
THE CORRIDOR AS A MAIN AXIS IN THE TASRIPIN HERITAGE HOUSE, KAMPUNG KULITAN: A SPACE SYNTAX STUDY

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ABSTRACT

The Tasripin Heritage House in Kampung Kulitan, Semarang, represents one of the few surviving examples of traditional Javanese spatial continuity within an urban setting. However, increasing urban densification and physical transformations threaten the legibility of its traditional spatial configuration, particularly the role of the corridor as a transitional connector. This study aims to analyze the spatial configuration of the house, with an emphasis on the functional role of the corridor as the axial connector between spaces. The research employs a spatial configuration analysis using Space Syntax through DepthmapX software. Data were collected through field surveys, architectural documentation, and redrawn floor plans. Axial and convex map analyses were conducted to measure the degree of integration and spatial connectivity. The results reveal that the corridor has the highest integration value, confirming its role as the main transitional axis between public, semi-public, and private zones. The study concludes that the corridor in Javanese heritage houses in Kampung Kulitan functions not only as a circulation element but also as a spatial identity that symbolizes the main axis and the balance between social openness and domestic privacy. This research contributes to the understanding of traditional spatial configuration preservation within the context of urban vernacular architecture.

KEYWORDS: corridor, heritage house, Kampung Kulitan, space syntax, spatial configuration

Rumah Warisan Tasripin di Kampung Kulitan, Semarang, merupakan salah satu dari sedikit contoh keberlanjutan ruang tradisional Jawa yang masih bertahan di kawasan perkotaan. Namun, meningkatnya kepadatan kota dan berbagai transformasi fisik mengancam keterbacaan konfigurasi ruang tradisional, terutama peran lorong sebagai penghubung transisional. Penelitian ini bertujuan untuk menganalisis konfigurasi ruang pada rumah tersebut, dengan penekanan pada fungsi lorong sebagai penghubung aksial antar ruang. Penelitian ini menggunakan metode analisis konfigurasi ruang melalui Space Syntax dengan bantuan perangkat lunak DepthmapX. Data dikumpulkan melalui survei lapangan, dokumentasi arsitektur, serta penggambaran ulang denah bangunan. Analisis axial dan konveks dilakukan untuk mengukur tingkat integrasi dan konektivitas ruang. Hasil penelitian menunjukkan bahwa lorong memiliki nilai integrasi tertinggi, yang menegaskan perannya sebagai sumbu transisi utama antara zona publik, semi publik, dan privat. Penelitian ini menyimpulkan bahwa lorong pada rumah warisan Jawa di Kampung Kulitan tidak hanya berfungsi sebagai elemen sirkulasi, tetapi juga sebagai identitas ruang yang merepresentasikan sumbu utama dan keseimbangan antara keterbukaan sosial dan privasi domestik. Penelitian ini memberikan kontribusi pada pemahaman pelestarian konfigurasi ruang tradisional dalam konteks arsitektur vernakular perkotaan.

KATA KUNCI: lorong, rumah heritage, Kampung Kulitan, space syntax, konfigurasi ruang

INTRODUCTION

Urban kampungs often host traditional houses that serve as living archives — preserving spatial, cultural, and historical values within rapidly modernizing cities. In architectural terms, kampungs are characterized by traditional dwellings that emerge as physical manifestations of the social and cultural identity of their communities (Asriana et al, 2024). One such important example is Kampung Kulitan in Semarang, historically linked to the heritage of the local

aristocrat-entrepreneur Tasripin. As documented in recent heritage studies, many houses in Kampung Kulitan exhibit an “Indies–Semarang” architectural style, reflecting a confluence of local vernacular traditions and colonial- era influences (Indarti, 2024).

Despite its historical significance and cultural value, Kampung Kulitan has experienced profound physical and social transformations over time. Changes in ownership, modifications to the original house layouts, and ongoing urban densification have threatened the clarity and continuity of traditional

spatial configurations (Kurnia and Krisprantono, 2024). Because of these pressures, many of the original spatial features that define heritage houses — such as traditional circulation paths, spatial hierarchies, and corridor-based connectivity — risk being lost or rendered unintelligible.

In response to this challenge, there is a pressing need to document and analyze the spatial logic of surviving heritage houses, to understand how they organize spaces and circulation, and to provide evidence for conservation efforts. One useful analytical framework for such a task is Space Syntax, which allows researchers to quantify and visualize spatial relationships and circulation potential within built environments. Space Syntax has been successfully applied to traditional and vernacular houses in urban kampungs: for example, a recent study on kampung-settlement houses demonstrated how syntactic analysis can reveal underlying socio-spatial structures and shared spatial grammar across dwellings (Asriana and Khidmat, 2024). Similarly, investigations into Indonesian vernacular houses highlight that traditional house layouts often balance privacy and connectivity through spatial configurations that accommodate local social needs and functional flexibility (Ramadhani et al, 2024).

These precedents suggest that applying Space Syntax to heritage houses in Semarang — and specifically to the houses in Kampung Kulitan — can provide valuable insights. In particular, attention to the role of the corridor (*lorong*) as axial connector and spatial backbone may reveal how spatial continuity and social interactions were negotiated in traditional dwellings. Previous case studies on Javanese vernacular houses found that the corridor often emerges as the most integrated space, linking public, semi-public, and private zones (Ramadhani et al, 2024).

Therefore, this study aims to analyse the spatial configuration of three surviving heritage houses in Kampung Kulitan, focusing on the corridor's function as the primary axial connector between spaces. By combining field survey, architectural documentation, and quantitative spatial analysis via Space Syntax (using DepthmapX), this research seeks to (1) uncover the hidden spatial logic of vernacular heritage houses under urban pressure, (2) assess how corridor-based spatial organization supports circulation, privacy, and social interaction, and (3) provide empirical evidence for heritage conservation strategies that respect traditional spatial typologies. The findings are expected to contribute to a deeper understanding of the preservation of traditional Tasripin house spatial patterns, emphasizing the corridor's role as a mediator between social openness and domestic privacy. Furthermore, this study contributes to the methodological enrichment of heritage architecture

research through the application of spatial syntax-based analytical frameworks in Indonesia. This research seeks to fill this gap by focusing on the corridor's role as the spatial axis connecting different zones within the Tasripin House.

Literature Review

Urban kampung represent dense socio-spatial environments where traditional settlement patterns, cultural norms, and informal community networks persist within rapidly urbanizing contexts. Within many Indonesian cities, kampungs continue to function as dynamic urban fabrics characterized by compact settlement structures, pedestrian-scaled circulation networks, and strong community interactions. Studies in urban morphology highlight that kampungs contribute significantly to the diversity and resilience of urban form due to their fine-grained land subdivision and flexible domestic spatial arrangements (Rapoport, 1969). These spatial characteristics encourage frequent encounters between residents and support mixed-use activities within residential environments. Research also demonstrates that kampung spatial structures enhance social interaction and facilitate natural surveillance through closely connected pathways and semi-open domestic spaces (Widodo, 2012). Consequently, kampungs are able to maintain a strong sense of place identity and social cohesion even as surrounding areas undergo rapid urban transformation and redevelopment pressures.

Within these environments, traditional houses constitute an important component of kampung cultural heritage. Such houses are not only valued for their physical architectural elements but also for the spatial structures that reflect long-established cultural practices and social relations. Domestic spatial organization—including hierarchy, orientation, circulation patterns, and transitional thresholds—embodies cultural meanings embedded within everyday life (Rapoport, 1969). Heritage conservation scholarship emphasizes that preserving historic dwellings requires attention not only to material components but also to the spatial logic and patterns of use that shape social activities (Feilden, 2003). Vernacular architectural studies across Southeast Asia similarly reveal that transitional spatial elements such as corridors, verandas, and courtyards play critical roles in structuring domestic movement and mediating relationships between public and private domains (Psarra, 2009). In the Indonesian context, recent research highlights the importance of documenting and preserving spatial configuration patterns within heritage houses in order to maintain architectural identity and cultural continuity.

The concept of spatial configuration provides an important theoretical framework for understanding

how spatial organization influences social behavior and movement patterns. According to spatial configuration theory, architectural and urban spaces can be interpreted as networks of interconnected spatial units whose relationships shape accessibility, visibility, and interaction (Hillier & Hanson, 1984). Built environments are therefore not simply collections of rooms or structures but relational systems in which spatial arrangement determines patterns of movement and social encounter. These ideas were further developed through configurational analysis, which links spatial structure to movement potential, spatial hierarchy, and the intelligibility of built environments (Hillier, 1996). Complementary perspectives from architectural morphology emphasize that spatial patterns evolve through typological transformations over time (Kamalipour & Zaroudi, 2014), while narrative-based interpretations highlight how spatial arrangements communicate cultural meanings and social values (Psarra, 2009).

Empirical studies applying configurational approaches to vernacular dwellings consistently demonstrate that transitional spaces—particularly corridors—often function as primary movement axes within domestic spatial systems. Such spaces typically exhibit high levels of integration and accessibility, while more private rooms tend to occupy deeper positions within the spatial hierarchy (Asriana & Khidmat, 2024; Ramadhani et al., 2024). This recurring pattern suggests that transitional elements play a fundamental role in organizing movement and regulating social interaction within traditional houses.

In many traditional Javanese and Southeast Asian houses, the corridor functions as a multifunctional spatial element that extends beyond simple circulation. Corridors often serve as mediating spaces that regulate access, visibility, and transitions between public, semi-public, and private domains (Rapoport, 1969). Ethnographic observations indicate that such transitional spaces frequently operate as spatial and symbolic axes that structure everyday household activities and social interactions (Psarra, 2009). From a syntactic perspective, corridors often exhibit high integration and choice values, indicating their importance as key connectors within the spatial system and as primary channels for movement (Hillier & Hanson, 1984; Turner, 2007). Examining corridors within traditional houses, therefore, provides valuable insight into how spatial organization supports both functional circulation and culturally embedded patterns of interaction.

To quantitatively analyze these spatial relationships, this study adopts the analytical framework of the academic field of Space Syntax. The space syntax approach provides a methodological framework for analysing spatial patterns and qualities by evaluating circulation systems and the

configuration of existing built environments (Alfathani & Nurdini, 2022). Developed by researchers including Bill Hillier and Julienne Hanson, Space Syntax theory conceptualizes spatial environments as networks that can be mathematically modeled to evaluate spatial connectivity and integration. Within this framework, built environments are decomposed into basic spatial units that can be represented graphically and analyzed through topological relationships. These representations commonly include isovists, axial lines, and convex spaces, each of which captures different aspects of spatial visibility and movement potential.

An isovist refers to the area visible from a single observation point, providing insight into visual fields within spatial environments. Axial lines represent the longest and most direct lines of potential movement within a spatial system, while convex spaces define spatial units in which every point is visually accessible from any other point within the same boundary. Through these representational models, spatial configurations can be examined using various syntactic indicators designed to quantify the morphology of spatial systems.

Several key syntactic measures are commonly used to evaluate spatial configuration. Connectivity represents the number of directly adjacent spaces linked to a given spatial unit, indicating the level of local accessibility within the spatial system (Lesmana, 2022). Closely related to this concept is spatial depth, which measures the number of intermediary spaces that must be traversed to move from one space to another. Spaces located at depth one are directly connected, while deeper spaces require movement through additional intermediate spaces. Depth is therefore a crucial parameter for understanding hierarchical relationships within spatial configurations and forms the basis for calculating integration values.

Integration describes the relative accessibility of a space within the overall spatial system by measuring its average depth from all other spaces (Hillier et al., 1993). Spaces with high integration values are typically shallow within the system and can be reached through fewer directional changes, making them more central to movement patterns. Conversely, spaces with low integration values are more segregated and tend to support more private or specialized activities. Another important syntactic indicator is choice, which measures how frequently a space lies along the shortest paths connecting other spaces in the system, indicating its significance as a transitional route for movement (Turner, 2007).

Finally, intelligibility represents the degree to which the overall spatial structure can be understood through locally observable spatial relationships. Calculated as the correlation between connectivity and integration, intelligibility indicates how easily users can infer the global structure of a spatial system

based on local spatial cues (Hillier, 1996). In highly intelligible environments, spaces that appear well connected locally also tend to be globally integrated, enabling users to navigate and comprehend the spatial layout more easily (Hillier et al., 1993). Previous studies applying these syntactic metrics to vernacular houses demonstrate that corridors frequently achieve high connectivity and integration values, highlighting their function as key structural nodes within domestic spatial systems (Asriana & Khidmat, 2024). These measures collectively provide an analytical framework for evaluating how spatial organization supports circulation, social interaction, and the hierarchy of privacy within traditional residential architecture.

METHODS

This study employs a qualitative–descriptive approach supported by spatial analysis using Space Syntax tools. The methodological framework consists of four main stages: (1) data collection, (2) digital reconstruction, (3) spatial analysis using DepthmapX, and (4) comparative interpretation.

Data collection Primary data were obtained through field surveys conducted in three traditional houses in Kampung Kulitan, Semarang. The survey included direct observation, spatial walkthroughs, photographic documentation, and manual measurements of all accessible interior and exterior spaces. Special attention was given to identifying spatial sequences, room functions, transitional spaces, and corridor-like elements connecting different parts of each house. Field notes were used to capture experiential information related to circulation, visibility, and spatial transitions.

All manually collected measurements were redrawn and digitized using AutoCAD to produce accurate floor plan representations of each house. The digitization process followed architectural drafting standards to ensure consistency in scale, line weights, and room boundary delineation. These digital plans serve as the base maps for subsequent spatial syntax analysis.

The digital floor plans were imported into DepthmapX to perform a series of configurational analyses. Three core Space Syntax metrics were generated:

1. Connectivity, assessing the number of immediate connections each spatial node holds.
2. Integration, measuring how easily a space can be reached from all other spaces in the system.
3. Intelligibility, evaluating the correlation between local (connectivity) and global (integration) properties, indicating how legible the spatial configuration is to a user.

These analyses were used to quantify the role of corridors (*lorong*) in structuring movement, visual

fields, and overall navigability within the traditional houses of Kampung Kulitan. Spatial segments classified as corridors or corridor-like pathways were identified based on their morphological characteristics and functional role as connectors between rooms. Their spatial properties were extracted directly from DepthmapX outputs, enabling comparison of their integration values, connectivity levels, and contribution to axial or visibility networks. This step provides insight into whether the presence of a corridor produces hierarchical, centralized, or linear circulation patterns.

A cross-case comparison was conducted to examine similarities and differences among the three houses regarding: Spatial Configuration, Function, levels of Accessibility and integration. The comparative framework integrates qualitative observation with quantitative DepthmapX metrics, allowing the study to interpret how corridor structures reflect functional and architectural characteristics of traditional Kampung Kulitan houses.

The final stage synthesizes spatial syntax results with theoretical insights from the literature on kampung morphology, traditional house typology, corridor theory, and spatial configuration. Interpretations highlight how corridor spaces shape spatial logic, movement patterns, and cultural practices within the traditional built environment of Kampung Kulitan.

RESULTS AND DISCUSSION

The study area is located in Kampung Kulitan, an urban heritage enclave situated within the historic core of Semarang. Kampung Kulitan in Semarang is identified in local and regional heritage studies as an important cultural environment containing several remaining examples of Javanese vernacular houses influenced by colonial and multi-ethnic interactions (Kurnia and Krisprantono, 2024).

Studies note that the kampung exhibits a mixture of traditional Javanese house plans with façade adaptations reflecting Chinese, Arab, and European stylistic influences typical of Semarang's historical urbanization. Documentation efforts have recorded material conditions and façade typologies of some houses in the Kulitan area, yet the interior spatial configuration of these houses remains understudied. Existing literature in Semarang tends to focus on Kota Lama, Pecinan, or broader kampung identity research, without quantitatively analyzing room-to-room spatial relationships using formal spatial analysis. Meanwhile, (Kurnia and Krisprantono, 2024). analyzed typology in northern kampungs but excluded syntactic evaluation. Consequently, there is a clear methodological gap in applying Space Syntax to examine how spatial logic—particularly the internal corridor (*lorong*)—structures

movement, hierarchy, and public–private gradients in heritage houses of Kampung Kulitan. This gap strengthens the relevance and necessity of the present study. See Figure 1 and Figure 2.

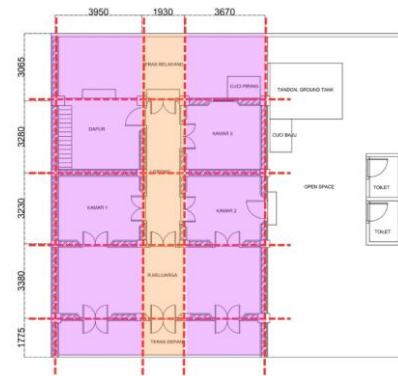


Figure 1. Kampung Kulitan Location
(Source: Author's Document, 2025)

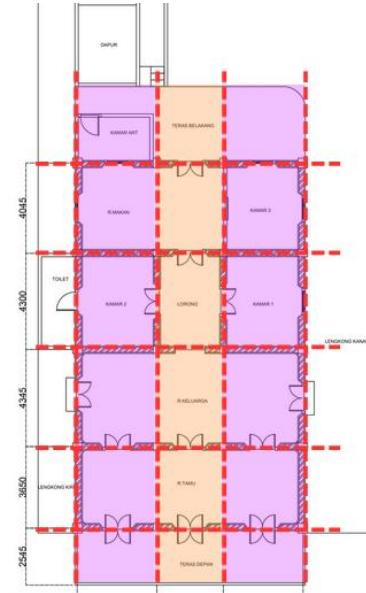


Figure 2. Facade of Nongtjik, Moeljo, Lily House
(Source: Author's Document, 2025)

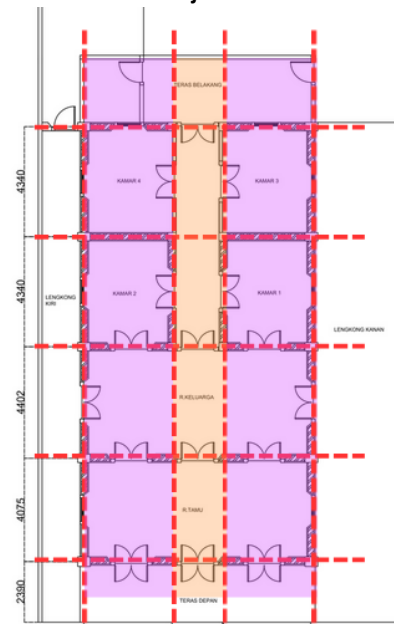
Within Kampung Kulitan, three residential units were selected as case studies based on their representativeness of traditional architectural characteristics and their location within the spatial network of the kampung. These houses—Rumah Nong Tjik, Rumah Moeljo, and Rumah Lily—are each named after their current owners and reflect the domestic architectural evolution occurring within the settlement. See Figure 3.



Nong Tjik House



Moeljo House



Lily House

Figure 3. Spatial Analysis of Nong Tjik, Moeljo, and Lily
(Source: Author's Document, 2025)

The spatial analysis of the three traditional houses in Kampung Kulitan reveals a consistent pattern in their internal organization. Each house exhibits a linear arrangement of spaces connected by a central corridor-like transitional zone. See Figure 3 DepthmapX results show that these corridors function as the primary connectors between private rooms, semi-public areas, and service spaces. In all three cases, the corridor demonstrates relatively high connectivity values, indicating its role as an essential node facilitating circulation within the house. This finding aligns with previous studies suggesting that traditional Javanese houses often utilize transitional spaces to mediate privacy gradients and regulate movement across the dwelling (Widodo, 2012; Rokhmansyah & Putri, 2020). See Figure 4

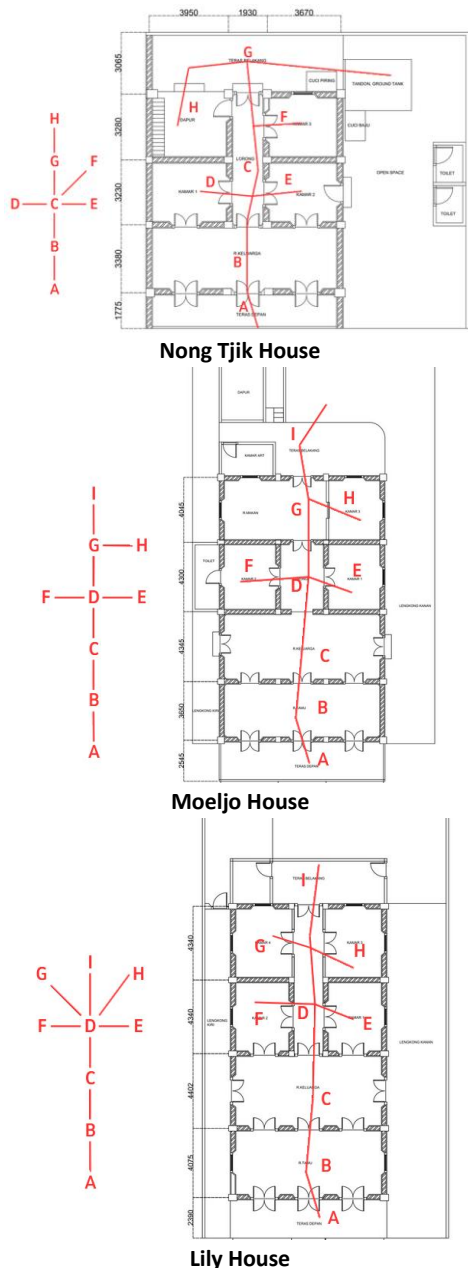


Figure 4. Connectivity graph
(Source: Author's Analysis, 2025)

Table 1. Connectivity Table

Nong Tjik House	
POINT	CONNECTIVITY
A	1
B	2
C	5
D	1
E	1
F	1
G	2
H	1
TOTAL CONNECTIVITY	14
CONNECTIVITY AVERAGE	1.75

Moeljo House	
POINT	CONNECTIVITY
A	1
B	2
C	2
D	4
E	1
F	1
G	3
H	1
I	1
TOTAL CONNECTIVITY	16
CONNECTIVITY AVERAGE	1.78

Lily House	
POINT	CONNECTIVITY
A	1
B	2
C	2
D	6
E	1
F	1
G	1
H	1
I	1
TOTAL CONNECTIVITY	16
CONNECTIVITY AVERAGE	1.78

(Source: Author's Analysis, 2025)

Based on the integration calculations derived from connectivity data and Space Syntax formulas, the most integrated space (with the lowest RRA value) in Rumah Nong Tjik is Room C, indicating its function as the central node of the spatial network. Rooms B, G, D, E, and F occupy positions of moderate accessibility, while Rooms A and H are the most segregated. In Rumah Moeljo, Room D emerges as the most integrated space, serving as the core of the configuration, followed by moderately accessible spaces—B, C, E, F, and G—whereas Rooms A, H, and I are the most segregated. Similarly, in Rumah Lily, Room D shows the highest integration value,

functioning as the primary connector, while Room A is the most segregated, and the remaining spaces show equal values due to symmetrical and direct connections to Room D. See Table 1 and 2

Across all three houses, the most integrated spaces—Rooms C or D—represent the corridor (*lorong*) that links multiple functional zones. This highlights the corridor’s critical role as the axial backbone of spatial movement, mediating transitions between public, semi-public, and private domains. The consistently high integration values of the corridor indicate its importance in maintaining spatial coherence, enabling visibility and accessibility throughout the layout, and supporting the circulation logic characteristic of Javanese traditional houses. These findings reinforce the theoretical understanding that corridors in vernacular architecture are not merely circulation elements but act as organizational spines that structure social interaction, spatial hierarchy, and cultural patterns of movement. This role is evident in the three case studies, where the corridor consistently shapes the spatial intelligibility and integration of the entire configuration.

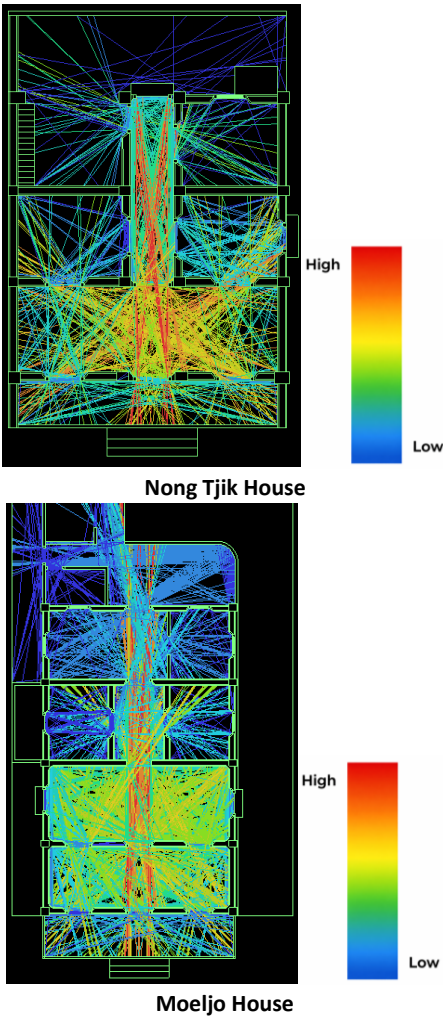
Table 2. Integration Table Based on Connectivity graph

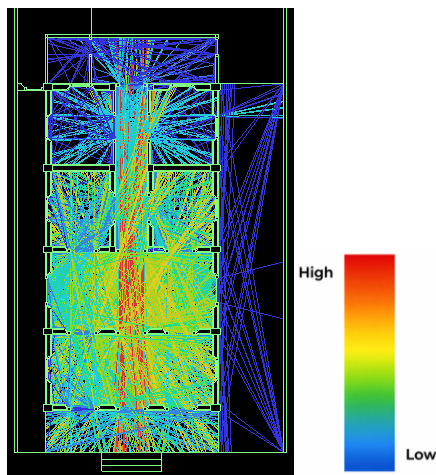
Nong Tjik House				
POINT	(TD)	(MD)	(RA)	(RRA)
A	19	2.714	0.571	0.155
B	13	1.857	0.286	0.078
C	9	0.095	0.095	0.025
D	15	2.143	0.381	0.103
E	15	2.143	0.381	0.103
F	15	2.143	0.381	0.103
G	13	1.857	0.028	0.078
H	19	2.714	0.571	0.155
Moeljo House				
POINT	(TD)	(MD)	(RA)	(RRA)
A	28	3.50	0.714	2.255
B	21	2.625	0.464	1.466
C	16	2.00	0.286	0.902
D	13	1.625	0.179	0.564
E	20	2.50	0.429	1.353
F	20	2.50	0.429	1.353
G	16	2.00	0.286	0.902
H	23	2.875	0.536	1.691
I	23	2.875	0.536	1.691

Lily House				
POINT	(TD)	(MD)	(RA)	(RRA)
A	26	3.250	0.643	1.739
B	19	2.375	0.393	1.063
C	14	1.750	0.214	0.579
D	11	1.375	0.107	0.289
E	18	2.250	0.357	0.966
F	18	2.250	0.357	0.966
G	18	2.250	0.357	0.966
H	18	2.250	0.357	0.966
I	18	2.250	0.357	0.966

(Source: Author’s Analysis, 2025)

The intelligibility analysis—expressed through the correlation between connectivity and global integration. From Pearson’s Product moment coefficient, the result of intelligibility of each house is: NongTjik House is 0.982, indicating a very high correlation, Moeljo House is 0.911, indicating a high correlation, and Lily House is 0.956, indicating a high correlation.





Lily House

Figure 5. Intelligibility graph
(Source: Author's Document, 2025)

Table 3. Intelligibility Graph Interpretation

Connectivity	Color	Location	Role
High	Red - Orange	Corridor	Main Connector
Medium	Yellow - Green	Transitional Space	Secondary Connector
Low	Blue	Private room	Segregated Spaces

(Source: Author's Analysis, 2025)

This study of the connectivity analysis reveals a clear spatial hierarchy within the Tasripin Heritage House. The corridor demonstrates the highest connectivity values, indicated by the red to orange axial lines concentrated along the central axis of the layout. This suggests that the corridor functions as the primary spatial connector, linking multiple rooms and facilitating movement throughout the house.

In contrast, the surrounding rooms exhibit lower connectivity values, represented by blue to green lines, indicating fewer direct connections and greater spatial segregation. These spaces tend to function as private areas with limited accessibility.

This pattern confirms that the corridor plays a crucial role as the main axis of spatial organization, acting not only as a circulation path but also as a structural element that defines spatial hierarchy within the house.

CONCLUSION

This study demonstrates that the spatial configuration of heritage houses in Kampung Kulitan—Rumah Nong Tjik, Rumah Moeljo, and Rumah Lily—reveals a consistent architectural logic in which the corridor (*lorong*) functions as the central integrative element of the layout. Through Space Syntax analysis using DepthmapX, including measurements of connectivity, total depth, mean depth, relative asymmetry (RA), real

relative asymmetry (RRA), integration, and intelligibility, all three case studies exhibit a similar pattern: the corridor always receives the highest integration value (lowest RRA), affirming its role as the primary spatial organizer.

In Rumah Nong Tjik, Room C—the corridor—acts as the most integrated and accessible space, while Rooms A and H are the most segregated. In Rumah Moeljo, Room D fulfills the same integrative role, with Rooms A, H, and I appearing as peripheral, low-integration spaces. Similarly, in Rumah Lily, Room D, functioning as the corridor, shows the highest integration value, while Room A is the most segregated, and other rooms maintain equal values due to their symmetrical connections.

Across all three houses, the findings emphasize that the corridor is not merely a circulation route but instead serves as the axial backbone that structures spatial hierarchy, directs movement, and organizes transitions from public to private zones. Its high integration values indicate that movement through the house is strongly centralized, enabling efficient access to multiple rooms and reinforcing the corridor's role in maintaining overall spatial coherence. The low intelligibility values in some cases also show that while corridors clarify internal spatial relationships, the surrounding rooms may still display deeper or more segregated configurations typical of traditional domestic layouts.

Overall, the results confirm that the corridor is a defining element of spatial identity in Javanese vernacular houses, especially within dense urban kampung contexts where spatial continuity is preserved despite external pressures of modernization and architectural transformation. The consistent integrative dominance of the corridor across all three heritage houses reinforces its cultural and architectural significance, suggesting that conservation of these spatial structures is essential for preserving both the functional and symbolic character of Kampung Kulitan's built heritage.

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