as they relate to their environment. This concept illustrates how spatial settings enable autonomy and control, as well as accessibility and opportunities for social participation, within the environment of older adults. Pertinent to this analysis, older adult residents of the environment, settings, and roles they occupy experience varying degrees of social interaction and privacy. Biophilic design and spatial harmonization focus on the more 'positive' and 'active' qualities of the environment that impact comfort and affective states. The Emotional quality of the environment, inclusive of biophilic design principles, is positively impacted by the incorporation of natural elements, (visual) nature, and a well-arranged environment (Kellert and Calabrese, 2015).

All three approaches provide a basis for understanding transitional spaces as spatial mediators between personal space and broader social environments. In senior housing environments, these spaces allow residents to gradually adjust their level of social interaction while maintaining privacy and spatial autonomy. Through this framework (Figure 1), transitional spaces are understood as spatial mechanisms that balance private and communal domains, informing design recommendations for senior housing environments.

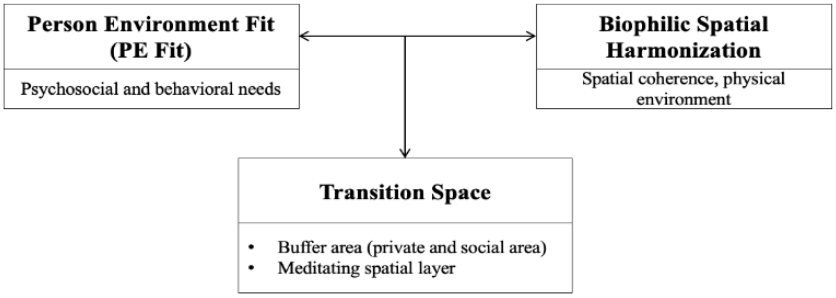

Figure 1. Conceptual Framework

Research Method

This study uses a qualitative approach in architectural research that focuses on the relationship between residential space configuration and the experiences of senior users. A qualitative approach was chosen because this study aims to understand how residents experience and utilize space in their daily lives, both in terms of private and social needs. The research was conducted at Wisma Lansia Harapan Asri in Semarang, a residential facility for the senior that was built in several stages, resulting in a variety of unit types and spatial configurations. Research process was carried out in three main stages, namely field observation and interviews, documentation and space measurement, and qualitative spatial analysis using the parameters of person–environment fit theory, spatial harmonization and biophilic integration, and transition space theory. The analysis was conducted based on a theoretical framework consisting of three main dimensions (Table 1).

Table 1. Spatial Dimension and Key Parameters

Analytical Dimension	Key Parameters
Person–Environment Fit	accessibility, privacy gradient, environmental comfort, social opportunity
Spatial Harmonization and Biophilic Integration	spatial coherence, natural light, visual connection to nature
Transition Space Theory	spatial gradient, social affordance, personalization opportunity, spatial legibility

RESULTS AND DISCUSSION

Wisma Lansia Harapan Asri is located in Semarang on a plot of land covering almost 1.2 hectares. This facility has a complex history of adaptive reuse. The building was originally a school complex comprising large classrooms and academic and administrative buildings. As the need for senior housing facilities grew, this facility was progressively repurposed. The office building, which was originally an academic space, was converted into a reception and administration office for the home as well as a special building for residential brothers and sisters. The land expanded with extensions to adjacent and interlocking buildings or land, most of which were for pavilion-type buildings (Figure 2).

Meanwhile, the existing school buildings, which consisted of classrooms, were then used as type 1, 2, and 3 room units. This expansion pattern reflects organic development driven by increasing demand for senior room units. However, this development primarily accommodates the volume of residents without necessarily addressing comprehensive spatial quality and long-term livability criteria for the senior population. The result of this gradual development is spatial fragmentation, inconsistent building standards across phases, and misalignment between the spatial configuration and functional requirements of the senior population.

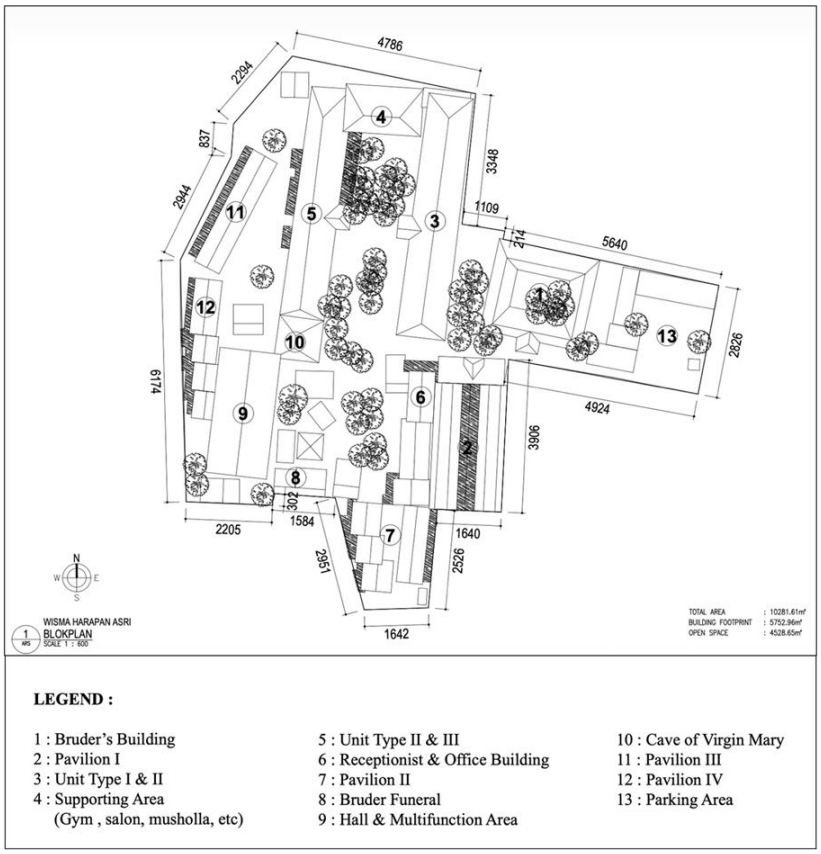

Figure 2. Site Plan Wisma Lansia Harapan Asri

Spatial Hierarchy and Unit Typology Analysis

Wisma Lansia Harapan Asri consists of four residential unit typologies with very different spatial characteristics. These differences reflect different phases of development and different planning approaches.

Pavilion Unit

The Pavilion units are the most recent addition to the complex and were constructed as freestanding outbuildings separate from the building original school. Prior to long-range planning, the place had evolved gradually, so features were oriented haphazardly and arranged inconsistently. Their most prominent under-performance space characteristic is light which was not on the service level to illuminate according to masterplan commands where building placements misaligned or impede circulation as an irregularity of alignment; entrances particularly windows fail to reconcile subsistence between visual privacy or exposure for public-space (Mixed-Use) versus mispositioned window design leading bad scenes outside if the flora makes everything ground around utterly chaotic and open; adjacency poorly found base in design. Stairs and topography restrict accessibility quite a bit, especially for people with mobility

issues. The absence of microclimatic control—when solar incident radiation, airflow, and thermal regulation cannot be moderated—lacks any scenic incentive to mediate naturally when skylights or indirect windows providing quality for interior light access exist, forcing over-dependence on mechanical cooling. The absence of foliage also worsens heat loads and makes built systems ineffective for thermally sensitive seniors. At present, rear areas are used for storage; residents do not have access to them, even though this could easily have been a restorative meditation space (Figure 3). This configuration is an ideal scenario highlighting missed opportunities of biophilia and person-environment fit integration, whereby exteriorized terraces could potentially augment accessibility, gradients towards privacy, or environmental comfort.

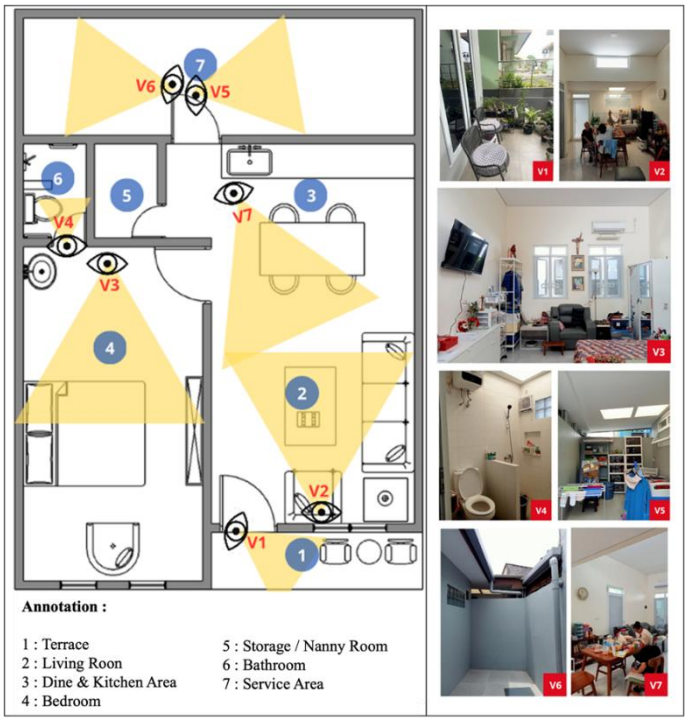

Figure 3. Layout-Plan and Existing Condition of Pavilion Unit

Unit Type 1, 2, and 3

These units are located in the main building, which is a former school complex. The three types of units (Classes 1, 2, and 3) are essentially similar in nature and layout but differ in the number of occupants per room and the accompanying communal space configuration.

Type 1 units have been constructed such that there is a single occupant per room and each room is attached to a single living room that is shared with two to three other rooms (Figure 4). This living space acts as a transition and informal meeting room. This is advantageous to residents, as they can fully close their doors and have private time in their rooms while still engaging in social interactions in the shared living room.

However, it has been noted that the shared living room has not been fully, or indeed optimally, utilized, and a large portion of it remains underutilized. As each room in Type 1 units does not have a private backyard, all residents must rely solely on the shared living room for all outdoor experiences. Because of this, the shared living rooms have great potential to be repurposed to serve a more valuable purpose. By incorporating personalization elements, natural features such as plants, adaptable seating arrangements, and distinct visuals, the living room could be a social center.

Unit Type 2 buildings were constructed with the idea of having two units designed for double occupancy, with a shared living room for every two units (Figure 5). The strategy of having more occupants with limited shared communal living arrangements reflects a design tradeoff between privacy and living spatial efficiency. The living room unit 2 also receive little to no sunlight and have almost no airflow. Living room units are situated behind the building's corridors and along the corridors' layout, which prevents any light from entering the rooms and results in almost no natural light reaching the living room units. The units have low roof heights and narrow the space even more, creating a more pressure-tunnel-like spatial feeling and more darkness in the room. This lack of light and pressure physically creates a void of function in units, corridors, and areas intended for more social functions. This lack of light in the corridors creates lower energy levels, greater discomfort, and poorer mental states for more active and social functions like education and recreation. Given the low-pressure unit meetings and the small individual sleeping areas, the units create a poor sense of living from a design perspective.

Figure 4. Layout-Plan and Existing Condition of Type 1

Unit Type 3 housing is intended for 3 people per room unlike types 1 and 2 housing which do include a living room (Figure 5). Type 3 housing is mostly situated facing the hall, meaning that their closest common area is the hall or a bigger public space in the building. This layout causes a low amount of semi-private area and leads Type 3 residence to be in the most spatially restricted position in regard to transitional and semi-public space options.

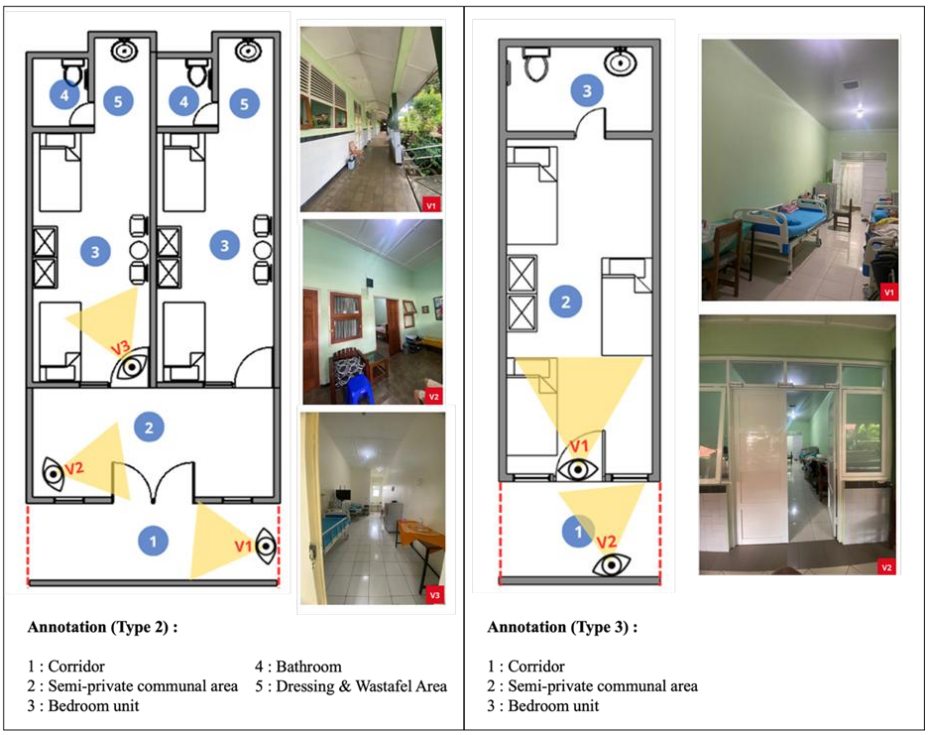

Figure 5. Layout-Plan and Existing Condition of Type 2 (Left) and Type 3 (Right)

These typological variations illustrate a particular order of spaces embedded within the facility. Type 1 units, which have four rooms and a communal space for every three rooms, have the most spatial flexibility. Type 2 units are in mid position. Type 3 units, having no communal space, hold the most spatially restricted position in terms of transitional space and social opportunity access. However, the order is not consistent with the gerontological order that should have been applied. Type 3 residents, who are in triple rooms, have the greatest need to deconstruct a spatial unit of semi-privateness to achieve the privacy, self-regulation, and social flexibility they need.

Spatial Transition Analysis with Theory Alignment with Existing Condition

Person-Environment Fit Analysis

Pavilion outdoor spaces are accessible but paved and unstructured, limiting environmental comfort and nature contact—residents compensate by adding potted plants visible only externally. Class 1–3 units lack private outdoor access, forcing reliance on distant gardens and weakening the privacy gradient and social opportunities. This mismatch demands the redesign of transitional zones for better accessibility, comfort, and flexible social engagement.

Spatial Harmonization and Biophilic Design Integration

Pavilion front porches balance social engagement and privacy via small gardens; buffers reduce density, improve airflow, and enhance visual privacy with vegetation. For Class 1–3, inner courtyards, planted alcoves, and corridors can unify spatial coherence, daylight, and nature views while offering graduated seating for varied interactions. Biophilic integration thus structures restorative, legible environments.

Transition Space Theory: Secondary Territories and Social Affordance

Pavilion porches and rear zones act as secondary territories, enabling personalization (plants/decorations) and social affordance from gathering to retreat. Class 1–3 courtyards and alcoves can foster similar territoriality via customizable planters/seating, improving spatial legibility—crucial for Type 3's lack of intermediate spaces. Distinct visual markers ensure intuitive navigation and belonging.

Overall, one way or another, among all the existing two-generation senior housing architectures, transitional spaces of the properties in question are still not able to meet with needy regarding accessibility, privacy gradient, environmental comfort, and social opportunity. Though stronger than the Class 1–3 units in spatial quality, the pavilion still needed to address some clarity of space and opportunity for daylight access, as well as connection to nature. Transitional spaces should therefore not be understood as circulation leftover, but rather biodiverse space supporting a semi-orchestrated biophilic experience, social flexibility, and territorial personalization. This approach of integrating person–environment fit, spatial harmonization, and biophilic integration, transition space theory can establish a design strategy with differentiated responses to different needs of residents across all unit types. Spaces that result must tone up privacy gradience, environments comfort gradience, and transitional space legibility/adaptivity. And so that the redesign can enhance both functional performance and experiential quality of the housing environment.

Design Recommendation

Pavilion Unit(s)

The design of Pavilion Units includes a meditation and reflection garden area that thoughtfully integrates a structured garden and enhanced landscaping, altering the environment to support the psychosocial well-being of residents and the surrounding community. This design balances previously unavailable exposure to natural and

active biophilic elements. This design balances previously lacking exposure to natural and active biophilic elements (Table 2). Integration of natural and biophilic design elements fosters cognitive restoration and reduces physical demands on the interior. The creative landscaping to the rear of the Pavilion Centers features such visual prominence that it will assist in wayfinding to and within the overall complex. This space provides the community with a secondary zone that supports natural integration for community gatherings, promoting social and community engagement. These spaces will provide a balance for residents and community members, ensuring all seniors have natural integration. This balance will provide community members and seniors with opportunities to engage with and integrate into natural ecosystems, promoting social and community integration (Figure 6).

Table 2. Design Parameter Criteria for Pavilion Units

No	Parameter Criteria	Design Implementation
Theory: Person-Environment (PE) Fit Analysis		
1	Transformation of outdoor hardscape into designed landscape zones with structured green infrastructure	Transform the outdoor area from pure pavement into a garden with structured planting areas, a plant interaction system, and visual access from interior units.
2	Formalization of plant cultivation infrastructure	Provide planting media and maintenance support for sustained gardening activities.
3	Enhanced visual connection to the outdoors from the interior of the unit	Position strategic windows towards garden areas, creating a clear sightline from the room to the plant area.
Theory: Biophilic Design		
1	Front terrace as a social gathering zone with privacy options	Provide communal gathering infrastructure; maintain resident personalization; residents can choose to participate or personalize
2	Rear area as a distinct meditation/retreat zone	Design with an intimate scale, quiet character, natural elements; different function from the front terrace for social gatherings
3	Integration of BIOS patterns: visual connection, material connection, natural analogues, refuge function	Plants visible from entrances and circulation paths; residents can garden; vegetation barriers create privacy; meditation areas support contemplation
Theory: Transition Space		
1	Secondary territory formation on the front terrace	Formalize boundary definition; provide personalization infrastructure (plant display, flexible arrangement); communicate resident modification rights

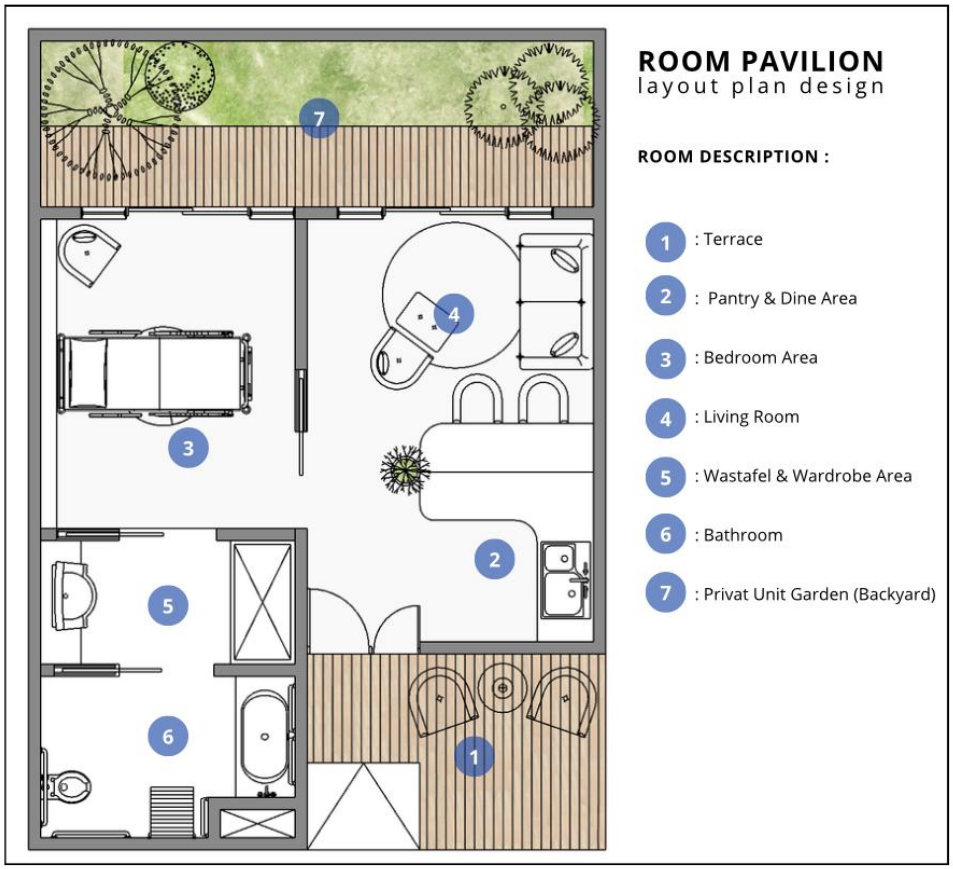

Figure 6. Layout-Plan Design Recommendation of Pavilion Unit

Type 1 Unit(s)

The Design of Type 1 units includes modifications to the bathroom to create an additional unit (Table 3). Each of these units will have its own private garden space, as well as an inner courtyard skylighted living room, to create a healthier and more comfortable living environment for the senior. Each unit has access to natural light and ventilation from the private garden and the courtyard. As a result, the living space is airy and calming. In the communal area, the skylights over the courtyard enhance circulation and the available space for communal activities. The residents will be able to take part in social activities when they want and enjoy privacy and quiet in their units, with access to the gardens. The gardens will reduce stress and will allow for personalized enhancement to the units. The design also includes a courtyard and garden to help people find their way and create a bond with their home. The design of the units will improve residents' quality of life and, clearly, their well-being (Figure 7).

Table 3. Design Parameter Criteria for Type 1 Units

No	Parameter Criteria	Design Implementation
Theory: Person-Environment (PE) Fit Analysis		
1	Adjust existing dimensions with space optimization	Relocation of bathroom units to create a private backyard garden in each unit
2	Maximize access and private outdoor exposure	Backyard garden with large windows and doors for natural lighting and ventilation
3	Limited and quality social activity support	Compact shared living room with skylight-equipped inner courtyard as a source of natural lighting and ventilation
Theory: Biophilic Design		
1	Balance personal privacy and social space	Communal spaces support limited interaction; compact interiors maintain natural air circulation and views
2	Integrate natural biophilic elements	Skylights in the inner courtyard, potted plants, natural materials in room finishes, natural colors
3	Create a harmonious and effective space	Private gardens reinforce the sense of place and psychological comfort of residents
Theory: Transition Space		
1	Facilitates secondary territory within the unit	Backyard and inner courtyard as transitional spaces and complementary personalization
2	Supports multi-level social activities and wayfinding	Living room and courtyard as transit zones and easily recognizable landmarks
3	Flexible space configuration	Support for seating and semi-private zoning in shared spaces; garden areas as reflective spaces

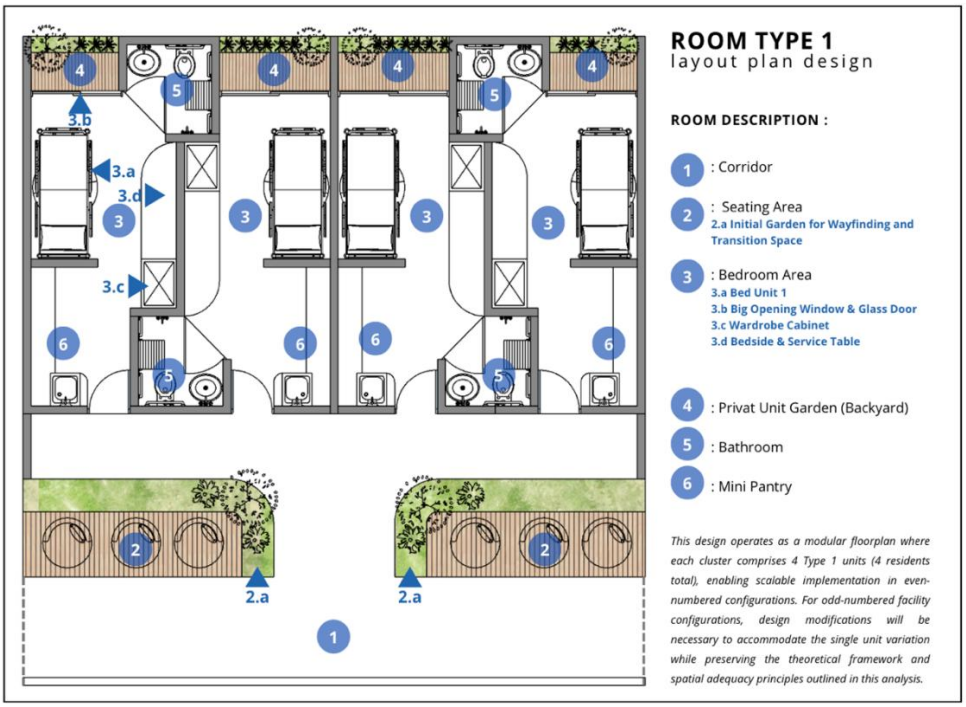

Figure 7. Layout-Plan Design Recommendation of Type 1

Type 2 Unit(s)

The Type 2-unit design's combination of large glass doors and windows with unobstructed access to the garden features a circular living room as a key transitional element and, together, results in a remarkable improvement in the garden's microclimate for the two residents (Table 4). This arrangement alleviates the spatial concentration of occupancy load, diminishes the feeling of enclosure in the room interior, and offers foremost access to the interior socio-relational space with spatial and thermal comfort as good as in other units. Residents can self-regulate the degree of social interaction, customize the space, and independently manipulate the system to achieve the desired privacy level (Figure 8).

Table 4. Design Parameter Criteria for Type 2 Units

No	Parameter Criteria	Design Implementation
Theory: Person-Environment (PE) Fit Analysis		
1	Overcoming limitations in natural lighting and oppressive perceptions	Wide glass windows and doors in the living room face the back garden; bright colors accentuate the light perception
2	Improving environmental quality for social functions and engagement	Semi-open circular living room, functioning as a meeting point and space for shared activities

No	Parameter Criteria	Design Implementation
3	Transforming the institutional atmosphere towards a natural, comfortable, and friendly character	Integration of potted plants, direct visual view of the garden, natural materials on the floor and walls
Theory: Biophilic Design		
1	Integration of daylighting with visual-physical biophilic elements	Wide glass windows and doors, large potted plants in the corners, direct and visual access to the garden
2	Adaptive biophilic patterns: visual/material connections, opportunities for interaction with plants	Plant shelves and personalization areas near the living room; residents can tend to their own plants
3	A welcoming, natural, and stimulating gathering atmosphere	Circular living room with seating arranged according to preference and circulation
Theory: Transition Space		
1	Circular transitional space landmark, strong visual identity	Circular living room (circular/shared node), easily recognizable, facilitates type 2 wayfinding
2	Graduated social engagement, flexible, supports secondary territory	Movable chairs, private corners for observers, semi-public gathering zones; open access to the back garden

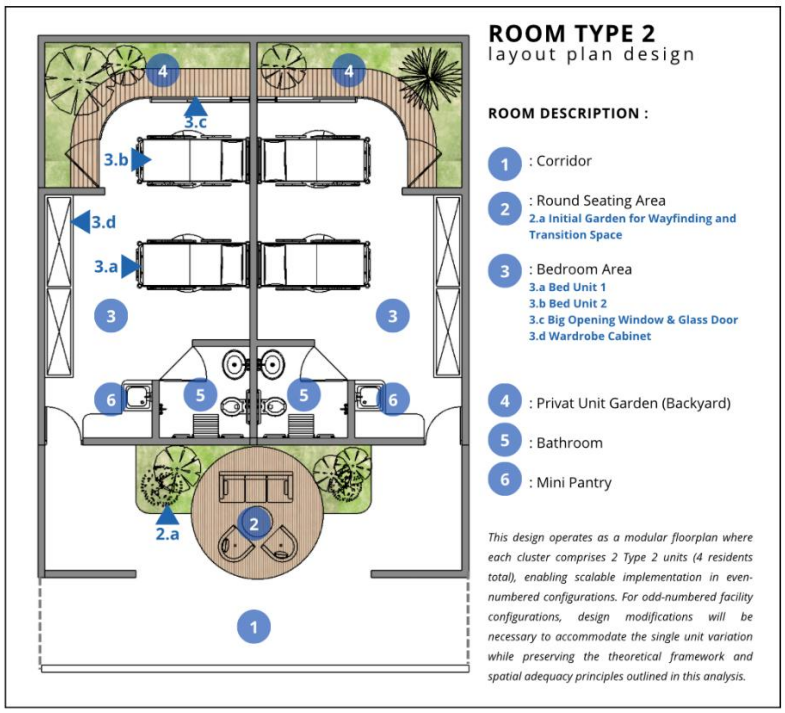

Figure 8. Layout-Plan Design Recommendation of Type 2

These results are completely contingent on a 50% increase in area on top of the current size. Increased area is a non-negotiable requirement for the simultaneous accommodation of the three primary design components: ideal daylighting, visual access to the natural landscape, and circular corridor spaces. This makes it possible to design living units with a strong quality of life for two people in a healthcare environment.

Type 3 Unit(s)

A single design for an integrated Type 3 unit will markedly improve livability and the environment for the three inhabitants (Table 5). The combination of large apertures, private gardens, and alcove corridors disperses closeness across several social containers and prevents a single large space from becoming overcrowded or forcing forced social interactions. For Type 3, social spatial equity is achieved for the first time, as these tenants have direct access to nature and to the intermediate social space (alcove), which is the unit's social space. Social control is achieved through these units, as residents can self-regulate their social exposure, control the geography of space, and use the space when they wish in any of the private units (Figure 9).

Table 5. Design Parameter Criteria for Type 3 Units

No	Parameter Criteria	Design Implementation
Theory: Person-Environment (PE) Fit Analysis		
1	Occupancy density via spatial expansion	Private garden and openings extend space; alcove buffers crowding in triple rooms
2	Flexible social spaces (no shared living)	Garden/alcove as first intermediate gathering; optional participation across scales
3	Autonomy/personal control	Direct garden access + adjustable alcove (doors/windows) for exposure/privacy
Theory: Biophilic Design		
1	Natural connections (multi-touchpoints)	Gardens: direct green views/plants; alcoves: corridor restorative points
2	Spaciousness via visual/physical links	Large openings transcend walls; distinctive alcoves break corridor monotony
3	Distributed nature experience	Garden: embodied therapeutic; alcove: passive circulation contact
Theory: Transition Space		
1	Secondary territory (multi-layer hierarchy)	Gardens primary; alcoves tertiary (personalized small-group claiming)
2	Wayfinding/spatial cognition	Distinctive alcoves (color/plant/material) as visual anchors/mental maps
3	Multi-layer buffers (private-public)	Garden interior-semi-outdoor; openings visual-social; alcove semi-private-public

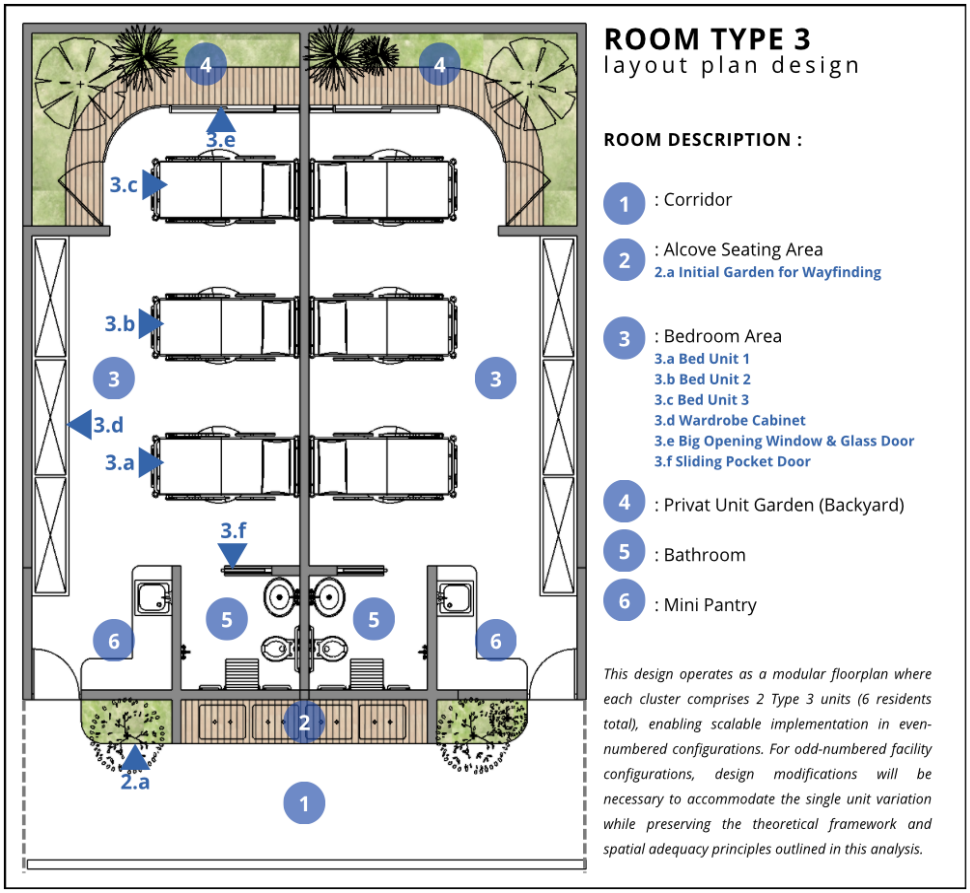

Figure 9. Layout-Plan Design Recommendation of Type 3

These outcomes are entirely dependent on a 75% spatial expansion of the existing size. The larger dimensions are not an optional enhancement, but rather an essential prerequisite for the integrated implementation of the three main design elements and for making the unit habitable and livable with a meaningful quality of life for the three occupants in a healthcare facility setting.

CONCLUSIONS

This research analyzes the spatial arrangement of Wisma Lansia Harapan Asri and illustrates how the incremental construction of senior housing without holistic integrated spatial planning can lead to a fragmented spatial structure and incongruity between the surroundings and the seniors' architectural intentionality. The results reveal that disparities in accessibility, spatial configuration, and the presence of communal areas influence the residents' mobility, environmental engagement, and social interaction. The lack of sufficient bridging spaces in certain housing units

constrains social interaction and the underutilization of the surrounding open spaces. By combining the person–environment fit theory and biophilic design spatial harmonization, transitional spaces can balance the process of social interaction and the need for privacy and autonomy of the residents. The addition of design features such as interior courtyards, corridor alcoves, and semi-private buffer zones can improve spatial clarity, facilitate informal social contact, and enhance both direct and indirect nature contact. In the context of this study, the design implications of the findings suggest that the strategies for designing transitional spaces can offer solutions to the increasing complexity of senior housing spatial issues. Design solutions that promote more open circulation patterns, social spaces integrated with courtyards, and corridor alcoves are likely to enhance accessibility, create opportunities for social interactions, and introduce elements that are supportive of the comfort and psychological well-being of seniors through environmental and biophilic design. Theoretically, this study contributes by showing how the integration of person–environment fit analysis, biophilic design-based spatial harmonization, and transitional space theory can be used as an analytical framework to understand the relationship between residents' needs and the quality of the built environment in senior housing. Through this framework, transitional spaces are understood not only as physical connecting elements, but also as spatial mechanisms that regulate privacy gradients, facilitate social affordances, and improve the quality of the environment for senior residents. However, this study has several limitations. It focuses on a single case study and uses a qualitative spatial analysis approach based on phenomenological observation. Consequently, this study's findings can only partially inform variations surrounding senior housing conditions in other settings. Future research can build on this study by way of cross-country comparisons of different forms of senior housing, the use of a mixed-methods approach to assess both the environmental comfort and the psychological wellbeing of the residents, and post-occupancy studies on the extent to which the strategies employed for transitional spaces have improved the quality of the senior housing surroundings.

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