E-ISSN: 2528-388X
P-ISSN: 0213-762X

INERSIA
Vol. 21, No. 2, December 2025

The Integration of Spatial Layouts in the Abdi Dalem Houses in Jeron Beteng, Keraton District, Yogyakarta

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Keywords:
Integration Spatial Patterns
Jeron Beteng
Abdi Dalem
Space Pattern
Abdi Dalem Houses

ABSTRACT

The abdi dalem house is a residence built and provided for the royal servants of the Yogyakarta Palace, featuring the traditional Javanese spatial configuration spread throughout the Jeron Beteng area. In recent times, the Jeron Beteng area has undergone significant transformations in response to modern developments, leading to the flexible reconfiguration of spaces to meet contemporary needs. This study aims to examine the evolving spatial patterns in the residences of abdi dalem in the present day. This holds significant importance in understanding the reflections of Javanese vernacular transformation.. The study focuses on two abdi dalem houses in the Panembahan district, known for preserving the original condition of these traditional homes. This qualitative research employs a case study approach, with data collection conducted through purposive sampling, observations, and interviews. Photographic documentation and floor plan sketches were utilized to strengthen the data, alongside literature reviews focusing on cultural, ritual, and traditional aspects of Javanese houses. The study uses two abdi dalem houses that still retain their original façade as case studies. The analysis of spatial integration is performed qualitatively, covering variables such as socio-cultural aspects, spatial layout, building orientation, building functions, land transformation, zoning, spatial circulation, and the integration of spatial patterns. The findings reveal that the integration of spatial patterns in abdi dalem houses for modern-day flexibility is influenced by the evolution of time and the growth of family members. This adaptation occurs without compromising the architectural heritage values of the house, though it does result in changes to the spatial patterns.

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1. Introduction

Yogyakarta is a city renowned for its distinctive historical and cultural characteristics, which are deeply influenced by the Yogyakarta Sultanate. In addition, the city is widely recognized as a center of education and tourism, with significant potential to attract both domestic and international visitors [1].

The Jeron Beteng area, also known as the Yogyakarta Palace (Keraton) Complex, constitutes the historical and cultural core of Yogyakarta. Covering an area of approximately 1.40 km² or 140 hectares, the term *Jeron Beteng* originates from Javanese, where *jeron* means “inner area” and *beteng* refers to the palace fortification (Figure 1). *Jeron Beteng* has been an integral part of the Yogyakarta Sultanate complex since its initial construction [2].

This area holds substantial cultural value and represents an important component of Yogyakarta’s historical and cultural heritage. Within the fortified *Jeron Beteng* area are not only the palace itself but also residential settlements of the Sultanate’s royal servants (*Abdi Dalem*) and aristocratic houses, which are distributed throughout and around the palace complex [3].

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https://doi.org/10.21831/inersia.v21i2.78851
Received 5th November 2024; Revised 31st May 2025; Accepted 22nd December 2025
Available online 23rd December 2025

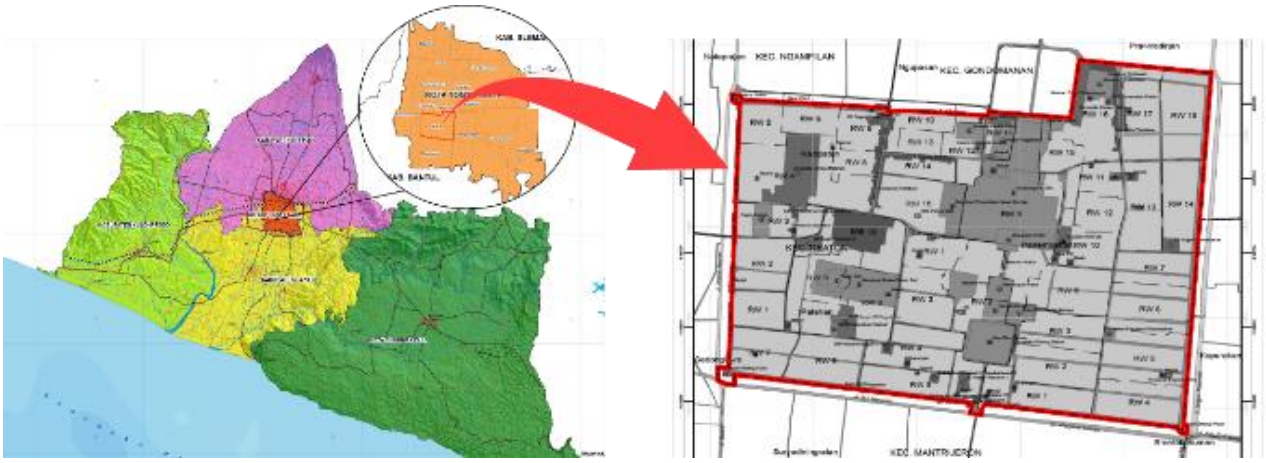

Figure 1. Research Location

In the context of the Yogyakarta Palace (*Keraton Yogyakarta*), *Abdi Dalem* refers to palace officials who perform dual roles, including the preservation of Javanese cultural traditions. To support their service and maintain close proximity to the palace, these servants are provided with housing within the Jeron Beteng area.

The residences of the *Abdi Dalem*, provided by the palace, generally reflect the spatial configuration of traditional Javanese houses. Their surroundings are often characterized by vegetation closely associated with Javanese culture, such as the *sawo kecik* and *melinjo trees*. Traditional architecture is defined by its function in accommodating cultural activities and fulfilling culturally embedded needs. The architectural characteristics of *Abdi Dalem* houses in Siliran include *kampung*, *limasan*, and *joglo* roof forms. Spatially, these houses typically consist of several key elements: the *pendopo*, *pringgitan*, *dalem*, *senthong*, and *pawon* (kitchen). The *pendopo* occupies the front section, the *pringgitan* forms the transitional central space, and the *dalem*, *senthong*, and *pawon* are located at the rear of the house [4].

Javanese vernacular houses are traditionally classified according to social stratification, which is reflected in their architectural features [5]. The residences of the *Abdi Dalem*, often referred to as "houses" bear closer similarities to noble residences than to those of commoners. This classification is particularly evident in the presence of *gandok* structures (additional pavilions), which may vary considerably in size, number, and form.

According to Handoko et al. [6], Yogyakarta—widely regarded as Indonesia's cultural, historical, and artistic center—is currently experiencing notable architectural transformations, particularly within the *Jeron Beteng* area. These changes are especially apparent in *Abdi Dalem* houses and are driven by modernization processes and increasing economic pressures. Although the cultural values of the *Jeron Beteng* community remain relatively well preserved, the construction of new buildings without the integration of ancestral cultural principles poses a threat to the area's cultural identity. This erosion is particularly visible in the architectural elements of *Abdi Dalem* residences, leading to a gradual decline in the cultural and historical significance of the *Jeron Beteng* area.

Based on these conditions, this study explores the strategies employed by the *Jeron Beteng* community—particularly the *Abdi Dalem*—in integrating spatial functions to adapt to modernization and increasing economic demands.

2. Methods

2.1. Data

This research adopts a qualitative methodology using a case study approach. Data were collected through purposive sampling techniques, including field observation, photographic documentation, in-depth interviews, and a review of relevant literature to address the identified research issues.

Field observations were conducted directly by the researcher, focusing on two selected houses identified using the 1925 *Jeron Beteng* map. This approach enabled the examination of representative cases within the *Jeron Beteng* area and facilitated an understanding of the physical conditions and spatial phenomena observed on site (Figure 2 and Figure 3).

Figure 2. Case observation 1

Figure 3. Case observation 2

The interview process involved identifying homeowners who were willing to participate in in-depth interviews. These interviews were conducted using a set of structured questions prepared by the researcher. The questions addressed spatial functions, layouts, architectural forms, and the historical background of the case study houses, with particular attention to the original functions of spaces and their current uses within the Jeron Beteng area of Yogyakarta (Figure 4).

Figure 4. Interview with homeowner respondents

Photographic documentation was conducted by the researcher with the consent of the homeowners. This process involved capturing images and measuring room dimensions using a camera and a laser distance meter. Documentation focused on spaces that had experienced changes in form, size, function, layout, and materials, allowing for a detailed assessment of their current conditions (Figure 5).

Figure 5. Photographic documentation inside the house

The final stage of data collection consisted of in-depth interviews during which the original floor plans of the houses were reconstructed, including the names and functions of each space. Subsequently, the current floor plans were redrawn to reflect existing spatial arrangements, functions, and layouts. Through this process, comprehensive qualitative data were obtained, enabling an in-depth understanding of the spatial transformations occurring in the selected case studies.

In this study, the qualitative approach proved effective in capturing various phenomena and conceptual factors related to changes in spatial function, form, and dimensions [7]. The combination of observation, interviews, and in-depth interviews provided rich and relevant data, offering valuable insights into the processes of spatial transformation within the *Abdi Dalem* houses. An overview of the research method, including observation, interviews, and in-depth interviews, is presented in Figure 6.

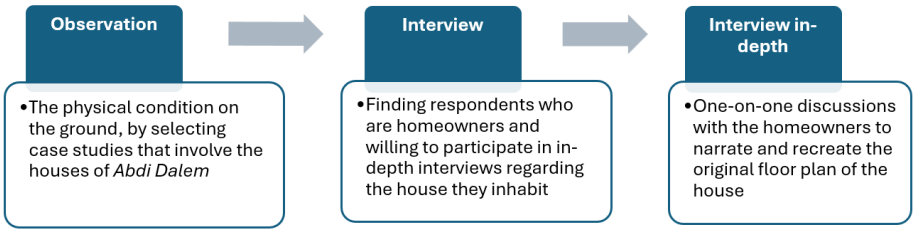

Figure 6. Research method diagram

2.2. The *Jeron Beteng* Area of Yogyakarta

It is referred to as the *Jeron Beteng* settlement because it is located within the walls of the Yogyakarta Palace, enclosed by high and thick walls that surround the area. Within the palace fortifications, also known as the Jeron Beteng community, the royal attendants and the Sultan's family reside in the vicinity of the Yogyakarta Palace complex [8]. *Jeron Beteng* was originally inhabited only by the Sultan and his family. However, over time, the area developed and began to be inhabited by people from various social strata. Within the walled area, also known as *Jeron Beteng*, there is not only the palace (keraton), but also the village of the *Abdi Dalem* (royal servants) and the residences of noble families, scattered throughout and around the area [2][3]. The Jeron Beteng area is governed by unique regulations issued by the Palace, known as Paugeran. These regulations include provisions such as the prohibition of multi-story buildings and the requirement that residents within the area must be indigenous people. [9] The location of Jeron Beteng was strategically chosen as it represents the birthplace of Yogyakarta's culture, is part of the UNESCO World Heritage site, and serves as the central hub for the city's governance. The Jeron Beteng buffer zone map can be seen in Figure 7.

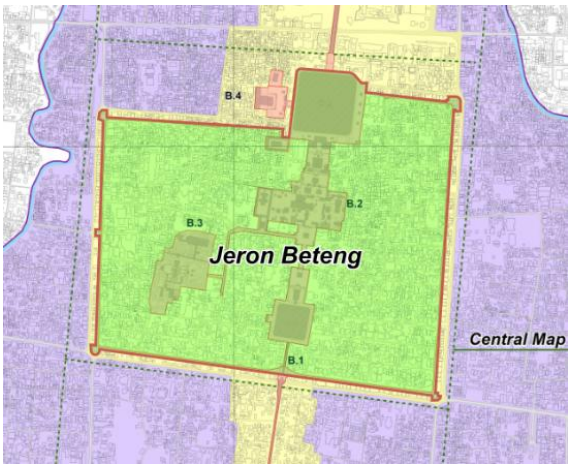

Figure 7. Jeron Beteng buffer zone map [9]

2.3. Architectural Transformation in the Jeron Beteng Area, Yogyakarta

Architectural transformation refers to the process of change in the design and structure of buildings, focusing on the evolution and modification of architectural elements over time [3]. In architecture, transformation involves analyzing and understanding how and why these changes occur in both the design and function of spaces. Changes in spatial patterns, accompanied by shifts in the functions of buildings, emerge from cultural transitions that become increasingly irrelevant to current conditions. Additionally, physical changes are influenced by the turnover of residents and the introduction of new activities, such as economic and educational pursuits. This phenomenon is also evident in the residential spaces of the Abdi Dalem in the Jeron Beteng area of Yogyakarta. The transformation process in each house shows varying degrees of change based on underlying factors [4].

The spatial patterns within a house can be categorized into three main functional zones: public spaces, which are used for social interaction; private spaces, which provide privacy for the inhabitants; and service spaces, which support daily household activities.

Public spaces in a house essentially include areas such as the living room and front porch. Meanwhile, private spaces consist of the dining room, family room, and bedrooms. Service spaces include the kitchen and bathroom. Changes in spatial arrangements can be influenced by various factors, depending on the needs of the inhabitants.

The spaces within a building can be interconnected and organized into four coherent patterns of form, function, and space [10][11].

Figure 8 illustrates space pattern within space is used to reinforce its identity as a standalone volume. The enclosed space can also have a different form from the surrounding

space. This contrast in form can highlight the functional differences between the two spaces or emphasize the symbolic significance of the enclosed space.

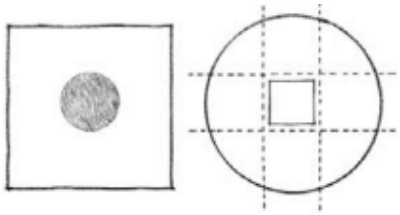

Figure 8. Space patterns within space [10]

Adjacent spaces, one of the most common types of spatial relationships is proximity. Each space fulfills specific functional or symbolic requirements with a clear definition. The illustration of adjacent space pattern can be seen in Figure 9.

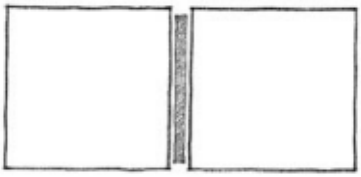

Figure 9. Adjacent space pattern [10]

Spaces connected by common areas, two spaces that are separated from each other can be linked or connected by a third space that lies between them. The intermediary space functions as a connector, having a form and orientation different from the other two spaces. Figure 10 illustrates a spatial pattern that connected by common spaces.

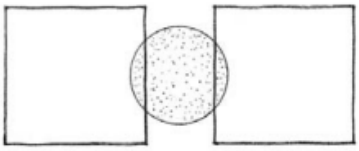

Figure 10. A spatial pattern connected by common spaces [10]

Spatial organization, the relative importance and functional or symbolic roles of these spaces within the building's organization can be explained as Figure 11.

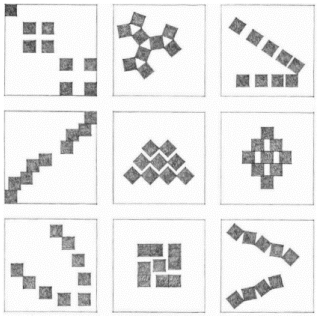

Figure 11. Room organization pattern [10][11]

The spatial elements used to form new spaces exhibit varying levels and types, which are determined by their respective variables, as shown in Table 1.

Table 1. Parameters and variables based on theory.

Theory	Parameters	Variables	Indicator
Formation of Spatial Elements (Rapoport, 1982)	Changes in Spatial Elements	Fixed, Semi-fixed, and Non-fixed	Walls, Ceilings, Furniture
Spatial Boundary Element (Ching, 1999)	Changes in Spatial Boundaries	Types of Spatial Boundaries	Walls, Ceilings, Furniture
Function of Space (Ching, 1999)	Changes in Spatial Patterns, Changes in the Function of Space	Space	Distance Between Spaces, Boundaries Between Spaces, Form of Space

2.4. Traditional Javanese House

A Javanese house is not merely a place of residence but also a philosophical symbol that imparts strength to its owner [12]. A Javanese residence typically consists of at least one basic unit, known as *omah*, which is divided into two main sections. The interior consists of a series of central *sentong* (rooms), which serve as ritual spaces and areas for offerings, while the left and right *sentong* are usually used as sleeping areas or for storing important belongings. An open space extends in front of the series of *sentong*, referred as *dalem*, which functions as a family room. The outer area is called *emperan*, serving as a seating or resting area for both residents and visitors. The spatial arrangement in Javanese housing functions as a system to maintain privacy, ensuring inner peace, and overall reflecting the balance of the universe. It is also important to note that the *Abdi Dalem* houses share the same spatial configuration as traditional Javanese homes as shown in Figure 12.

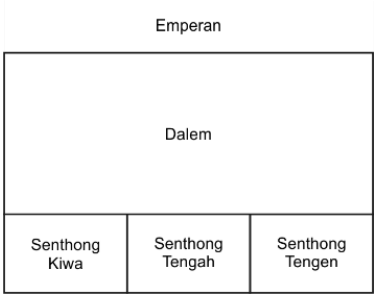

Figure 12. Spatial pattern of traditional Javanese house

According to Heinz Frick book [13][14], the Javanese people believe that the house, as a dwelling place, reflects the identity and personality of its owner. Jhonson, P.A. [13] also states that in Javanese homes, there is a spatial division based on gender. For example, as mentioned by the *gandhok kiwa* (east side of the house) is designated for male sleeping quarters, while the *gandhok tengen* (west side of the house) is designated for females. The typical configuration of traditional Javanese house space illustrated on Figure 13.

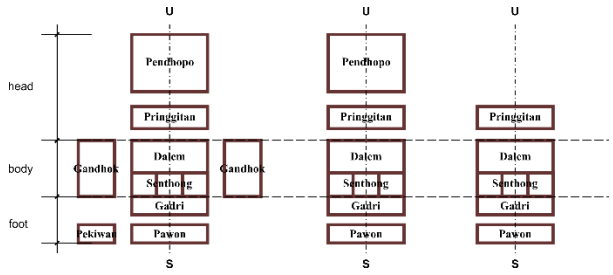

Figure 13. Configuration of traditional Javanese house space

2.5. Spatial Zoning

The zoning of spaces in a Javanese house is divided into several sections according to their functions. Based on the personality of the Javanese people, there is a need for spaces for interaction and private areas to accommodate daily activities. This spatial organization consists of public spaces, represented by the front yard of the house; semi-public spaces, which include the *pendhapa*; semi-private spaces, defined as the transitional area between the partition separating the *pendhapa* and *pringgitan*; and private spaces, comprising the *pringgitan*, *dalem*, *senthong*, *gadri*, *gandhok*, and *pawon* areas.

3. Results and Discussion

3.1. Results

This qualitative study, conducted through observation, interviews, and in-depth interviews of two *Abdi Dalem* houses, yielded several key findings. The results indicate that spatial integration within *Abdi Dalem* houses is driven by multiple interrelated factors, including:

(a) Changes associated with modernization, which have altered the functions of spaces and led to shifts in spatial patterns to accommodate flexible and contemporary needs [15]. The descendants of abdi dalem and their families no longer utilize spaces that were once considered sacred, which in the past were used for ritual purposes but are now repurposed for everyday practical activities. hese transformations are influenced by both internal factors, such as lifestyle changes, and external pressures, particularly increasing economic demands.

(b) The growth of household members who establish their own families yet continue to reside in inherited *Abdi Dalem* houses has resulted in changes to spatial dimensions to fulfill functional requirements and enhance domestic comfort [15]. Married children and extended family members who are unable to afford independent housing often share the same dwelling, necessitating spatial adjustments to accommodate multiple households.

(c) The economic potential of the surrounding environment has encouraged the transformation of residential houses into commercial buildings, such as heritage guesthouses. This change is closely linked to the rapid development of the Jeron Beteng area as a cultural tourism destination [6], which attracts both domestic and international visitors.

Further analysis was conducted through the redrawing of original and current floor plans of the two case study houses. This process revealed several key findings, as described below. Case 1 defined as the commercial building function, and the Case 2 defined as the residential building function.

In Case 1, spatial merging was identified in the side area of the house, which originally functioned as a sleeping space for close relatives and a kitchen. These spaces have since been combined using permanent architectural elements such as walls, ceilings, and floors [16], forming a larger bedroom area. Although the spatial dimensions have changed, the historical value of the space has been largely preserved, as the design and materials closely resemble those of the original structure, although not identically.

The merging of spaces also resulted in a reorganization of the spatial pattern. Initially, the layout positioned the relatives' sleeping area away from private family spaces. Following spatial integration and the introduction of new partition elements, a more contiguous spatial arrangement emerged.

In Case 2, spatial merging occurred in the side area of the house, where the kitchen and bathroom were combined to form a living room [10][11]. The transformation involved the use of permanent architectural elements, including walls, ceilings, and floors.

This space-merging strategy led to a change in spatial organization. Originally, the kitchen was directly adjacent to the bathroom. After the transformation, the merged space became positioned adjacent to the living room and

bedrooms, reflecting a revised functional layout that better accommodates current residential needs..

3.2. Discussion

This study find that the spatial pattern merging plays a crucial role in preserving the cultural identity and values passed down through generations by the abdi dalem. The processes observed in both cases reveal several key strategies of spatial integration, as discussed below.

In Case 1, the building initially functioned as a residential house, with spatial components aligned with the philosophy of traditional Javanese architecture. The space included the *pendhapa*, *pringgitan*, *dalem*, *senthong tengah*, *senthong kiwa*, *senthong tengen*, *gadri*, and a sleeping space for close relatives (Figure 14).

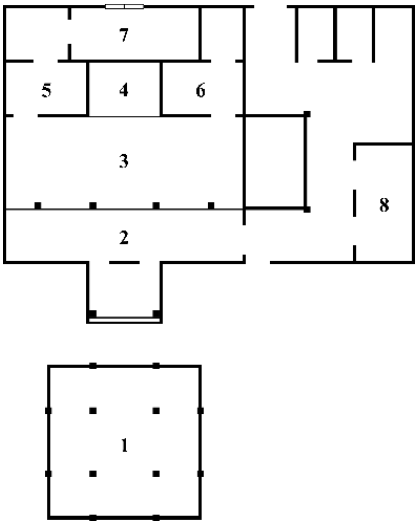

Figure 14. Initial spatial configuration of Case 1

Over time, the building in Case 1 undergone a complete functional transformation into a commercial heritage inn, due to the environmental potential and the growth of tourism activities in the *Jeron Beteng* area [10]. While most spaces were renamed to reflect new functions, the *pendhapa* retained its original designation. Other spaces were redefined as a waiting lobby, lobby, administration room, massage room, storage room, circulation access, guest bedrooms, side lobby, pantry and dining room, swimming pool, and green open space. These changes aligned with the current needs of the building as a heritage inn and are influenced by the surrounding tourism context. Figure 15 illustrates the current spatial configuration of Case 1. The numbers shown in Figure 15 correspond to the following room functions: (1) *pendhapa*, (2) waiting lobby, (3) lobby, (4) administration room, (5) massage room, (6) storage room, (7) circulation access, (8) guest bedrooms, (9) side lobby, (10) pantry and dining room, (11) swimming pool, and (12) green open space.

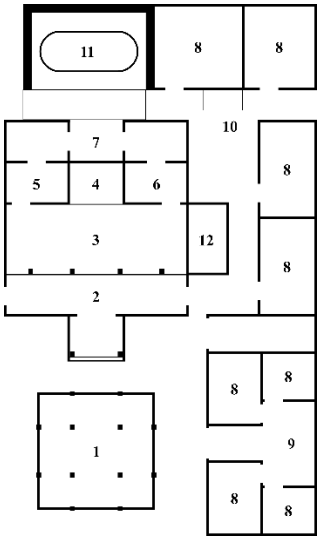

Figure 15. Current spatial configuration of Case 1

Case 2 originally functioned as a residential house with spatial components similar to those of Case 1, reflecting the philosophy of a traditional Javanese architectural principles. As shown in Figure 16, these include (1) *pringgitan*, (2) *dalem*, (3) *senthong tengah*, (4) *senthong kiwa*, (5) *senthong kanan*, (6) *gadri*, (7) bedroom for close relatives, (8) *pawon* (kitchen) and bathroom.

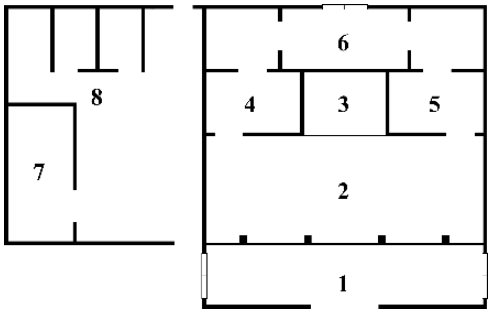

Figure 16. Initial spatial configuration of Case 2

Unlike Case 1, Case 2 continues to function as a residential house, currently inhabited by two nuclear families. However, due to an increase in household members over time, several spaces have been renamed and repurposed to accommodate current needs [11]. The current spatial configuration provided in Figure 17. The rooms are renamed as follows: (1) living room 1, (2) family room 1, (3) unused space, (4) bedroom, (5) bedroom, (6) circulation access, (7) laundry and drying area, (8) family room 2, (9) living room 2, (10) bedroom, and (11) carport.

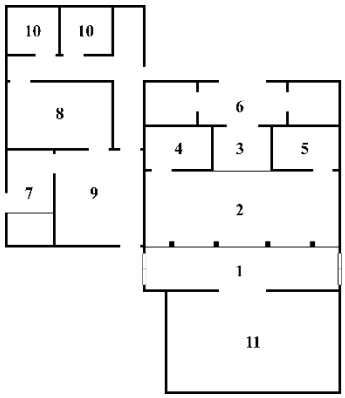

Figure 17. Current spatial configuration of Case 2

The space merging represent a strategy employed by the owners of *Abdi Dalem* houses in response to temporal changes, the increase in family members, and the surrounding environmental potential. This is evident in both cases, where side areas of the house are adapted by incorporating permanent elements [11].

In Case 1, the bedroom for relatives was merged with the kitchen and bathroom to form a larger area, which was later subdivided into separate bedrooms with different dimensions compared to the original floor plan. As illustrated in Figure 18, the spatial structure within is influenced by changes in the configuration of the space [17] and the elements used are permanent elements. This space merging was carried out by the owner to expand the sleeping area to enhance the comfort of the guests staying at the property. This strategy led to a change in both the zoning and spatial patterns of the house.

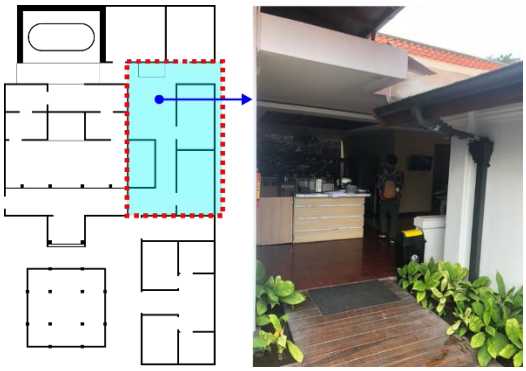

Figure 18. Space merging in Case 1

In Case 2, the kitchen and bathroom were merged to create a family room. The owner remove the existing partition elements and merge the two spaces into one large room, using permanent elements for the room's new boundaries. This transformation change the shape and dimensions of the space [10][11], followed by a shift in the spatial pattern. The illustration of space merging in Case 2 is shown in Figure 19.

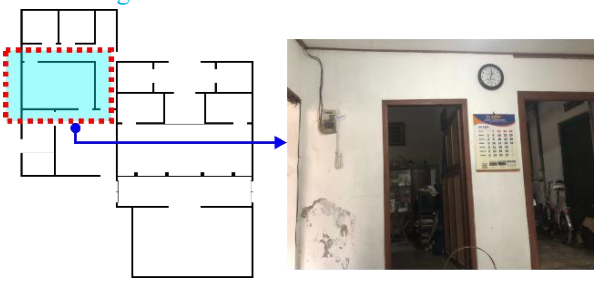

Figure 19. Space merging in Case 2

The buildings in Case 1 and Case 2 initially had similar zoning arrangement, consisting of public, semi-public, semi-private, and private zones [18]. However, functional and spatial patterns changes have significantly altered these zoning of the spaces. In Case 1, which has now transformed into a commercial property, the previously private zone has shifted to a semi-public zone. On the other hand, in Case 2, only minor zoning changes have occurred, as the building's function remains a residential home. The initial spatial zoning in both Case 1 and Case 2 are similar due to the presence of the same room components, which are as follows: (1) public zone, (2) semi-public zone, (3) semi-private zone, and (4) private zone following Figure 20.

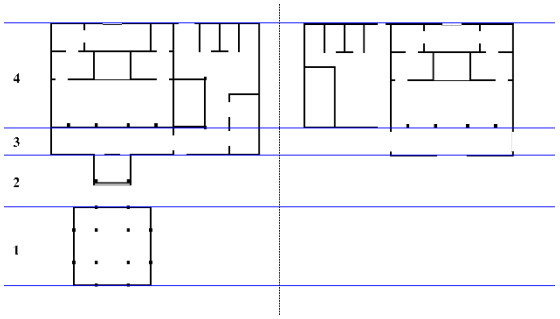

Figure 20. Initial zoning of Case 1 and 2

After the spatial integration in Case 1, there is a significant change in zoning due to the transformation of the building's function from residential to commercial. The new zoning includes: (1) public zone, (2) semi-public zone, (3) semi-private zone, and (4) private zone. The current zoning of Case 1 can be seen in Figure 21.

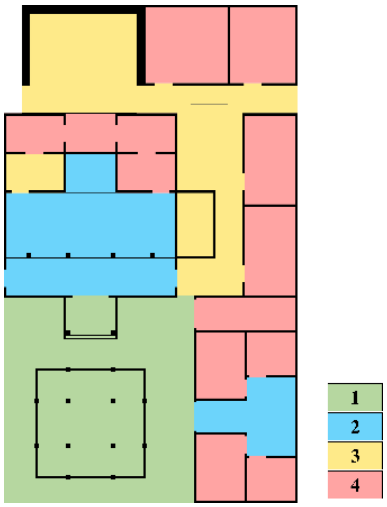

Figure 21. Current zoning of Case 1

In Case 2, zoning changes are relatively limited due to the continued residential function of the building.. The zoning is arranged by each occupant of the space, as the house is inhabited by two separate households. Unlike Case 1, Case 2 does not have a public zone. The Case 2 zoning illustrated in Figure 22 and the number represent as follows: (1) public zone, (2) semi-public zone, (3) semi-private zone, and (4) private zone.

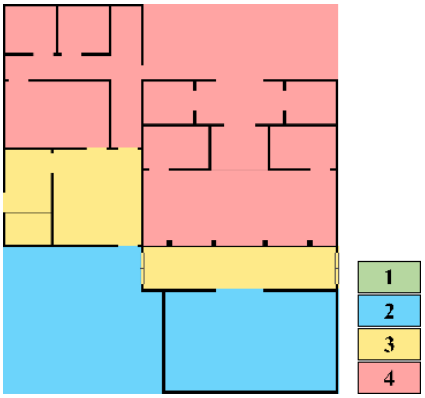

Figure 22. The current zoning of Case 2

Originally, *Abdi Dalem* houses followed a traditional Javanese spatial pattern characterized by hierarchical organization and symbolic meaning [12]. This house follows a hierarchical arrangement of spaces, where guest bedrooms are separated from the private areas such as the *dalem* (main living area) and *senthong* (chamber). The original spatial pattern of the house can be seen in Figure 23 which represents the same spatial organization in both Case 1 and Case 2.

In Case 1, spatial integration resulted in a more compact arrangement, with the bedroom, dining room, and pantry now being adjacent to each other. In Case 2, the merging of spaces led to a a closer configuration between the living room and the guest room as shown in Figure 23.

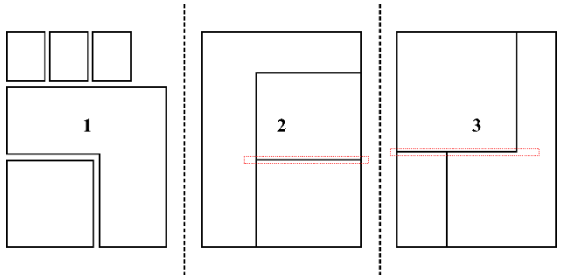

Figure 23. Initial spatial layout of Case 1 and 2

The resident circulation acess in both cases exhibited similar circulation patterns at the initial stage. This can be explained by the application of the traditional Javanese spatial concept, where circulation is formed based on ritual purposes behind certain activities and the sacred nature of these spaces. In traditional Javanese houses, circulation typically starts from the outermost pendhapa, the space for receiving guests and conducting various communal activities, and then moves inward to the dalem, a more private and sacred area.The hierarchical structure of these spaces reflects a philosophy of a balanced and harmonious life, where individuals are allowed to enter specific areas or use certain pathways for designated purposes [12]. However, over time, social changes and practical needs have altered the circulation patterns in both houses.

Currently, the change in the function of the spaces has led to an adjustment in circulation pathways. In Case 1, where the building has transitioned into a commercial function as a heritage guesthouse, the circulation route has been altered. Guests now enter through the front or *pendhapa* area and proceed to the lobby, marking a significant change from the previous layout where only the homeowners freely traversed the central area or lobby. In Case 2, although there has been a change in circulation for the occupants, the impact is not as significant because the building still functions as a residence. The circulation remains more oriented towards the needs of the family living in the house, without the need for public or commercial adjustments.

5. Conclusion

The strategy of spatial merging has resulted in changes to traditional spatial patterns, which are regarded as historical values according to their philosophy. Comprehensive documentation of each *Abdi Dalem* house—including original floor plans, existing architectural elements, and embedded cultural values—is therefore essential. This documentation provides a critical reference to ensure that any future modifications or

renovations are based on historical knowledge and guided by conservation principles.

One of the major risks associated with the passage of time is the gradual loss of cultural values when they are not transmitted to subsequent generations. It is essential to involve the local community, particularly the descendants of *Abdi Dalem*, in efforts to preserve both culture and architecture. This involvement may take the form of education and training programs focused on heritage conservation, including the maintenance of houses with traditional architectural elements.

Functional adaptation should be carried out as a form of respect for historical values. It is important to note that changes in the function of a space to accommodate contemporary needs are necessary to ensuring that a house remains attractive and livable. Nevertheless, such adaptations should be implemented carefully to avoid diminishing the historical and cultural essence of the building. It is therefore recommended renovations should be based on conservation principles, where every renovation or space merging is done with an approach that preserves the essential character. This must be carried out with attention to historical elements, such as using materials that resemble the originals and maintaining the distinctive structural features of the building.

Tradition-Based Multifunctional Design: The design of multifunctional space zones should evolve by referencing the traditional layout patterns that have been established. . New or adapted spaces, such as family rooms, can be envisioned with decorative elements that take into account the parameters of the *Abdi Dalem* houses within the cultural context.

The utilization of land and buildings for commercial purposes must be approached carefully. In this case, it will greatly assist in preserving and promoting the *Jeron Beteng* area as a growing cultural heritage tourism site. Incorporating elements with historical and cultural significance will help convey an authentic impression of the building.

The changes in spatial patterns have have the potential to erode the philosophical values inherent in traditional Javanese houses. To preserve the philosophical meaning, consultation with architects or professionals specializing in heritage conservation is strongly recommended before implementing strategies that involve merging spaces, which may alter the building's main structure.

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