

SPATIAL DIALOGUES OF HISTORIC ALLEY THROUGH SERIAL VISION THEORY (CASE STUDY: *PONTOCHO ROJI* AND *JALAN RUKUNAN*)

Mustika Kusumaning Wardhani^{1*}), Zhixi Wang²

*) Corresponding author email : kweemustika@itenas.ac.id

1) Faculty of Architecture and Design, Institut Teknologi Nasional, Bandung, Indonesia,
2) School of Tourism, Hainan Normal University, Hainan, China,

Article info

MODUL vol 23 no 1, issues period 2023

Doi : 10.14710/mdl.23.1.2023.22-29

Received : 20 march 2023

Revised : 12 may 2023

Accepted : 18 may 2023

Abstract

Traditional settlements are part of the urban context of every country, especially tourism-oriented cities such as Yogyakarta (Indonesia) and Kyoto (Japan). The design strategy and regulations have a more significant and complex portion involving cultural heritage buildings and settlement networks that shape the city's morphology. Pontocho and Kotagede are cultural areas with unique characteristics, such as the existence of narrow alleys called Roji (in Japanese) and 'Jalan rukunan'. This research aims to understand the role of alleyways between two traditional settlements that form urban identities. The descriptive-qualitative research method uses depth map software to display the observed area coverage through connectivity and visibility. The results found in this research can manifest both locations' characters in a tangible and intangible aspects. The existence of a historic alley that forms the morphology of historic settlements will keep its existence considered because it is a continuity network that forms a serial vision for observers, tourists, and also the local community. Spatial dialogue studies through serial vision theory in historic alleys are expected to provide renewal to considerations of revitalizing heritage settlements, especially in Asian countries.

Keywords: Spatial dialogue, Historic alley, Serial vision

INTRODUCTION

Many people live in mechanically planned cities nowadays, and creating mental maps in standardized and typed cities is exciting (Jász, 2018). When we visit a tourist destination, especially one with historical and cultural uniqueness, we will cognitively store memories

of the visit as a 'mental map' in our brain. According to Suprapti *et al.* (2018), the benefits of preserving cultural heritage include strengthening the city's character and urban village heritage, significantly influencing their local identity formation. The uniqueness of traditional cities has different characters from one another, bearing in mind that the morphological backgrounds of cities vary widely. However, there are similarities in patterns and characters in traditional cities, which can be used as a potential for spatial dialogue between the two areas.

Urban architects widely use the term 'spatial dialogue' in viewing the local urban context at the mezzo scale, such as the existence of the traditional settlement. Spatial dialogue allows occupants to easily share ideas and reflect on where they are. Talking about the traditional settlement, it seems that many researchers have observed the shape of the building envelope. Another unique aspect that can be seen as characteristic of traditional settlements is that they unique have narrow alleys. According to Radovic, (2016a), the meaning and long tradition of Asian alleyways (e.g., Japanese *roji*; Shanghainese *lilong*) suggest that the perception of streetscape quality is relative and specific to local socio-cultural values. Narrow alleys are also found in non-traditional organic settlements. However, for historic settlements, the alleys become a network of settlements that form that kind of serial vision for observers, especially for tourism.

Serial vision theory, popularized by Cullen (1961a), states that serial vision is a visual description of the existing conditions of urban space. Moreover, this set of visions takes its final form as urban architecture and design are shaped to shape the public art form. In the series of 'visions,' one can experience the unfolding of the scenery while walking. In previous research, Capitanio (2019) assessed whether the qualitative attractiveness of the walking streetscape could be more important than the quantitative walking distance when selecting – often

unwittingly – walking routes. In his research, attractiveness refers to morphological forms and natural characteristics associated with pleasure. The novelty of this research is taking two samples of narrow alleys in two countries with the same morphology as historical alleys to see how narrow alleys offer interestingness that can form a sense of place for tourist destinations.

According to Kum & Ujang (2012), over the last sixteen and seventeen centuries, researchers developed the idea of mind mapping to identify how people structure their environments in various contexts. The discussion regarding alleyways in traditional settlements has yet to be accompanied by a design method that relies on connectivity and visibility. This study's novelty is how to use the theory of serial vision in reading patterns of syntax findings, one of which is discussing connectivity and visibility.

This study aims to determine the potential for narrow alleys in traditional settlements so that they can become part of efforts to revitalize tourist destinations. This study can become input for local governments, architects, and researchers to maintain harmony between buildings and narrow alleys to preserve tangible and intangible cultural heritage.

PREVIOUS STUDIES

The Theory of Serial Vision on Historical Alleys

Cullen, in 1961 introduced a method for visual urban analysis and design based on the psychology of perception, one of which is how the observer needs visual stimulation in an area it passes through. Cullen (1961b) stated that the urban experience is one of a series of revelations. Also, Cullen saw particular significance in the tension of “hereness” and “thereness.” From the explanation above, serial vision is a method of observing urban treasures in which there are ‘unique’ areas forming city identity, such as historical alleys.

Historic alley is somehow defined as one of the ancient lanes in the city (Khalaf & Abbas, 2020). Talking about historical alleys, which are particularly characterized by narrow alleys, the authors felt *déjà vu*¹ when visiting two areas with the same typology and morphology but in different locations: Kotagede and Kyoto. In a previous study, Damayanti *et al.* (2020) tried to read the sense of place in the *kampung* with Cullen's theory which starts with mapping the physical conditions, identifying the daily rhythm of the *kampung's* people, and interviewing the young adults to identify the spatial perception. The process of 'reading' the existence of a *kampung* can stimulate one's mental map to get a sense of place in that area. Several studies use this method also to read villages, urban corridors, and residential spaces.

However, what about the 'reading' historical alleys? This is what will be a novelty of this study.

Between Pontocho Roji, Kyoto and Jalan Rukunan, Kotagede

Ford (2001) observed that alleys are also ideal places for informal activities that can help create a sense of community. In addition, an alley in settlement units is not only a circulation area but also a representative of diverse cultures, a local people background, and an indicator of city development (Nur, 2020a). In some Asian countries, such as China, Japan, and Indonesia, alleyways have become the busiest market and benefit the surrounding community, especially those working as small industrial businesses.

According to the Japanese term alley (in Japan called *roji*), the *roji* is prominent in everyday life and social interaction. The *roji* can be described as a primarily narrow and winding alleyway in traditional wooden, low-rise neighborhoods that no car can enter or are only wide enough to allow one person to walk or cycle through. The *rojis* formed historically inside the block or behind the main or side streets, a ‘semi-public, semi-private realm, which was a place for collective activities around small shrines, local shops, and bathhouses (Heide Imai, n.d.). Thus, from the above understanding, we can know that the existence of alleys is essential in creating a sense of place in a community that supports revitalization efforts, especially in historic urban areas.

According to Kyomachiya Council (n.d.), Kyoto is divided into tiny neighborhoods, and the narrow streets and lanes between the houses serve as a safe play area for the local children of *roji* lane. In the *Nishijin* district, the *Jizo* Bon festival is celebrated in every neighborhood at the end of August. Besides these festivals, there is also the *Gion* festival.

The Pontocho Area covers approximately 2.1 hectares, consisting of *Sanjo-dori* south to *Shijo-dori*, a district developed in connection with the renovation of the Kamo River during the Edo period. It has developed as one of the city's leading cultural and entertainment centers. Moreover, *Pontocho-dori* is a narrow street that continues for about 500 m, and traditional buildings with a frontage of about three are lined up on both sides. Along with the regularly arranged entrance doors and many alleys between *Kiyamachi-dori* and *Pontocho-dori*, the space is characterized by a delicate sense of scale (Pontocho Town Development Council, 2015a).

The distinctive features of *Pontocho-dori* Street are created not only by the narrowness and width of the streets but also by the shape of the buildings. There is a new building equipped with alleys on the west side of the

¹ *déjà vu*: the strange feeling that in some way you have already experienced what is happening

road for entering and leaving buildings. The alleys are cobbled, like the paving stones found in the townhouse grounds, leaving behind a pre-modernized urban scene. Landscape-related phenomena occur when entering an alley from the street. Entering the back alley of the straight street landscape, the observer can feel a completely different impression from the street landscape because the back alley streets of Kyoto, surrounded by a small area, are brought together. The landscape characteristics of these alleys are inherent in the landscape characteristics of the streets.

The characteristics of the buildings in the Pontocho area differ depending on the east and west of the street and land allocation on the *Kyomachi-Dori* side. In order to preserve the landscape characteristics of the Pontocho area, which is characterized by continuous eaves, where traditional buildings are lined up in contact with the small Pontocho street, the height of the eaves is considered continuous with the surrounding buildings. In principle, the width of the eaves shall be the total width of the outer wall facing the road (Pontocho Town Development Council, 2015b).

The phenomenon is similar to Kotagede, where the traditional settlement in Kotagede has narrow alleys called *Jalan rukunan*. Around the *Jalan rukunan*, traditional settlements still produce silver handicrafts as a hallmark of Kotagede. The *rukunan* comes from the word “rukun,” which means “harmonious.” (Ikaputra, 2019). Indeed, from an intangible aspect, it can be shown that alleyways near Kotagede create harmonization between the local community and tourism in its ‘sense of space.’ Moreover, according to Wikantiyoso (2000a), *Rukunan* as public purposes in the private domain is an example in which personal acceptance and participation have supported the interaction space.

Rukunan alley is a collective road in the private lot that connects houses within a group of houses and the group of private houses continuously; relatively straight with a 1-1.2 meter width and is marked by the gate at the far and from the pattern of the linear houses (Wikantiyoso, 2000b). Moreover, Kotagede is unique because most residents work as silver craftsmen, and they use the small alleys to dry their crops and as a small shop in the living room of their house. If we visit Kotagede, the interaction between the traditional building facades and the activities of the synergized silversmiths form a uniqueness that we cannot find anywhere else. These things make alley revitalization as important as efforts to preserve buildings, considering that both are indicators of forming city identity.

From the description of the two different locations above, the role of the alley in accommodating the activities of the people who pass through it becomes an interesting spatial dialogue about how these similarities give rise to the uniqueness of historic areas. The findings

of this research will be part of the effort to revitalize historic areas, which discusses the embodiment of buildings and the structure of historic alleys.

METHODS

Location

This study took locations as observational samples in two places with the same morphological type but in different countries, still within the scope of Asian countries: Yogyakarta (Indonesia) and Kyoto (Japan). The morphology of the two selected locations is similar: historic alleys around residents' settlements that have grown into tourist destinations. The data collection method is carried out qualitatively using a serial vision approach. Serial vision is indeed a method of rhythmicity, and it is a sequential way of exploring cities. This sequential information about the visual fields on a path reveals insights into the urban environment's rhythms, atmospheres, and character. The boundaries of the observation locations can be seen in Figure 1 below:



Figure 1. Locuss of the study (Authors using google earth, 2023)

Research Stage

The research is divided into three stages. The first stage is location sampling which shows similarities in character, typology, and morphology of traditional settlement areas between Indonesia and Japan. After looking at several possible indicators to be used as a research context, the authors proceed to the next stage, drawing maps. In this case, the author uses ArcMap 10.8 software to get a complete picture of the scope of the spatial boundaries between the observed samples.

After the researcher limits the scope of observations, it is followed by preparation for entering into the analysis syntax space. According to Ramadhan *et al.* (2019), from space syntax analysis, we could perceive the urban system through syntactic systems, such as symmetry-asymmetry, distribution, integration-segregation, determination of control values, integration features, and morphology. Also, from a similar study published by Xu *et al.* (2020), the space syntax analysis approach to improve tourists' spatial cognition in historic districts constructs a connection between urban tourism and urban space morphology. The research phase can be seen below (see figure 2):

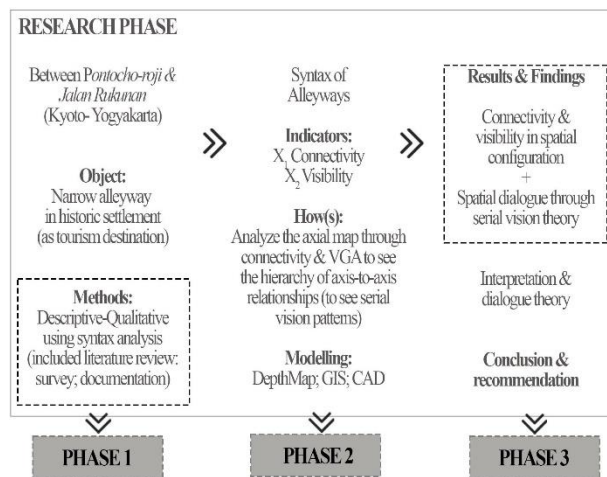


Figure 2. Diagram of research stages (Author, 2023)

In this case, analysis begins by preparing an axial map. Furthermore, connectivity and visibility calculations are carried out to measure the connectivity and visibility resulting from the alley corridor in both locations. The final stage is to analyze the area from the perspective of connectivity and visibility using spatial syntax analysis and how it relates to the serial vision felt by observers. In this case, the author uses DepthMapX 0.8.0 software to help read the axial map of the alleys selected as observation samples. After getting the results of the analysis, the next step is to interpret the meaning obtained and dialogue with theories from previous similar studies. The stages of the research referred to above can be seen in the research diagram see Figure 2.

RESULT AND DISCUSSION


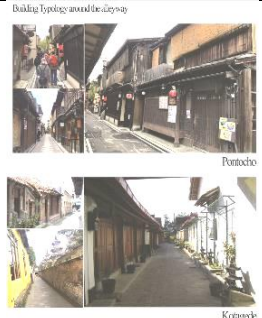
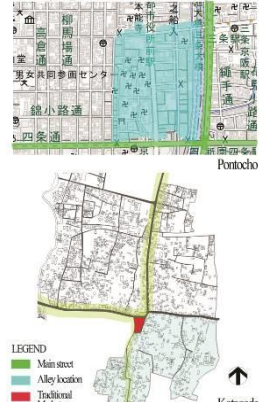
Spatial Dialogue between Pontocho Roji and Jalan Rukunan

As argued by Radovic (2016b), different places and cultures have different meanings of alleyways. The spatial dialogue between the two locations forms an in-depth discussion about the role of historical alleys in urban areas. One of the things that makes it unique is how

the alley can provide easy access to achievements and offer a traditional building facade that accompanies visitors when they pass by. The findings from this study provide insight that the historic alley is an element of consideration that must also be included in the revitalization process of the historic area.

In this paper, serial vision is used as a theory that builds spatial dialogues between two locations which is Indonesia and Japan. To be able to explain how the characters, typology, and morphology are similar, the explanation can be seen in the table below:

Table 1. Similarity of alley characters, typology, and morphology of the two study locations (Author, 2023)

Indicators	Vision's series	Findings
Character of alley through daily activities	Daily activity around alleyway Between tourism, small industrial business, & rituals 	The character of a narrow alley that can only be passed by pedestrians, with building facades dominated by wood. Tourism activities and local communities form a 'set of visions' in daily rhythms.
Typology of buildings around the alley	Building typology around the alleyway 	Typology of residential and commercial buildings with certain characteristics of small industrial businesses such as jewelry and restaurants.
Urban Morphology where the alleyway is located	Urban morphology in research locations 	Historic alleys around traditional settlements are growing into tourist destinations. Area Center in the form of a traditional market (both locations) and a station (Pontocho only).

The characteristics of the two alleys as the locus of this research are that they are both located in cities with the characteristics of historical cities. Another characteristic that can be seen in these narrow alleys is narrow width, which makes the serial vision formed in human cognition easier to obtain for pedestrians with a standard walking speed. Based on the road hierarchy, this narrow alley enters an arterial road that connects the main road with residents' houses. Vehicle access is limited and only tolerates bicycles (non-monitored vehicles).

The typology of buildings around these narrow alleys is dominated by residential typologies consisting of traditional houses with an organic concept far from the impression of a grid-like urban settlement. Apart from the typology of traditional settlement buildings, other building typologies that can be found around the research site are religious building typologies, such as the mosque for Kotagede and the shrine or temple in Pontocho. Traditional settlements' places of worship are characteristic of community facilities for carrying out worship. Apart from the typology of housing and places of worship, settlement infrastructure that can be found in both locations is the existence of traditional markets, which are the area's icons.

The morphology of the area formed from the two locations chosen in this study is a slightly different morphology of the city shape where Pontocho-roji is located in the center of Kyoto City. In contrast, *Jalan rukunan* is located on the outskirts of Yogyakarta City, directly adjacent to Bantul Regency. The area's morphology is focused on its center, namely the traditional market. Specifically for the regional center in Kyoto, the traditional market is close to the Kyoto central station, where this pattern is not found in Kotagede.

Connectivity on spatial configuration

The connectivity analysis shows that *Pontocho roji* and *Jalan rukunan* are 'arterial routes' connecting pedestrians by tracing traditional villages' historical heritage. What distinguishes *Pontocho roji* is that its revitalization efforts have penetrated additional functions, namely restaurants and coffee shops that operate 24 hours a day. This adds value to using historical avenues as part of the sales process for that function. Meanwhile, with the same historical aspects and alley width dimensions, *Jalan rukunan* still needs to activate informal activities around the alley. Moreover, these findings align with the findings expressed by Nur (2020b), which states that alley revitalization provides communal space, settlement arrangement, and local cooperation. Concerning the aims of this study mentioned in the introduction, the results manifest the postulate that narrow alleys are part of forming "a series of visions" for cultural cities that become tourist destinations like Kyoto and Yogyakarta.

According to Hillier & Hanson (1984), connectivity measures the number of spaces connecting a space of origin. In this case, what is meant by a space of origin is a place where humans begin to map out a path starting from a point. At the two observation locations, the starting point of a trip is the same as departing from the traditional market, *Pasar Gede* in Kotagede and *Nishiki Market* in Kyoto. The results of the Depth Map analysis are as follows:

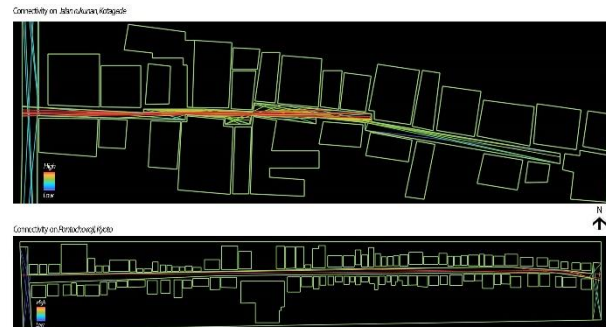


Figure 3. Connectivity in both location (Analysist result, 2023)

Connectivity measurement is done to find the level of interaction for each path. The red indicates that the road has high connectivity, while the blue indicates low connectivity. In *Pontocho roji*, activities in the morning and evening are dominated by the busy restaurants that are visited after working hours. As for tourism, together with residents enjoying the surrounding streets that are connected to modern malls and traditional markets. Meanwhile, what can be seen in the Kotagede case study, the narrower the alleys, the less connectivity, so it can be seen that the process of reaching these narrow alleys tends to decrease in intensity and can only be traversed on foot. In this case, the characteristics of the historic alley have not changed and are still a feature of the Kotagede area.

The Visibility on spatial configuration

This study uses a visibility graph analysis to discuss visibility in a spatial configuration. According to Turner *et al.* (2001), visibility graph analysis investigates the properties of a visibility graph derived from a spatial environment. In this case, VGA is used to be able to help the author to find the serial vision that is obtained when walking across historic alleys.

The visibility calculation uses a grid size of 0.60 meters according to the standard of one human module. The measurement results of the two locations showed low visibility to the human eye when walking. This is due to the narrowness of the alley and the density of buildings,

which makes visitors sometimes need guidance on where to 'get out' of this continuous linear circulation.

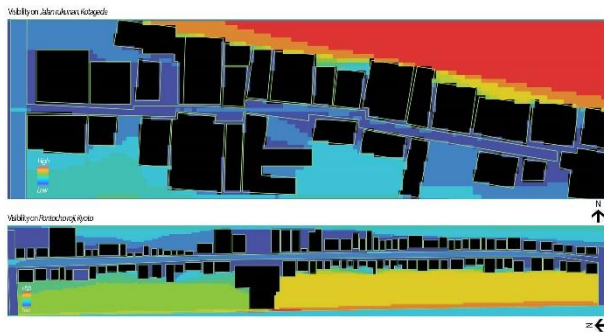


Figure 4. Visibility in both location (Analysist result, 2023)

In *Jalan rukunan*, the alleyway is not continuous, so visually, people will guess where the point of stopping or exiting the passage is, different from the case with *Pontocho roji*, where the path goes straight so that visual predictions can provide clarity of direction. Alleys with many tourists, such as *the Pontocho* area, pay attention to the gaze behavior of pedestrians, combining constituent elements, spatial properties, and regional characteristics. Alley space indicates moving objects such as plant pots and other enchantment devices compared to which elements in the alley space attract pedestrians' attention. Alleys with good road space continuity tend to have a higher level of attendance. From the case with *Pontocho roji*, where the path goes straight so that visual predictions can provide clarity of direction..

Jalan rukunan is a spatial feature of traditional Javanese house buildings in the Kotagede area, which is not owned in other areas. The layout of this environmental site is formed from basins that connect each other between houses. This alley was to fulfill the need for road access and a shortcut between groups of settlers. *Jalan rukunan* is also an open space for residents, as well as a place for daily activities, a place for holding religious events, traditional ceremonies, social activities, and celebrations (Jogjacagar, 2023). The findings that can become a dialogue between the two observation locations can be seen in Table 2.

Jalan rukunan is a spatial feature of traditional Javanese house buildings in the Kotagede area, which is not owned in other areas. The layout of this environmental site is formed from basins that connect each other between houses. This alley was to fulfill the need for road access and a shortcut between groups of settlers. *Jalan rukunan* is also an open space for residents, as well as a place for daily activities, a place for holding religious events, traditional ceremonies, social activities, and celebrations (Jogjacagar, 2023).

The two observation locations in this study provide vision in a narrow alley, as explained in the indicators that form serial vision. The vision formed can be seen from various indicators such as narrow character, typology of traditional residential buildings with several supporting facilities such as traditional markets, and morphology, which characterizes the organic city.

The serial vision reveals the psychological perception of the observer where the observer needs to get visual stimulation which can be found in both research locations. The daily rhythm of the people who live in the two alley areas provides an understanding of the interiority of a narrow alley of a tourist destination. Observers are invited to enjoy almost similar scenery and 'visions' where both offer unique characteristics such as wooden building facades, small industrial businesses that serve as place attachments, and also rituals such as the existence of *abdi dalem* (king's servants) and *geisha* or *maiko* (Artist and entertainer) as the intangible aspect.

The serial visions in this study are complemented by spatial configuration through urban space syntax, where connectivity and visibility have not been studied in previous similar studies. The connectivity and visibility encountered in the modeling of this study are characterized by high connectivity with low visibility, which characterizes a vision of closeness and intimacy in the interior of a narrow alley. What distinguishes the serial vision of the two research locations is how the genius loci or the prevailing character or atmosphere of a place will never be the same, even though the similarities of the two locations can be said to be similar in terms of their character, typology, and morphology. The findings that can become a dialogue between the two observation locations can be seen in Table 2.

Table 2. Serial Vision at the location on the tangible and intangible aspects (Authors, 2023)

Observation Indicator	Pontocho roji	Findings	Jalan rukunan Kotagede	Findings
Spatial Morphology Connectivity	S	Historic alley; traditional settlement networks	S	Historic alley; traditional settlement networks
	S	Linear circulation; arterial road with high connectivity	S	Linear circulation; arterial road with high connectivity
<i>Genius Loci</i>	D	Alley is active 24/7, dominated by tourist & local activities (F&B, Airbnb)	D	Alleys busy & crowded in the morning & evening, dominating local resident activities
Visibility Graph Analysis (VGA = 0,6 M grid)	S	Low visibility; easy to find the main road	S	Consist of <i>cul-de-sac</i> ; low visibility

S = Same, D = Different

CONCLUSION

Alleys in traditional settlements have their role for visitors who pass through them. Moreover, this narrow alley has unique characteristics that can create experiences and memories for visitors, especially tourism. In this study, the similarity of the alleys in the *Pontocho roji* and *Jalan rukunan* association can create a serial vision of the historic area. Given its role as a tourist destination, alley revitalization can be an effort to increase the potential of the local community's domestic activities. Domestic activities can manifest *genius loci* in two locations as a characteristic of historic alleys in Asian countries.

This study found that the historic alley is a potential domestic space that can indicate studies on revitalizing historic settlement morphology. The study findings are divided into two factors influencing serial vision in two locations. Intangibly, the activities that can be reached and seen in narrow alleys consist of leisure time for locals in utilizing alleys as social and interaction spaces, tourism activities, and production and selling activities for local businesses. The tangible aspect can be seen in the façade of traditional buildings consisting of wood, brick, and stone materials that activate sensor vision for observers who pass through. The impression of unfinished and 'old style' gives a historic atmosphere that activates the visitor's memory and makes the observer feel the sense of *de javu* when visiting the same historic alley. As for the study of the spatial dimension, the narrow alley spaces make pedestrian intimacy feel the sense of 'local life' around the alley.

The limitation of this research is that the study is used to see the serial vision, which is discussed only from the aspects of connectivity and visibility. Meanwhile, further research in other areas in Japan or Indonesia is needed to determine how 'walking' culture is seen as a significant factor in designing historic areas. In addition, the suggestion for further research is to observe the historical alleyways that can provide communal space for

community and tourist interaction. The results of this study can be a reference for urban architects in efforts to activate narrow alleys in the residential area master plan.

REFERENCES

- Capitano, M. (2019). Attractive streetscape making pedestrians walk longer routes: The case of Kunitachi in Tokyo. *Journal of Architecture and Urbanism*, 43(2), 131–137. <https://doi.org/10.3846/jau.2019.10359>
- Council, P. T. D. (2015). *Pontocho Design Collection (Extracted part)*. Pontocho Town Development Council. <https://www.city.kyoto.lg.jp/tokei/>
- Cullen, G. (1961). *The Concise Townscape* (1st ed.). Architectural Press. <https://doi.org/https://doi.org/10.4324/9780080502816>
- Damayanti, R., Kossak, F., & Nurdiah, E. A. (2020). *Spatial reading of kampungs by using Gordon Cullen's theory: A contemporary perspective* <https://doi.org/10.1088/1755-1315/490/1/012013>
- Ford, L. R. (2001). Alleys and urban form: Testing the tenets of new urbanism. *Urban Geography*, 22(3), 268–286. <https://doi.org/10.2747/0272-3638.22.3.268>
- Heide Imai. (n.d.). *Preserving Tokyo's Alleyways from margin (1)*. 1–18.
- Hillier, B., & Hanson, J. (1984). *The Social Logic of Space*. Cambridge University Press.
- Ikaputra, I. (2019). Linear Settlement as the Identity of activitie Heritage City. *DIMENSI (Journal of Architecture and Built Environment)*, 46(1), 43–50. <https://doi.org/10.9744/dimensi.46.1.43-50>
- Jász, B. (2018). Mental map of the city: Elements of visual argumentation and creativity in modern city planning. *Creativity Studies*, 11(2), 284–293. <https://doi.org/10.3846/cs.2018.6901>

- Jogjacagar. (2023). *Jalan Rukunan Kotagede*.
<https://jogjacagar.jogjaprovo.go.id/detail/4386/displayrecords-i-nama-warisan>
- Khalaf, R. A., & Abbas, S. S. (2020). Economic revitalization of historical paths, Analytical study of the tourist attraction property. *IOP Conference Series: Materials Science and Engineering*, 881(1).
<https://doi.org/10.1088/1757-899X/881/1/012012>
- Kum, T. L., & Ujang, N. (2012). The Application of Mental Mapping Technique in Identifying The Legible Elements Within Historical District Of Kuala Lumpur City Centre. *Alam Cipta*, 5(June), 55–62.
- Kyomachiya Council. (n.d.). *Kyoto Machiya Revitalization Project II*. Retrieved December 29, 2022, from <https://kyoto-machisen.jp/en/>
- Nur, K. W. (2020). Alley activation: Genius loci to construct a resilient city. *Journal of Architecture and Urbanism*, 44(1), 63–68.
<https://doi.org/10.3846/jau.2020.11015>
- Radovic, D. (2016). Measuring the non-measurable: on mapping subjectivities in urban research. *City, Culture and Society*, 7(1), 17–24.
- Ramadhan, T., Hendra Septian, L., & Nurdini, A. (2019). Housing Morphology and Connectivity Quality in Periphery of Bandung City: Space Syntax Analysis. *KnE Social Sciences*, 2019, 470–484.
<https://doi.org/10.18502/kss.v3i21.4988>
- Suprapti, A., Kim, S., Pandelaki, E. E., & Firmadhani, S. W. (2018). A spatial dialogue of heritage village between kauman in Semarang and Seochon in Seoul toward preservation development. *Journal of Architecture and Urbanism*, 42(1), 16–23.
<https://doi.org/10.3846/jau.2018.1478>
- Turner, A., Doxa, M., O’Sullivan, D., & Penn, A. (2001). From isovists to visibility graphs: A methodology for the analysis of architectural space. *Environment and Planning B: Planning and Design*, 28(1), 103–121.
<https://doi.org/10.1068/b2684>
- Wikantiyoso, R. (2000). Indigenous Architecture Consideration in the Sustainable Urban Planning Approach, Lessons from Traditional Urban Pattern of Kotagede Yogyakarta. *Proceeding Senvar*, July.
- Xu, Y., Rollo, J., Jones, D. S., Esteban, Y., Tong, H., & Mu, Q. (2020). Towards Sustainable Heritage Tourism: A Space Syntax-Based Analysis Method to Improve Tourists’ Spatial Cognition in Chinese Historic Districts. *Buildings*, 10(2).