UNDERSTANDING THE RELATIONSHIP BETWEEN VISITOR BEHAVIOR AND LINKAGE SYSTEMS TO SUPPORT SUSTAINABLE TOURISM OF THE JAKARTA OLD TOWN AREA

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Abstract

The Jakarta Old Town Area is a major urban heritage and tourism destination experiencing spatial management challenges due to concentrated visitor activities, particularly in Taman Fatahillah. This study analyzes the area's linkage system based on visitor behavior mapping to understand patterns of spatial connectivity. A qualitative descriptive method was applied to observe visitor movements through weekend observations over two weeks, involving 20 respondents. Of these, 50% of respondents visited Taman Fatahillah, while 25% visited the Bahari Museum and 25% visited Sunda Kelapa Harbor. The research was to identify destination preferences, and classify the types of linkages among attraction points. The results indicate two dominant connectivity clusters. The Taman Fatahillah–Jakarta Kota Station cluster accounts for the most of visitor movements and demonstrates the highest linkage complexity, connecting up to seven tourist objects through multiple linkage types, including side, linear, axis, corridor, rhythmic, and structural linkages. More than 50% of visitors to Taman Fatahillah originated from Jakarta Kota Station, confirming its role as the primary access node. In contrast, the Bahari Museum and Sunda Kelapa Harbor form a cluster but is characterized by limited spatial reach, connecting only two objects and dominated by side and linear linkages. These findings show that areas with more diverse linkage elements attract higher visitor flows, while zones with simpler linkages remain underutilized. These results underscore the importance of strengthening physical and functional linkages to promote balanced spatial use and support sustainable urban heritage tourism in the Jakarta Old Town Area.

Keywords: *Kota Tua Jakarta, Old Town, Visitor Behaviour, spatial linkage system, sustainable heritage tourism*

Introduction

The Jakarta Old Town Area is a designated cultural heritage site in DKI Jakarta Province that has been revitalized into a mixed-use district encompassing tourism, office, commercial, and service sectors by the provincial government. As a heritage-based tourism destination, the area offers visitors the opportunity to explore colonial-era architecture and urban heritage elements (Hermawan et al., 2021). Historically, Jakarta Old Town reflects the deep influence of Dutch colonialism, as it functioned as the first administrative center of Dutch governance in Indonesia and marked the early development of Jakarta's urban society. The area's origins date back to the establishment of Sunda Kelapa Harbor in the 13th century, which evolved significantly in the 15th century when the Dutch began their exploration of Jayakarta (Aulia et al., 2021).

According to the Master Plan of the Old Town Area, the site spans approximately 334 hectares, encompassing parts of the Tambora, Glodok, Jembatan Lima, Pekojan, Roa Malaka,

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Pinangsia, Penjaringan, and Pulau Onrust sub-districts (Government of DKI Jakarta Province, 2014). The district is further divided into five zones characterized by distinct physical, social, and cultural features. Zones 1 and 2 form the core area within the old city walls, Zone 1 maintains a strong maritime identity connected to the daily life of the Sunda Kelapa community; while Zone 2, as the historical city center, contains the highest concentration of preserved colonial buildings. Meanwhile, Zones 3, 4, and 5, which extend beyond the walls, function as multi-ethnic residential and commercial buffer zones, inhabited by diverse communities including Arab and Chinese ethnic groups (Widowati, 2018; Parhani, 2016).

Despite revitalization efforts, tourist activity remains concentrated mainly around Fatahillah Square, leading to uneven spatial utilization and increased environmental pressure in certain zones (Hermawan et al., 2021; Parhani, 2016). This pattern aligns with the concept of tourism carrying capacity, which emphasizes that concentrated visitor flows in heritage environments can surpass ecological and social thresholds, resulting in congestion, resource degradation, and reduced heritage quality (Saveriades, 2000; Koens et al., 2018). Understanding how visitors move and interact across these zones is therefore essential for improving spatial connectivity, mitigating environmental stress, and supporting more balanced use of the heritage area.

According to the study by Hermawan et al. (2021), as the main tourist area, the core zone exhibits good accessibility (paths) and permeability, however, the nodes and edges of the area are still poorly defined, with the landmark of the area being the Fatahillah Museum. This indicates that a linkage system has already formed in the Jakarta Old Town Area. Linkage is a simple city adhesive, namely an effort to unite all levels that produce the form of a city (Maki in Zahnd, 2008).

According to Zahnd (2008), linkage refers to the interrelation among spatial elements that shape the dynamics of urban form. Urban linkage can be understood through three approaches: visual, structural, and collective linkage. However, the collective type is generally identified at a larger spatial scale, such as cities or metropolitan regions. Therefore, this study focuses on two main types of linkage: visual and structural. Visual linkage connects two or more urban fragments into a unified composition. Zahnd (2008) identifies five elements that establish distinctive spatial relationships: (a) line, a direct connection between two points through a sequence of built masses; (b) corridor, a spatial path formed by two rows of buildings; (c) edge, an indirect connection between two areas through a single mass; (d) axis, a connection emphasizing one dominant destination; and (e) rhythm, a linkage formed through variations of mass and open space. Structural linkage integrates multiple urban forms into a coherent structure through a compositional network, known as a collage system. Zahnd (2008) distinguishes three structural linkage elements: (a) addition, continuing existing development patterns; (b) connection, introducing new patterns within the environment; and (c) penetration, integrating existing spatial patterns through internal passages. The main elements forming the linkage of the area are in the form of movement circulation and visual elements forming interconnected atmospheres (Dewi, 2015).

An area that is well-connected should ideally have evenly distributed activities, however, in reality, tourists, both domestic and international, are not evenly distributed (Parhani, 2016; Sukmajati, 2016). In this regard, the findings of Agradiana (2020) also indicate that the good pedestrian accessibility along the street corridors

in the Jakarta Old Town Area does not directly correlate with the preferences of pedestrian routes chosen by visitors to the area; where certain street segments with high accessibility levels have lower preference values compared to other street segments with lower accessibility levels. Furthermore, Agradiana (2020) suggests that the atmosphere and purpose of the journey can be more influential factors in the selection of routes for tourists within the area.

The atmosphere of an area is greatly influenced by its visual characteristics. There are expressive elements of urban physical design that support the formation of the city's visual structure and the creation of its environment (Dewi, 2015). As mentioned by Lynch in Zahnd (2008), the city's imaging capability is determined by the physical quality that can provide a strong identity. Lynch also states that an image requires identity in an object or something different from others, a structure or pattern of interconnection between objects and observers, and finally, the object has meaning for its observer. Strong visual characteristics in an area can build physical connections and establish linkages between activity zones.

Tourist behavior is a factor that needs further examination to understand preferences for activities and desired atmospheres in order to create linkage and tourist distribution between zones in the Jakarta Old Town Area. Consequently, the distribution of these activities is expected to help revitalize the Jakarta Old Town Area. Efforts to gain an understanding of visitor behavior in the Old Town can be achieved through observing individuals to ascertain their movements, how their movements can be traced through physical measurements, and behavior mapping (Sommer, 1986, as cited in Agustapraja, 2018). Therefore, the aim of this research is to analyze the linkage system in the Kota Tua Jakarta area from the perspective of mapping visitor behavior.

Research Methodology

Research Variables

The research variables are derived from theories on the visual characteristics of an area and their relationship to tourist behavior toward destinations in Kota Tua Jakarta. Lynch, as cited in Zahnd (2008), proposes that a city's image is determined by five visual elements: paths, nodes, edges, districts, and landmarks. Meanwhile, Smardon, as cited in Aryangga et al. (2022), identifies five physical elements of a view that are perceived and recorded through human observation. The visual characteristic elements of an area used in this study are defined through a comparative synthesis of Lynch's and Smardon's frameworks, as presented in Table 1.

Table 1. Visual Characteristic of an Area

No	Visual Characteristics of the Area According to Smardon	Visual Characteristics of the Area According to Lynch	Observed Objects
1	*Paths*	*Paths*	streets, Rivers, Area Circulation
2	Degree of Enclosure	Edges, nodes	Vegetation, Parking Locations, Buildings
3	Roadside Vegetation	Paths, edges	Vegetation on Roadside and Median, as well as Outer Boundary of the Area
4	Architectural Patterns	District, landmark	Architectural Patterns in the Area Divided by Districts, Main Buildings with Unique Characteristics (Landmarks)
5	Activity Patterns	-	Visitor Activities in the Area

Source: Processed from Lynch in Zahnd (2008) and Smardon in Aryangga et al (2022)

Although the two theories differ in terminology, they share conceptual similarities. Based on this synthesis, the variables observed to represent the visual characteristics of an area include paths (such as streets and rivers), vegetation, open spaces (including parking areas, parks, and plazas), buildings (in terms of architectural

patterns), and visitor activities within the area. Table 2 contains of research variables that have been summarized from the review.

Table 2. Research Variables

No	Aspect	Variable	Indicator
1	Visitor Behavior	Activity pattern	mapping of activities of visitors/tourists coming to the old town area
2	Linkage area	Circulation	Patterns of road networks, rivers, and other elements used as circulation routes in the area
3		Parking Facilities and Open Spaces	roadside parking and the presence of open spaces influencing visitor comfort
4		Vegetation	availability of plants on roadside: tree height, distribution of trees, and canopy shapes in an area.
5		Building	Area Landmarks, Building Facades, Land Use Types

In the study of linkage system in the Jakarta Old Town Area, behavior mapping can elucidate the community's perception, particularly that of visitors to the area, regarding the physical connections within the area. Agradiana (2020) indicates that the perceptual phenomenon of tourists regarding the atmosphere and distance between tourist attractions influences the travel routes and stops of tourists when visiting Jakarta Old Town. Therefore, mapping the behavior of tourists to Jakarta Old Town can be compared with observations of the visual characteristics of the area to formulate an effective linkage system in "binding" the Jakarta Old Town Area and increasing the distribution of visitors to the area beyond just the Fatahillah Square area.

Data Collecting

The data collection method for this research involves obtaining primary and secondary data of the research variables (table 2). Secondary data is obtained from websites, Google satellite maps, as well as plans and policies related to the study area. Primary data collection involves field observations, including interviews and photography. Data collection was conducted for two weeks during weekends at midday and in the afternoon, which correspond to peak visiting periods for tourists, ensuring that observed movement patterns reflected typical visitor behavior.

The destination sampling used snowball sampling method to 20 visitors who visited three tourism areas in the area within the Old Town Jakarta Walls. The snowball sampling technique is used as it allows for the flexibility to obtain informants who meet the data requirements (Endraswara, 2006). The sample size of 20 respondents was considered sufficient for this qualitative spatial analysis, as observations and interviews were repeated until no new walking routes or movement patterns emerged, indicating data saturation. In accordance to Saunders et al (2018), In qualitative studies, data collection continues until no new information emerges. This is widely accepted as the standard for justifying sample size in qualitative designs rather than relying on predetermined numbers.

The observed tourism areas included the Taman Fatahillah Area (Fatahillah Square), the Bahari Museum area, and the Sunda Kelapa Harbor area. Ethical considerations were addressed during data collection; verbal consent was obtained from all respondents prior to interviews, and participants were asked to voluntarily draw their routes of movement between destinations as part of the behavior mapping process.

Data Analysis

The research analysis employs a qualitative descriptive approach, with visitor behavior mapping as the primary analytical method. The behaviors mapped in this study include visitors' patterns of activities, starting points, walking routes, and destinations visited during their trips

within the study area. Behavior mapping was used to understand pedestrian behavior in public spaces by observing how individuals move, the routes they select, and how they interact with the physical environment (Sommer, 1986, as cited in Agustapraja, 2018). In line with Ramadhani (2020), observational behavior analysis involved recording and observing tourists in the Kota Tua Jakarta area, complemented by brief interviews to capture visitors' perceptions of space use and movement choices.

Visitor routes were identified through a combination of direct observation and interviews, during which respondents were asked to draw their walking routes between destinations. The number of routes was not predetermined; instead, route classification was based on data saturation, whereby observations and interviews were repeated until no new routes emerged. As a result, four dominant routes were identified in the Taman Fatahillah area, one route in the Museum Bahari area, and two routes in the Sunda Kelapa Harbor area. Observations were conducted during peak visiting periods to ensure that the recorded routes reflected typical visitor behavior.

Linkage types were identified through systematic observation of visitor routes derived from behavior mapping. These routes were established based on visitors' actual walking paths, starting points, and sequences of visited destinations, as recorded through direct observation and respondent-drawn route sketches. The spatial and visual characteristics of each identified route were then examined using the linkage variables outlined in Table 2 and subsequently classified by comparing them with the visual and structural linkage criteria proposed by Zahnd (2008) as previously described in the Introduction. This method ensured that linkage classification was grounded in empirically observed visitor movement patterns, reflecting how spatial connections are perceived and utilized by visitors within the Kota Tua Jakarta Area.

Results and Discussion

Analysis of Visitor Behavior Mapping in the Walled Area of Jakarta Old Town District (Core Zone)

Visitor behavior analysis in the Kota Tua area was conducted using a combination of behavior mapping techniques and primary interviews with visitors at selected sample points distributed across the five designated zones of Kota Tua Jakarta. The study examined visitor movement patterns: routes, range, and destinations, to understand the spatial connectivity and accessibility of the area from the visitor's perspective. The mapping results were organized according to the zoning delineation stated in the Jakarta Governor Regulation No. 36 of 2014, distinguishing between the *core zone* (inside the city walls) and the *supporting zone*.

The *core zone* represents the Old Town Center and contains the highest concentration of protected historical buildings. Within this zone, the main observation points were located at Taman Fatahillah (Fatahillah Square) and Jakarta Kota Station. Taman Fatahillah functions as the symbolic and activity center of Kota Tua, while Jakarta Kota Station serves as the main transportation hub providing multimodal connections via commuter rail, bus, and informal transport such as motorcycle taxis and minibuses. Two additional sites, Bahari Museum and Sunda Kelapa Harbor, were selected to represent the northern waterfront area closely associated with Jakarta's maritime heritage.

Behavior mapping of ten respondents in the Taman Fatahillah–Jakarta Kota Station area revealed three main access points: Jakarta Kota Station (six respondents), Kalisari Barat Bus Stop (three), and Taman Fatahillah Bus Stop (one). Two dominant routes of visitor movement were identified: (1) a northward route from Jakarta Kota Station into the heart of the

heritage core leading to Taman Fatahillah, and (2) a westward route toward the Bank Mandiri Museum, Bank Indonesia Museum, and Asemka Market. The mapping showed that visitors using one route rarely visited attractions along the other, indicating a spatial separation of visitor interests and limited pedestrian continuity between subzones. The overall movement range in the Taman Fatahillah area is bounded by Jakarta Kota Station and Raya Pantura Road to the south, Asemka Market and Kali Besar Barat Street to the west, Kunir Street to the north, and Kemukus and Lada Dalam Streets to the east.

In contrast, visitor behavior in the Bahari Museum and Sunda Kelapa Harbor area, each represented by five respondents, exhibited different mobility characteristics. Access to these coastal destinations was predominantly by private vehicles, reflecting limited availability of public transportation. Two patterns of movement were identified: (1) direct visits to each destination and (2) sequential movement between the Bahari Museum and Sunda Kelapa Harbor via Menara Syah Bandar. This suggests a perceived linkage between the two sites based on thematic and spatial proximity. The overall movement range extended from Pakin Street near Menara Syah Bandar eastward across the connecting bridge to Krapu Street leading to the harbor area.

Based on the behavior mapping analysis conducted within the walled area, it can be concluded that there are two groupings of connectivity: between the Taman Fatahilah area and Jakarta Kota Station (figure 1), and between the Bahari Museum and Sunda Kelapa Harbor (figure 2). Although all these locations are within the core zone of the Kota Tua Jakarta Area, visitors tend to visit only one of these two groupings of destinations. Jakarta Kota Station, while technically part of the supporting zone, has a strong connection with the core zone at Taman Fatahilah Area, as more than 50% of respondents visiting Taman Fatahilah started their journey from the station.

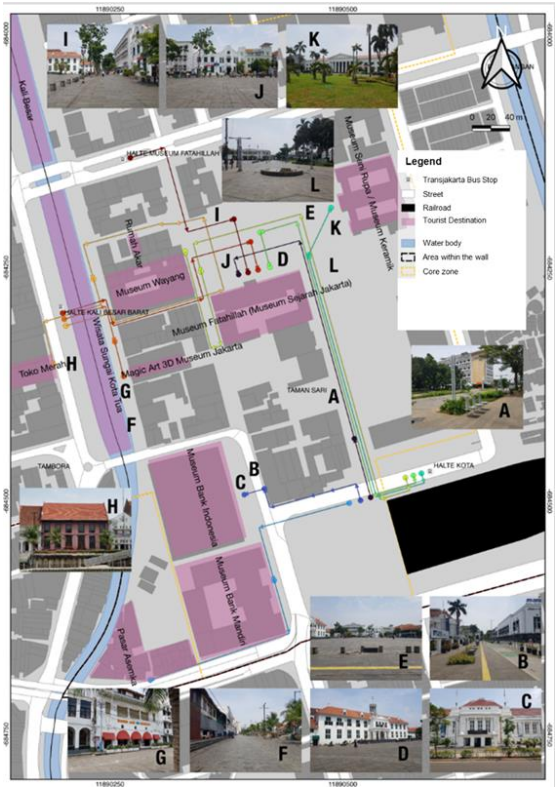

Figure 1. Visitor Behavior Mapping in the Taman Fatahilah and Jakarta Kota Station Area

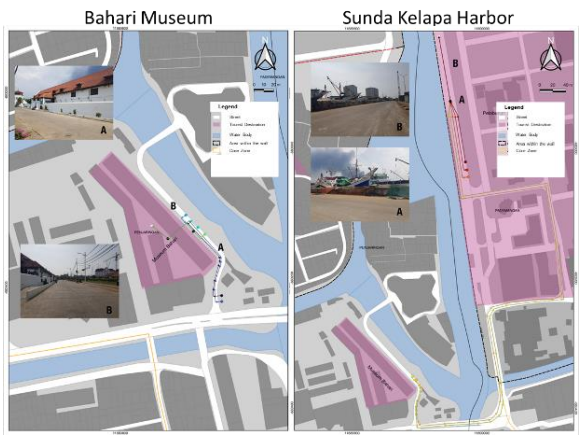

Figure 2. Visitor Behavior Mapping in the Bahari Museum and Sunda Kelapa Harbor Area

Identifying the types of linkage elements present in in the Walled Area of Jakarta Old Town District (Core Zone)

To identify the types of linkages in the Kota Tua Jakarta area, it is necessary to conduct an

analysis of the characteristics of sample points spread across the five zones of the Kota Tua area. This analysis will be carried out using the character appraisal method on four variables that constitute the elements of linkage: circulation, parking and open spaces, vegetation, and buildings. Once these four elements are identified, the types of linkages present in the areas surrounding tourist destinations in each zone can be determined. This linkage analysis is based on visitor routes identified through visitor behavior mapping analysis.

A. Taman Fatahillah and Jakarta Kota Station area

The linkage analysis in the Taman Fatahilah and Jakarta Kota Station areas follows routes identified in the visitor behavior mapping analysis, including: (1) The route from Kota Station to Asemka Market; (2) The route from Kota Station to Taman Fatahilah; (3) The route from the Kali Besar Barat bus stop to Taman Fatahilah; (4) The route from the Taman Fatahilah bus stop to Taman Fatahilah.

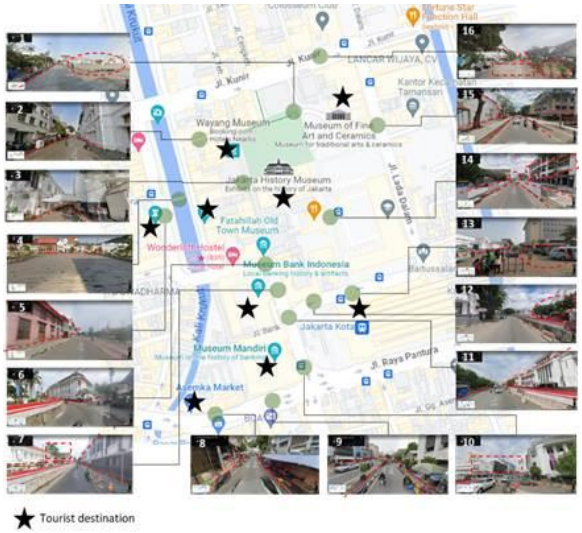

Figure 3. Mapping of Linkages in the Taman Fatahilah and Jakarta Kota Station Area

The figure 3 illustrates the identified linkages based on 4 visitor routes in the Taman Fatahilah and Jakarta Kota Station areas. Each route is analyzed for its characteristics regarding circulation, parking and open spaces, vegetation, and buildings to determine the types of linkages present in these key areas.

(1) The Route from Jakarta Kota Station to Asemka Market

The route from Kota Station to Asemka Market begins at Jakarta Kota Station and includes three destination objects along the way: the Bank Mandiri Museum, the Bank Indonesia Museum, and Asemka Market. This route is situated in the southern part of the core zone. Starting from Jakarta Kota Station, visitors walk westward towards the Bank Mandiri Museum and the Bank Indonesia Museum, then head south towards Raya Pantura Road before taking a westward direction to Asemka Market. Figure 4 shows the identification of linkage elements along the corridors traversed by this route.

Figure 4. Identification of Linkage Elements on the Route from Kota Station to Asemka Market

In Figure 4, the linkage elements can be identified as follows:

a. At the corridor in front of Jakarta Kota Station: There is an open space element serving as a parking area for public vehicles. The facades of historic buildings, such as the BNI Building, the station itself, and other historic buildings on the north side of the station, form a linkage element characterized by colonial architecture.
b. In the second image, at the corridor west of the station: A visual linkage line is formed by trees along the pedestrian path on the right side of the road corridor.
c. At the corridor in front of the Bank Mandiri Museum and the Bank Indonesia Museum: The facade elements of

buildings flanking the corridor create a side linkage element, forming a corridor linkage extending to the intersection, where an axial linkage element is identified from the corner of the Bank Indonesia Museum building.

d. To the south, at the intersection of Raya Pantura Road: This main road features colonial buildings mixed with modern structures. The buildings at the intersection corners form axial linkage elements.
e. On Raya Pantura Road heading west: Asemka Market, consisting of street vendors (PKL) lining the corridor under Raya Pantura Road, forms a corridor linkage element characterized by informal trade facilities, with vendors lining both sides of the road.

(2) The route from Kota Station to Taman Fatahilah

The route from Kota Station to Taman Fatahilah encompasses six destinations, namely Taman Fatahilah, Fatahilah Museum, 3D Art Museum, Wayang Museum, Rumah Akar, and Ceramic Museum. These museums are situated around Taman Fatahilah. Therefore, the linkage analysis focuses on the corridor leading from Jakarta Kota Station to Taman Fatahilah.

Figure 5. Identification of Linkage Elements on the Route from Kota Station to Taman Fatahilah

In Figure 5, the linkage elements can be identified as follows:

a. From the front of Jakarta Kota Station, the route heads north directly towards the heart of the core zone, which is the Taman Fatahilah area. Within this corridor, several linkage elements can be identified: the corridor linkage element formed by two pedestrian pathways flanking the corridor; the side elements from the facades of colonial-era buildings along the corridor; and the linear linkage created by rows of trees along the pedestrian paths. This corridor aligns with the main facade of Kota Station, establishing a geometric central open linkage system between Kota Station and Taman Fatahilah. This configuration suggests that Taman Fatahilah was designed as the central focal point of the core area of Old Jakarta.
b. In the Taman Fatahilah area, it is surrounded by colonial-style buildings (museums), forming a "U" shape open to the north, with the central building being the Fatahilah Museum. Additionally, the park area is encircled by a pathway with street furniture ornaments, creating rhythmic and linear linkage elements. There are alleys and/or pathways connecting this area to the south (Jakarta Kota Station), west (across the Krukut River), north (Jl. Kunir), and east (Jl. Lada Dalam).
c. To the east of the Ceramic Museum is Jl. Lada Dalam. This road corridor marks the eastern boundary of the core zone, characterized by the side linkage element formed by the rear walls of the colonial buildings surrounding Taman Fatahilah. Within this corridor, a corridor linkage is also identified from the two pedestrian paths flanking the road.

(3) The route from the Kali Besar Barat bus stop to Taman Fatahilah

The route from Halte Kali Sari Barat to Taman Fatahilah encompasses six destinations: Toko Merah, Taman Fatahilah, Fatahilah Museum, 3D Art Museum, Wayang Museum, and Rumah Akar. Visitors using this route originate from the western side of the core zone, thus tending to explore less of the eastern side of the core zone, such as the Ceramic Museum. The journey begins at Halte Kali Besar Barat, located across

the Krukut River. Figure 6 identifies the linkage elements present along this route.

Figure 6. Identification of Linkage Elements on the Route from Halte Kali Besar Barat to Taman Fatahilah

Based on Figure 6, the analysis of linkage elements is as follows:

a. Front Corridor at Halte Jl. Kali Besar Barat: The corridor in front of the halte on Jl. Kali Besar Barat features side linkage elements formed by a row of colonial-style commercial and service buildings, including the iconic Toko Merah, which is frequently visited by tourists. To the east, the corridor is bounded by the Krukut River, which also serves as a side linkage element for the corridor.
b. Structural Linkage towards the Core Zone: To reach the heart of the core zone of Old Jakarta, namely Taman Fatahilah, there is a structural linkage element in the form of a connecting bridge. From this bridge, one can clearly see how colonial buildings align to form side linkage elements along Jl. Kali Besar Barat.
c. Corridor Connection to Taman Fatahilah: From the connecting bridge, there is a corridor alley flanked by two buildings, creating a corridor linkage element that leads directly to the open space of Taman Fatahilah.

(4) The route from the Taman Fatahilah bus stop to Taman Fatahilah

The route from Halte Taman Fatahilah to Taman Fatahilah includes six destinations: Taman Fatahilah, Fatahilah Museum, 3D Art Museum, Wayang Museum, Rumah Akar, and Ceramic Museum. Halte Taman Fatahilah is located on Jl. Kunir and provides the closest access to Taman Fatahilah in terms of distance. Despite this, this route is not the preferred choice for visitors, with the smallest number of respondents selecting this route. Figure 7 identifies the linkage elements present along this route.

Figure 7. Identification of Linkage Elements on the Route from Taman Fatahilah Bus Stop – Taman Fatahilah

Based on Figure 7, the analysis of linkage elements is as follows:

a. Corridor on Jl. Kunir: The linear linkage element is formed by a row of trees along the street, the median, and Halte Taman Fatahilah. The side linkage element is created by the colonial-style buildings on the south side of the street. Structural Linkage, The zebra cross to the east of the halte serves as a connecting linkage, linking Taman Fatahilah with the residential area located to the north, and an additional Structural Linkage, in which the halte itself is a new building designed to complement the colonial facade of the surrounding area, integrating it into the Taman Fatahilah environment.
b. Access Road to Taman Fatahilah: Rhythmic Linkage by the access road closest to the halte is equipped with street furniture, such as lamps, ornaments, and benches, which create a rhythmic linkage. Corridor Linkage, the road is flanked by two colonial buildings, establishing both a side linkage and a corridor linkage for the street.
c. Alternative Routes: Alternative Access Points: There are several alternative routes to enter the Taman Fatahilah area that are relatively close to Halte Taman Fatahilah. One such route is the alley near the Wayang Museum. This alley shares characteristics with other alleys in the Taman Fatahilah area, being flanked by colonial buildings which provide side

linkage and contribute to the corridor linkage of the street.

B. The Bahari Museum and Sunda Kelapa Harbor Area

In the analysis of the Bahari Museum area and Sunda Kelapa Port, both located to the north of Taman Fatahilah, these areas are examined together despite being separated by a body of water. This joint analysis is justified by indications of connectivity identified from visitor behavior mapping analysis. The linkage analysis for the Bahari Museum area and Sunda Kelapa Port follows the route identified in the visitor behavior mapping analysis, which includes: (1) Menara Syah Bandar – Bahari Museum: This segment connects Menara Syah Bandar with Bahari Museum; (2) Bahari Museum: Directly focusing on the Bahari Museum itself; (3) Bahari Museum – Sunda Kelapa Port: The route from Bahari Museum to Sunda Kelapa Port; (4) Sunda Kelapa Port: Directly focusing on Sunda Kelapa Port itself.

Of the four types of visitor behavior at the Bahari Museum Area and Sunda Kelapa Harbor, two types involve visitors heading directly to the attractions, resulting in linkage types that are identical to the other two routes. Therefore, the linkage types of two routes were analyzed: the Menara Syah Bandar – Bahari Museum route and the Bahari Museum – Sunda Kelapa Harbor route. The interconnection of of both areas is shown in figure 8.

(1) Route from Menara Syah Bandar to Bahari Museum

The route from Menara Syah Bandar to the Bahari Museum, depicted in Figure 8, is straightforward. Visitors typically travel by private vehicle or taxi to Menara Syah Bandar via Pakin Street. From there, they turn north onto Pasar Ikan Street, where the Bahari Museum is located. The distance between Menara Syah Bandar and the Bahari Museum is relatively short, so some visitors choose to either drive or walk. Figure 9 identifies the linkage elements along this corridor.

Figure 8. Linkage Mapping in the Area Surrounding the Bahari Museum and Sunda Kelapa Harbor

Figure 9. Identification of Linkage Elements on the Route from Menara Syah Bandar to Bahari Museum

Based on Figure 9, the analysis of linkage elements is as follows:

a. Along the Pakin Street corridor in front of Menara Syah Bandar, a linear linkage is formed by a row of trees and the Krukut River on the left side of the road, the median strip, and the pedestrian path on the right side. As a main thoroughfare, Pakin Street has a strong visual linkage. However, the visual elements do not yet

reflect the cultural heritage of Jakarta's Old Town. Only the Menara Syah Bandar building on the right side of the road stands out from the surrounding buildings, showcasing its facade as part of the core zone of Jakarta's Old Town. Although Menara Syah Bandar is not a designated tourist destination in the Old Town area, it attracts attention and has the potential to become a landmark.

b. From Pakin Street, the Bahari Museum can already be seen to the north of Menara Syah Bandar, along Pasar Ikan Street. On Pasar Ikan Street, a side visual linkage is identified, formed by the buildings on the left side of the road. These buildings have a row-like structure with colonial warehouse facades. Additionally, the extended front facade of the Bahari Museum enhances the old warehouse district identity of Pasar Ikan Street.

(2) Route from Bahari Museum to Sunda Kelapa Harbor

The route from the Bahari Museum to Sunda Kelapa Harbor (Figure 8) begins at the Bahari Museum, with visitors exiting Pasar Ikan Street onto Pakin Street. From Pakin Street, visitors cross the bridge to the east of Menara Syah Bandar, then turn north onto Krapu Street, leading to Sunda Kelapa Harbor. Figure 10 identifies the linkage elements along this corridor.

Figure 10. Identification of Linkage Elements on the Route from Bahari Museum to Sunda Kelapa Harbor

Based on Figure 10, the analysis of linkage elements is as follows:

a. Respondents begin their journey from the Bahari Museum after visiting the museum. They travel by private vehicle, passing through Pasar Ikan Street to Pakin Street and turning east towards the bridge.

b. Respondents cross the bridge on Pakin Street towards Krapu Street, where there are linear linkage elements on both sides of the bridge. This bridge also marks a change in characteristics that define the identity of the area leading to Sunda Kelapa Harbor as a port and warehouse district.

c. Krapu Street is the main access road to Sunda Kelapa Harbor. On both sides of the road, there are linear linkage elements formed by pedestrian pathways. The land use along the road is dominated by industrial and warehouse facilities with modern facades. At the end of the road, the entrance gate to Sunda Kelapa Harbor is visible. Although it is a historic harbor, the Sunda Kelapa Harbor Gate has the typical characteristics of a port managed by PT. Pelindo II.

d. Within the harbor area, linear linkage elements are identified from the median strip with rows of trees, and side linkage elements are formed by the sea wall. In this harbor, the buildings exhibit the characteristics of a modern port typical of Pelindo ports. However, there are still traditional ships docked, which strengthen the area's identity as a heritage harbor and as part of the core zone of Jakarta's Old Town.

Discussion on The Linkage System of Jakarta's Old Town Area from the Perspective of Visitor Behavior Mapping

In the study of the linkage system in Jakarta's Old Town Area, behavior mapping can explain public perception, specifically that of the visitors, regarding the physical connectivity within the area. Therefore, the routes and

destinations identified from the behavior mapping of tourists to Jakarta's Old Town are compared with the observed linkage elements along each chosen route. This comparison aims to identify the relationship between the area's linkage system and visitor behavior.

Table 3. The Relationship Between the Linkage System of Jakarta's Old Town and Visitor Behavior

No	Survey Area	Visitor Behavior Mapping in Jakarta's Old Town		Types of Identified Linkage Elements
		Route	Tourist Destination Reach	
1	Taman Fatahilah and Jakarta Station Area	Jakarta Kota Station – Asemka Market Jakarta Kota Station – Taman Fatahilah Kali Besar Barat Bus Stop – Taman Fatahilah Taman Fatahilah Bus Stop – Taman Fatahilah	7 objects	- Side Linkage - Linear Linkage - Axis Linkage - Corridor Linkage - Rhythmic Linkage - Structural Linkage Connections - Additional Structural Linkage Elements
2	Bahari Museum Area	Menara Syah Bandar – Bahari Museum Bahari Museum	2 objects	- Side Linkage - Linear Linkage
3	Sunda Kelapa Harbor	Bahari Museum–Sunda Kelapa Harbor Sunda Kelapa Harbor	2 objects	- Side Linkage - Linear Linkage

The analysis of the linkage system in Jakarta's Old Town Area through visitor behavior mapping reveals how physical connectivity and spatial perception shape visitor movement and area utilization. The identified routes and destinations were compared with existing linkage elements to understand how the configuration of spatial connections influences tourist distribution and engagement within heritage zones.

The results (Table 3) demonstrate that areas with more diverse and continuous linkage elements—such as Taman Fatahillah—exhibit greater visitor reach and interaction intensity. This suggests that well-defined visual and structural linkages enhance accessibility and spatial coherence, thereby supporting more balanced visitor distribution. Visual linkages, including linear, axial, and rhythmic elements, reinforce the sense of spatial unity and guide visitors through connected environments (Zahnd, 2008). In contrast, areas with weaker linkages, such as the Bahari Museum and Sunda Kelapa Harbor, tend to attract visitors who focus only on specific destinations rather than exploring adjacent spaces.

Structural linkage elements in Taman Fatahillah were identified in the presence of extended pedestrian corridors, colonial-style bus stops, and connecting bridges that physically and visually integrate surrounding attractions. These linkages create a "collage system" that unifies distinct structures into a coherent network (Zahnd, 2008), improving walkability and encouraging exploration beyond the main square. Such linkages play a crucial role in maintaining functional and aesthetic continuity in heritage environments, supporting their sustainable management (Bandarin & van Oers, 2014).

Meanwhile, the Bahari Museum and Sunda Kelapa Harbor areas, although thematically connected through maritime heritage, lack the physical and structural continuity needed to sustain visitor movement between sites. The

limited access and weak pedestrian connectivity result in fragmented spatial use despite their shared cultural narratives. This aligns with findings from Aranburu et al. (2016), which emphasize that thematic coherence alone is insufficient to generate sustained visitor engagement without adequate spatial and infrastructural linkages.

Overall, the results underscore the importance of enhancing both visual and structural linkages in heritage districts to balance visitor flow, mitigate environmental pressure on core attractions, and support the sustainable management of urban heritage areas. Strengthening physical connectivity between core and peripheral zones could serve as a community-based environmental management strategy by distributing visitor impacts and promoting more inclusive spatial use (UNESCO, 2011; Avrami et al., 2019).

Conclusions

Based on the analysis of the core area within the walls of Jakarta's Old Town, visitor behavior mapping indicates that the highest concentration of movement and destination reach occurs in the Taman Fatahillah and Jakarta Kota Station areas. These areas exhibit the most diverse range of travel routes and destination objects, suggesting stronger spatial connectivity and accessibility compared to other parts of the Old Town. Although Taman Fatahillah, the Bahari (Maritime) Museum, and Sunda Kelapa Harbor are all located within the same heritage core, visitors generally focus on only one of these destinations, demonstrating limited spatial continuity between them.

The identification of linkage elements reveals that the Taman Fatahillah–Jakarta Kota Station area contains the greatest number and variety of linkages, both visual and structural. Visual linkages such as linear corridors, axial views, and rhythmic building patterns enhance spatial legibility and orientation, encouraging visitors to move through and explore the area. Conversely, areas with fewer linkage elements, such as the Bahari Museum and Sunda Kelapa Harbor, display lower visitor mobility and more destination-specific behaviors. This finding supports the notion that visual connectivity plays a crucial role in shaping visitors' cognitive mapping and exploration patterns

The results also imply that improving physical and visual linkages within Jakarta's Old Town can help balance visitor distribution and alleviate concentrated environmental pressures on the most visited zones, particularly Taman Fatahillah. Moreover, further study about integrating these linkage improvements can foster more inclusive and sustainable tourism practices. This includes enhancing pedestrian networks, creating thematic routes connecting the heritage sites, and involving local stakeholders in maintaining connectivity infrastructure. Strengthening such linkages would not only enrich visitor experiences but also contribute to the long-term preservation and sustainable use of the Old Town's urban heritage landscape.

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