Sustainable Vertical Housing Based on Social & Cultural Activities

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Abstract

The development of vertical housing is currently a response to the problem of population increase. People with low incomes (MBR) who have a range of restrictions, from knowledge gaps to financial difficulties, are typically the ones who live in vertical housing in developing nations like Indonesia. Due to misunderstandings about residents' social and cultural behavior and activities addressing the culture of living in multi-story residences, there are many issues with vertical housing these days, particularly those pertaining to disorganization and improper use of space. The study aims to offer best practices for bridging the gap between the existing conditions and the vertical housing usage pattern. The careless use of hallways, which leaves them cluttered with trash, clotheslines, and the possessions of residents, is one issue that frequently arises. This study outlines the issues with vertical housing in Bandung City and provide examples of well-designed housing in the past. Review of regulations and basic objectives of apartment planning are the basis for the literature review to be able to see the rationale for the provision of apartments by the government. Furthermore, a literature review is formulated regarding various local social & cultural activities that occur in vertical housing. The formulation of the state of the art from the literature review is the basis for seeing various phenomena of space utilization that occur at the vertical housings in Ujung Berung and Cingised, Bandung. Furthermore, it is anticipated that the findings will lead to both intelligent spatial utilization and sustainable architectural design solutions.

Keywords: Vertical Housing, Sustainable Design, Social and Cultural Activities

I. INTRODUCTION

The rapid growth of urban populations has heightened the demand for cost-effective and efficient housing solutions, especially in metropolitan areas. This increasing demand highlights a social fact: many urban centers are struggling to accommodate the surge in population, leading to housing shortages and poor living conditions, particularly for low-income residents. One of the strategies that has gained significant attention in addressing these issues is the development of simple, multi-story residential buildings, often referred to as "simple vertical housing." These buildings are not only seen to maximize limited urban land but also as potential spaces that can serve the social and cultural needs of communities. The provision of community centers, parks, and other social facilities within these housing developments can greatly enhance the quality of life for residents, fostering a stronger sense of community and belonging [1], [2].

From a literature perspective, however, there exists a gap in understanding how well these vertical housing solutions address the diverse social and cultural needs of their residents. Earlier research has predominantly focused on the economic benefits of vertical housing—primarily how they provide affordable living spaces and optimize land use. There has been less attention paid to the social and cultural dimensions of these developments, particularly in terms of how the design and provision of social spaces within these buildings can influence community cohesion and residents' well-being [3], [4]. Furthermore, there are indications that the physical condition of many vertical housing developments can negatively affect the social and cultural activities of the residents. For example, inadequate infrastructure, lack of maintenance, and insufficient social facilities are common issues that can diminish the overall quality of life in such housing projects [5]–[7].

In the context of Bandung, Indonesia, the local government has recognized the urgent need to provide sufficient housing and other public services to accommodate the city's growing population. The city has started a vertical housing development strategy, particularly in areas surrounding the city center that are characterized by high population density and slum-like conditions. The aim of this strategy, as outlined in the Regional Medium-Term Development Plan (RPJMD) of Bandung City, is not only to address the housing shortage but also to revitalize and rehabilitate urban areas that have long been neglected [8]. Vertical housing developments, along with the creation of tourist and creative villages, are seen as key components of this urban rehabilitation effort. Additionally, the Bandung government has sought to reduce the presence of heavy slums, with the Mayor's Decree No. 648/KEP.286 DISTARCIP/2015 confirming that only light and moderate slums now remain in the city [8].

One of the key challenges faced by residents of vertical housing, particularly those in lower-income brackets, is the limited space available within their homes. Many low-income individuals use their homes as places of business, attempting to supplement their income by opening small enterprises [9]. This dual use of space can exacerbate the already limited living areas available to them, creating tension between their personal and economic needs. Moreover, the poor visual quality of many vertical housing developments, often characterized by poorly maintained social facilities and the unsightly appearance of drying laundry in communal areas, can further degrade the living environment [10]. This highlights a research gap: while vertical housing addresses the basic need for shelter, it often fails to provide a holistic living environment that supports residents' social and cultural activities.

This research aims to fill that gap by investigating how social and cultural factors shape the architectural and spatial configurations of vertical housing in Bandung City. Specifically, this study seeks to understand how the design of these buildings can either support or hinder the social interactions and cultural practices of their residents. The focus will be on two case study areas, Cingised and Ujung Berung, where vertical housing projects have already been implemented. Through this analysis, the study will explore potential architectural solutions that can better accommodate the social and cultural needs of residents while also addressing the practical limitations of space. The argumentation underpinning this research is that the design of vertical housing, including the provision (or lack) of social facilities, plays a crucial role in shaping the social dynamics and cultural activities of its residents. It is argued that inadequate social spaces and poor infrastructure within these housing developments can lead to social isolation, psychological stress, and even conflict among residents [11]. Conversely, when well-designed social spaces are incorporated, these developments can foster stronger community ties, reduce social tensions, and enhance the overall well-being of residents [12].

This study investigates the specific social and cultural challenges faced by residents of vertical housing in Bandung. These include limited space, which can lead to psychological distress and social conflicts; the lack of social facilities, such as libraries or performance venues, which hinders cultural and creative activities; and the potential breakdown of social networks due to a lack of opportunities for interaction among residents. By addressing these challenges, this research hopes to offer new insights into how vertical housing can be designed to not only meet the economic and spatial needs of urban populations but also to support the social and cultural vitality of the communities they house [13]–[16].

II. METHOD

A qualitative approach was combined with a naturalistic method in this study. Based on the issues that needed to be investigated, a qualitative technique was chosen for this study. Researchers aim to understand how the design of low-rise housing for the lower middle class is influenced by social and cultural activity dynamics. Case analysis with a qualitative approach is the methodology employed in this study. The social and cultural context of vertical housing in Bandung is described in the case analysis of this study. Conditions that truly exist in natural environments are examined using this qualitative naturalistic research methodology [18].

Data collection was carried out from April to May 2023 in vertical housing in Ujung Berung and Cingised, Bandung. Observations focus on the physical quality of space and the types of activities that occur in public spaces at the selected location. Data from field observations was presented in a photo/picture and descriptive narrative. In addition to observation data and literature study data, interviews were also conducted to see data on space usage from user perceptions. Documentation of space use data is also presented in the form of measurable and scalar images, so that it can inform how space use occurs. Data validity is maintained through data triangulation methods. Data triangulation in this study was carried out by combining data from various sources (interview results, literature reviews and on-site observations) in various ways (interview recordings, and image recordings) and at various times (morning, afternoon, evening and night).

Analysis connected with the results of a literature review regarding the diversity of social and cultural factors that occur in various vertical housings in Indonesia. From the results of field observations, several themes of space utilization by users were found. Each theme found will be divided between themes so that there is a saturation of findings. Themes found such as utilization of lower space, utilization of space in the circulation area, utilization of parking space, are analyzed and dialogued with themes that emerge related to social and cultural activities of the community from interviews.

III. RESULTS AND DISCUSSION

The conditions observed during the survey and fieldwork are examined in conjunction with the findings from the literature review. The physical conditions of Rusunawa Cingised and Ujung Berung were carefully documented, revealing a range of infrastructural issues such as deteriorating buildings, limited public spaces, and insufficient maintenance. These physical challenges were cross-referenced with the interviews conducted with residents, providing insights into the social and cultural activities that take place in these environments. The interviews highlighted how the residents' daily lives, including their ability to engage in communal activities and

sustain small businesses, were directly influenced by the physical state of the housing facilities. For example, the lack of sufficient community spaces limited social interaction, while poor infrastructure hampered cultural and recreational activities.

The analysis then connected these findings to existing literature, which outlines the crucial role that well-designed public housing plays in enhancing residents' social and cultural well-being. The results suggest that addressing physical deficiencies in vertical housing environments can have a direct positive impact on social cohesion and quality of life. From an architectural perspective, solutions such as the addition of communal spaces, improved maintenance, and thoughtful spatial planning were proposed to address the identified issues. These recommendations align with established theories in architectural and urban design, which emphasize the importance of accommodating diverse social and cultural needs within residential environments. By integrating these architectural solutions, the aim is to foster a more vibrant and connected community in vertical housing developments like Rusunawa Cingised and Ujung Berung.

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A. The Recent Condition Vertical Housings in Ujung Berung and Cingised, Bandung

Cingised vertical housing is in the Cistern Kulon Village area, Aramaic District, Bandung City. This building is a type of simple rental vertical housing (Rusunawa) owned by the government which was built to address the problem of housing needs for low-income people. This building was built in 2005 and began to be used in 2008 [10][11][12]. Field observations (2023) indicate that Cingised vertical housing complex consists of five building units, one unit each of UPT office, open multipurpose room, community health center, mosque, and convenience store (Waserda) on the ground floor of building 2. Additionally, there is a PAUD on the ground floor of building 3, several sports fields, a temporary waste dump, one generator building unit, a vehicle parking area, and public open space in the form of a park. There are 483 families and 1932 residents in all. This building contains type 21 and type 24 residential housing, which are two different types.

Figure 1 Block Plan Drawing and Building Configuration of Cingised Vertical Housing Complex [19][20]

The West Java Provincial Government owned the land on which the Ujung Berung vertical housing complex was constructed. Its primary purpose is to house public servants working in the vicinity temporarily until they can obtain permanent housing [21][22]. The occupation time is one way that vertical housings and transit vertical housings differ from one another. Transit vertical housing allows a maximum stay of 5 (five) years while it allows a maximum stay of 10 (ten) years. There are three (three) twin blocks with 36 units each block, or 12 units per floor, in the Ujung Berung vertical housing area. There are two types of residential housing that are available: Type 24 has 196 units and Type 21 has 60 units.

Figure 2 Block Plan and Space Layout of Residential Units in Ujung Berung Vertical Housing [19] [20]

B. Socio-Cultural Activities of Residents Impact the Physical Condition of Vertical Housing

The conditions that are currently present in the vertical housing are consistent with the results of field observations for routine tasks like drying mattresses and clothes and routines for storing equipment or household goods. At the vertikal housing in Cingised and Ujung Berung, it was also discovered that selling behavior and social activities, such as social interaction places, were problematic. Another issue is the absence of natural illumination in the public areas and kids' playrooms that are offered. In the case of the vertical housing communities in Cingised and Ujung Berung, Indonesia, the socio-cultural activities of residents have played a crucial role in shaping the physical environment of these housing complexes. In table 1, the analysis was conducted to see the socio-cultural problems found in the physical traces seen during physical observations in Rusunawa Cingised and Ujung Berung. The data discussed in the table comes from the results of interviews based on the social and cultural activities of the community, as well as visual recordings. The findings of the problems found in this study were:

1. The use of balconies both in residential units and open balconies in common spaces that were filled with clothes drying or converted into storage areas,
2. Public open spaces outside buildings that were not maintained,
3. Lack of lighting in building units and in common spaces,
4. Parking spaces that were not maintained.

Table 1 Socio-cultural Issues in Cingised & Ujung Berung Housing

No.	Problems in Vertical Housing	Social Activity	Cultural Activity	Condition of Physical Setting
1.	Use the balcony to dry clothes and other household equipment, as well as store personal belongings in the corridor area or use the balcony as a warehouse.	The limitations of socio-economic conditions cause residents to choose to wash and dry their clothes manually.	The knowledge and culture of daily life that is inherited from generation to generation provides knowledge about the domestic process that must be carried out in drying clothes around each residential unit. There is limited space, so drying clothes is done in the open area closest to the residential unit.	  Use of the balcony as a place to dry clothes or carpets or mattresses in *Rusunawa* Cingised and Ujung Berung.  The balcony at *Rusunawa* Cingised is used as a warehouse or storage area. The poor behavioral habits of the residents cause the visual appearance of the building to lose its beauty and damage to residential balconies quickly occurs (mold, rust, etc.). Unmaintained balconies occur due to the unavailability of an area for drying laundry due to the inadequate/too small size of the balcony or the unavailability of shared laundry room facilities in the housing.
2.	Has a less caring attitude, behaves individually and lacks interaction	Social interaction activities occupy a narrow area in the front hall of the residential unit. There is	Lack of places that can be used collectively for arts and culture activities.	  The atmosphere is quiet in the open space at *Rusunawa* Ujung Berung.

No.	Problems in Vertical Housing	Social Activity	Cultural Activity	Condition of Physical Setting
		no proper place for good social interaction to occur.		Residents lack care, behave individually, and interact less with other residents due to busy work or lack of facilities, shared spaces, and routine activities carried out together with other residents.
3.	Decreased motivation to work (sell) in vertical housing environment	The most important need for social interaction is with neighbors in the immediate environment. The available public open spaces do not allow for social interaction to occur.	The culture of community life at the landed house is realized through mutual cooperation activities and tepa selira (mutual respect for each other).	 The management of *Rusunawa* Cingised does not provide enough retail areas to accommodate the needs of residents in buying and selling activities or offering services in the housing environment. Limited residential units make it impossible to open a business area in each residential unit. Regulations do not allow tenants to permanently renovate their residential units.
4.	The condition of the residential unit is unhealthy due to lack of lighting	The limited area of residential units due to limited rental price demand affects the condition of openings to the outside of the building. This affects the quality of lighting and activities in each residential unit.	-	  The poor quality of windows in residential units in *Rusunawa* Cingised and *Rusunawa* Ujung Berung.
5.	Destructive behavior such as violence, narcotics, and even suicide due to the monotonous environment and daily stress	Unmaintained social spaces and vehicle parking spaces tend to be dark, causing residents to feel unsafe.	-	  There is minimal lighting in the corridor areas and parking spaces on the ground floor of the building. Dark shared spaces and corridors can trigger destructive behavior.

Source: Research Team Analysis and Field Observations, 2023

The rapid urbanization experienced by many developing countries, including Indonesia, has resulted in a significant increase in the demand for affordable housing options within city limits, prompting governments and urban planners to explore various solutions to this pressing issue [23][24]. One such solution that has gained widespread attention and implementation is the development of high-rise residential buildings, commonly referred to as vertical housing, which are designed to optimize the use of limited land resources in densely populated urban areas [4][10]. The socio-cultural activities of vertical housing residents can have a significant impact on the physical condition and sustainability of these residential structures. Munasinghe suggests that sustainable

development in the housing sector should strive to balance the ecological, economic, and social dimensions, with the transformation of horizontal housing into vertical development being a readily achievable policy [24][25].

C. Architectural Solutions to Physical Problems in Rusunawa

It is necessary to address issues brought on by the sociocultural practices and conduct of residents of vertical housing. Enhancing dwelling architecture can help residents live better lives and lessen the damaging effects of sociocultural activities on the environment [26][27].

Table 2 Architectural Response to the Physical Problems of Rusunawa

No.	Problems in Vertical Housing	Architectural Design Response
1.	Use the balcony to dry clothes and other household equipment, as well as store personal belongings in the corridor area or use the balcony as a warehouse.	a) Providing public washing and drying areas on each floor of the vertical housing. b) Designing residential balconies with sufficient area for drying and have closed sides (can use rosters) so that drying can be covered and not damage the appearance of the building facade. c) Providing a temporary waste disposal space on the ground floor of the building and creating a waste shaft utility system (trash chute) to make it easier for residents to collect and dispose of their waste on each floor. d) Designing the interior with multifunctional furniture so that there is hidden storage space in the residential unit.
2.	Has a less caring attitude, behaves individually and lacks interaction	Providing shared spaces such as gathering areas in the Residents' Hall, sports facilities and senior exercise areas in the vertical housing, playgrounds, multi-purpose rooms. Maximizing residential corridors as a comfortable accidental meeting place between residents with wide and bright corridors.
3.	Decreased motivation to sell in the vertical housing environment	Providing residential units that have additional facilities in the form of sales space (attached to the unit). Another solution can also be provided with a multifunctional furniture design, so that it can become a sales stall/kiosk that can be folded so that it is practical and does not take up space.
4.	The condition of the residential unit is unhealthy due to lack of lighting	Making the bright room setting to minimize crime with the use of white and exposure to sunlight.
5.	Has a less caring attitude, behaves individually and lacks interaction	Providing shared spaces such as gathering areas in the Residents' Hall, sports facilities and senior exercise areas in the vertical housing, playgrounds, multi-purpose rooms. Maximizing residential corridors as a comfortable accidental meeting place between residents with wide and bright corridors.
6.	Destructive behavior such as violence, narcotics, and even suicide due to the monotonous environment and daily stress	Designing buildings and housing landscapes with dynamic shapes, using bright colors, namely white and grayish white, and maximizing sunlight for all residents. Providing various kinds of joint activities, such as shared sitting areas, gardens, and sports facilities (Futsal, badminton, jogging track, table tennis).

Source: Analysis of the Research Team, 2023

Several factors should be taken into consideration when designing sustainable architectural solutions to physical issues in low-income housing brought on by sociocultural activities (Table 2) [9][10][26]. These include:

1. Paying attention to the needs and behavior of residents, as well as the surrounding environment. In this way, the design can be adapted to the needs and behavior of residents, as well as improving environmental quality.
2. The application of technology and green architectural concepts in housing design can reduce energy use and reduce large costs for building maintenance.
3. Proper design of balconies and corridors must consider the socio-cultural behavior of residents. Increasing the area of the balcony or hallway is not the only solution, but it can be considered to improve the socio-cultural quality of the residents.
4. Designing outdoor areas as urban public gatherings and public facilities.

Responding to the activities of residents in drying clothes on the balcony, the design that can be proposed is to provide a shared drying area on each floor (Figure 3). This area is designed to be visually closed from the outside of the building, but still allows the entry of wind and sun heat to dry the clothes that are being dried. The use of the outside area of the building as a commercial area needs to be followed by the formation of a residents' cooperative (Figure 4). This cooperative will regulate the traders who are allowed to sell in this area [9]. The design of the open space in front of the residential unit needs to consider the existence of a place that can be used by residents as temporary grocery store (Figure 5). A multifunctional room that can be used as a temporary grocery store, as well as for sports for the elderly can be a solution for the existence of a social space that can also increase the economic income of residents (Figure 5).

Designing Residential Balconies with Sufficient Area for Drying and Have Closed Sides

Public Washing and Drying Areas on Each Floor of the Vertical Housing

Figure 3 Architectural Response Solutions for Washing and Drying Activity in Vertical Housing Design

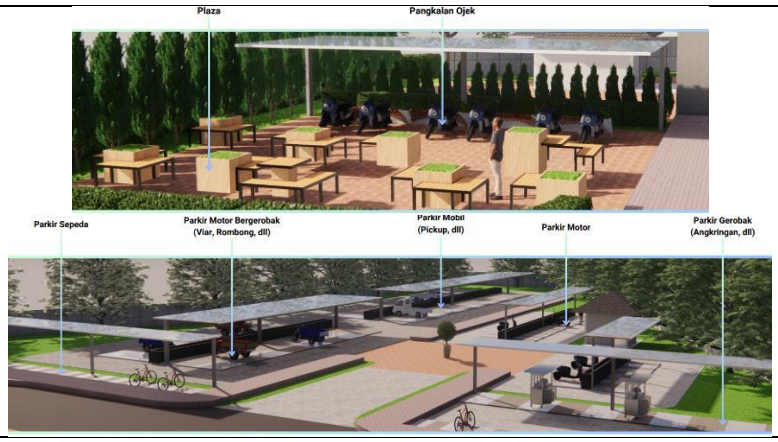

Figure 4 Examples of Solutions in Outdoor Vertical Housing Design for Urban Public Facilities

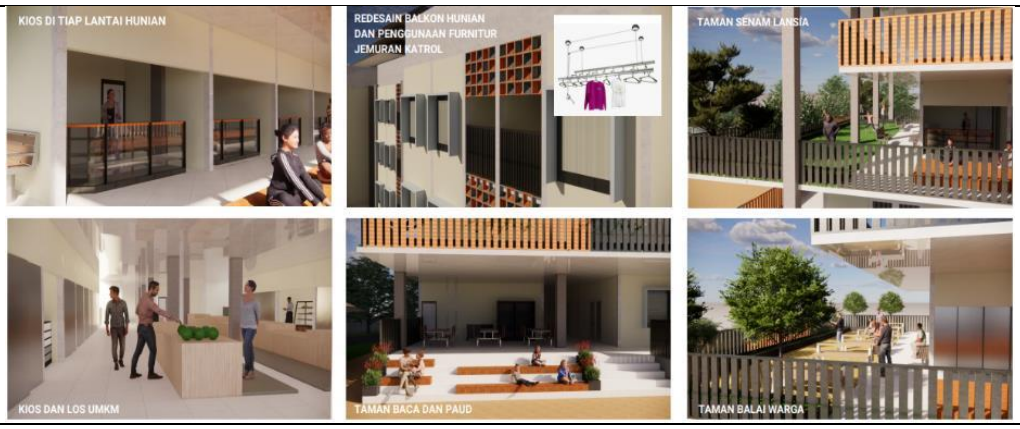

Figure 5 Examples of Implementing Various Solutions in Vertical Housing Design

V. CONCLUSSION

Due to the variety of socio-cultural activities that its residents engage in, rented vertical housing (in Indonesia: *Rumah Susun Sewa Sederhana*) has poor physical conditions. A sustainable architectural response aims to address this issue. Local social and cultural norms and behaviors must be considered in sustainable building design. Some of the architectural solutions that can be used are the addition of amenities like communal drying rooms, areas for social interaction and children's play areas, multipurpose furniture, and the use of technologies based on green architecture. Naturally, there are obstacles to the adoption of this sustainable solution, given that the people who live in vertical housing are mostly low- to middle-class individuals with less education. However, this does not prevent the realization of sustainable livable vertical housing, which can raise standards of living for all societal strata.

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