



Jurnal Arsitektur Zonasi

Journal homepage:

<https://ejournal.upi.edu/index.php/jaz>



Public Perception of Street Infrastructure Along the Asia-Afrika Street Corridor

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ABSTRACT

Street furniture is an essential element in shaping the quality of urban open spaces, serving to support social activities, enhance user comfort, strengthen the identity of an area, and create a more organized and attractive urban environment. The presence of elements such as benches, trash cans, streetlights, information boards, and other supporting elements play a crucial role in supporting the function of public spaces, particularly in historic areas with high cultural value and community activity. This study aims to identify and analyze the influence of the quality of street furniture elements on environmental quality and the level of public appreciation along the Asia-Africa Street Corridor in Bandung. The research method employed is a mixed-methods approach combining field observation, visual documentation, questionnaire distribution, and regression analysis of the perceptions of 147 respondents. The analysis was conducted to determine the relationship between the design, function, material, and construction aspects of street furniture and the environmental quality perceived by users. The results indicate that the variables of design, function, and materials have a significant direct influence on environmental quality, while construction aspects exert an indirect influence through other variables. Furthermore, environmental quality was found to be the primary mediating factor determining users' comfort levels and appreciation of the corridor. These findings recommend the integration of responsive, contextual, and sustainable physical elements to enhance the quality of public spaces within this historic corridor.

ARTICLE INFO

Article History:

Submitted/Received 3 Feb 2026

First Revised 4 July 2026

Accepted 27 September 2026

First Available online 1 Oct 2026

Publication Date 1 October 2023

Keywords:

Urban architecture;
function;
user comfort;
public space quality

1. INTRODUCTION

The city of Bandung is an urban area experiencing rapid development in tandem with increasing economic activity, tourism, and community mobility (Jayanti & Mukti, 2025). These dynamics have driven the intensified use of urban space, particularly public spaces, which serve as venues for social interaction and the daily activities of the community (Dwi et al., 2023). However, physical development is often not accompanied by optimal and responsive space management that addresses user needs, leading to a decline in environmental quality that directly impacts users' experiences of urban spaces.

In this context, the concept of responsive public space is crucial as a framework for understanding the quality of urban public spaces (Andaloro et al., 2022). A responsive public space is understood as a space designed and managed to support user comfort, engagement, and experience through the integration of physical design, supporting facilities, and adaptive space management (Sushanti et al., 2021). Responsive public spaces can enhance user engagement, create a sense of comfort, and foster positive and meaningful spatial experiences.

A number of studies indicate that the success of public spaces is greatly influenced by the quality of their supporting elements (Andaloro et al., 2022). Gehl emphasizes the importance of human activity and human scale in creating vibrant and comfortable public spaces (Gehl, 2011; Mushkani & Koseki, 2025). Whyte demonstrates that the success of public spaces is heavily influenced by the quality of supporting elements capable of fostering social activity and active use of the space (Ameijde et al., 2025; William H, 1980). Meanwhile, Mehta asserts that users' perceptions of comfort, accessibility, and visual quality are key indicators in assessing the success of public spaces (Ameijde et al., 2025; Mehta, 2014).

Theoretically, the quality of public space within the framework of responsive public space can be explained through the Responsive Environment approach proposed by Bentley (1985). This approach places the user experience at the center of the evaluation of spatial quality through seven indicators: permeability, variety, legibility, robustness, visual appropriateness, richness, and personalization (Bentley et al., 1985). These seven indicators emphasize that the quality of a space is not determined solely by the presence of physical elements, but by the extent to which the space is accessible, understandable, and flexible in its use, as well as its ability to provide a meaningful spatial experience for its users.

One form of public space that plays a strategic role in the urban fabric is the street corridor. Street corridors function as linear spaces that connect various areas while shaping spatial orientation, visual experiences, and the image of urban areas (Aulia et al., 2020; Sumartono, 2003). Therefore, the quality of street corridors directly influences how people interact with urban spaces in their daily activities, particularly for pedestrians (Ahmadin et al., 2025; Dirdaedrea et al., 2025).

The quality of a corridor as a public space is inextricably linked to its physical elements. Shirvani (1985) argues that urban design elements—including street furniture—play a crucial role in shaping the visual and functional quality of a space (Shirvani, 1985). In the context of street corridors, street furniture such as benches, streetlights, trash cans, signs, and information boards support pedestrian activity, enhance the legibility of the space, and create comfort and environmental quality. The quality of street furniture not only impacts the function of the space but also influences users' visual perception and experience of public spaces.

Although numerous studies have been conducted on street furniture and the quality of public spaces, most research still views street furniture as a separate physical or aesthetic element. Research that integrates the quality of street furniture with environmental quality

and public appreciation using the Responsive Environment framework, particularly in the context of historic street corridors in Indonesia, remains relatively limited. This limitation indicates a gap in the scientific understanding of the comprehensive relationship between the physical elements of the corridor and the user's experience of the space.

Therefore, this study aims to analyze the impact of street furniture quality on environmental quality and user comfort along the Asia-Africa Street Corridor in Bandung, using the Responsive Environment approach. The findings of this study can provide practical insights for the design and management of more responsive urban public spaces, while also enriching theoretical research on the relationship between physical elements, environmental quality, and user experience along this historic street corridor.

2. RESEARCH METHODS

This study employs a mixed-methods approach with a rational framework, combining theoretical conceptualization and literature review as the foundation for research, analysis, and drawing conclusions. This approach is used to assess the condition of street furniture and its relationship to environmental quality as well as public appreciation of urban street corridors (Creswell & Plano Clark, 2018; Lesan & Gjerde, 2021; Li et al., 2025; Putri et al., 2021; Shania Adilla Wildhalini et al., 2025).

The research was conducted in three phases: pre-field, field, and post-field. The pre-field phase involved the development of research instruments—a combination of observation guides and questionnaires—based on the theoretical framework and prior research on the quality of public spaces and streetscape elements (Li et al., 2025; Mehta, 2014). The field phase was carried out through direct observation of the study corridor, which was divided into several segments based on activity and spatial characteristics. Data on user perceptions was collected by distributing questionnaires to 147 respondents, selected using purposive sampling, as is commonly used in user-perception-based public space evaluation studies (Carmona, 2021). All collected respondents (100%) were used in the data analysis process. Based on respondent characteristics, participants consisted of 63.9% women and 36.1% men. The age range of respondents fell into the 10–17, 18–60, and >60 age groups, with the 18–60 age group being the most dominant. In terms of educational level, respondents were predominantly bachelor's degree holders, followed by high school/vocational school graduates. These characteristics reflect the profile of active users of the research corridor, which is relevant to the objective of evaluating the quality of public spaces (Ernawati et al., 2024; Lesan & Gjerde, 2020; Putri et al., 2021; Shania Adilla Wildhalini et al., 2025).

The post-fieldwork phase involves the processing and analysis of data from observations, visual documentation, and questionnaires. Field data is categorized into research variables that include the function and activities of the space, accessibility and safety, and environmental quality. Data was obtained through an inventory of street furniture, observations of its physical condition and usage, and visual documentation using cameras and Street View imagery. This approach aligns with methods for assessing streetscapes and urban furniture based on visual observation and spatial data (Askarizad & He, 2025; Lesan & Gjerde, 2021).

Data analysis was conducted by combining quantitative descriptive analysis and qualitative interpretation. Each corridor segment was evaluated based on the research variables, with numerical scores assigned to classify the quality of public spaces into quality categories ranging from low to high, as is common in similar studies. Scoring-based assessment methods are widely used in research on public space quality and street furniture

to obtain a comparative overview across segments (Ernawati et al., 2024; Li et al., 2025; Mehta, 2014; Shania Adilla Wildhalini et al., 2025).

The research instruments were developed based on the theoretical framework and relevant references. Variables are derived from theoretical concepts; indicators are the operationalization of variables based on theory; and parameters are the measurable values used in the assessment (Creswell & Plano Clark, 2018; Shania Adilla Wildhalini et al., 2025).

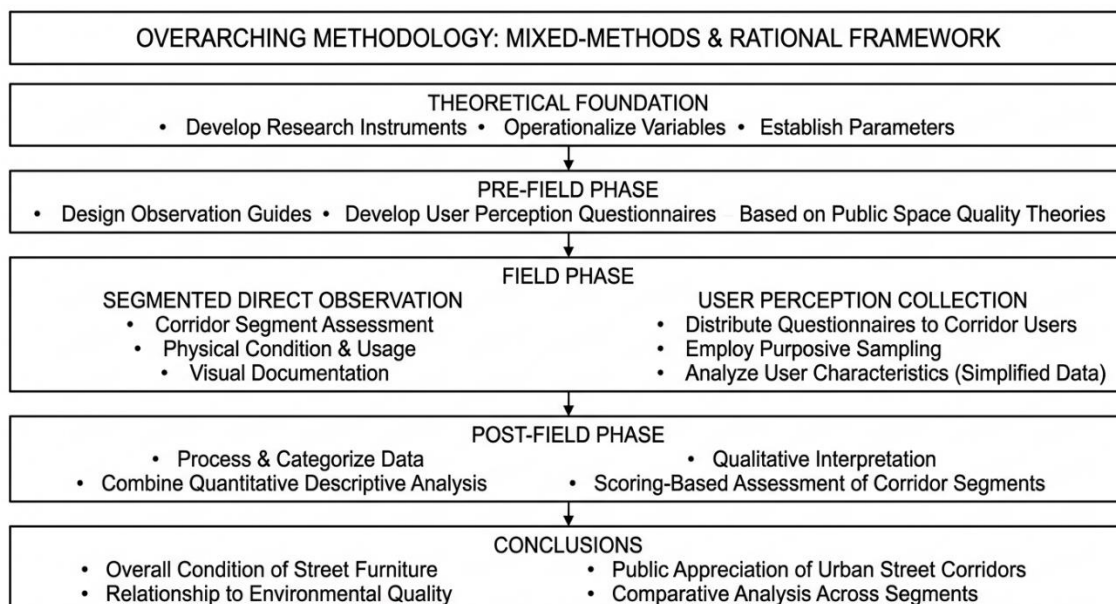


Figure 2.1 Research Methodology Framework
(Source: Author, 2026)

3. RESULTS AND DISCUSSION

3.1 Theoretical Framework

According to Bentley, he put forward the concept of the 'Responsive Environment', which places the user at the centre of the assessment of public space quality. The quality of a space is assessed using seven indicators that describe the space's ability to respond to the needs, perceptions and behaviour of its users. The following are the seven indicators according to (Bentley et al., 1985):

Permeability refers to the ease of access and variety of movement options within a space, enabling users to choose routes and activities flexibly. A high level of permeability contributes to increased intensity of public space use (Bentley et al., 1985; Jens & Gregg, 2021); variety indicates the diversity of functions and activities that a space can facilitate. Spaces with a high level of diversity tend to be used by a more diverse group of users and at different times (Bentley et al., 1985; Carmona, 2021; Gehl, 2011); legibility relates to the clarity of the space and the ease of user orientation. Clear and consistent physical elements help users understand the structure of the space, reduce confusion, and enhance a sense of safety whilst carrying out activities (Bentley et al., 1985; Lynch, 196 C.E.)

Robustness refers to a space's ability to accommodate a variety of activities within a single physical configuration. Flexible spaces allow for changes in use without requiring significant physical alterations (Bentley et al., 1985); visual appropriateness emphasises the alignment of a space's visual appearance with its function and environmental context. Visual appropriateness helps users intuitively recognize the function of a space and enhances the quality of perception of public spaces (Bentley et al., 1985); Richness describes the richness

of sensory experiences generated by a space through variations in materials, textures, visual details, and supporting elements. This richness of experience plays a role in shaping an impression of the space that is appealing and meaningful to users (Bentley et al., 1985); Personalization, relates to opportunities for users to express engagement and a sense of ownership towards the space. Spaces that allow for personalization foster emotional attachment and enhance users' appreciation of the public environment (Bentley et al., 1985).

These seven indicators confirm that the quality of public spaces is determined not only by the presence of physical elements, but by how those elements shape users' experiences and responses. (Shirvani, 1985) explains that the quality of urban spaces is shaped by eight interrelated design elements that influence the function and image of an area; these eight elements are as follows:

Land use, which determines the type and intensity of activities along the corridor, thereby influencing the level of activity and vitality of public spaces; building form and massing, which shape the scale and visual continuity of the corridor, thereby influencing users' perception of space and visual comfort; circulation and parking, which regulate the flow of vehicles and pedestrians, thereby having a direct impact on the safety and comfort of public space activities; open space, providing spaces for respite and social interaction that enrich the spatial experience, particularly in supporting non-mobility activities.

Pedestrian ways are a key element in street corridors as they determine the quality of pedestrian movement, including aspects of comfort, continuity and safety; signage serves as an element of information and spatial orientation that supports the legibility and clarity of the corridor's function; activity support encompasses elements that facilitate social and economic activities, thereby enhancing the vitality and intensity of public space use, and street furniture, which are elements that interact directly with users as they support activities such as sitting, waiting, stopping, and spatial orientation on a human scale (Carmona, 2021; Gehl, 2011; Shania Adilla Wildhalini et al., 2025; Shirvani, 1985; William H, 1980).

Street furniture acts as a link between the physical elements of urban design and the user experience, as described in the Bentley approach. The placement of street furniture influences permeability by regulating the flow of pedestrian movement, whilst the diversity of street furniture types and functions contributes to the variety of activities within the corridor (Carmona, 2021; Shania Adilla Wildhalini et al., 2025). The clear and consistent presence of street furniture supports the legibility of the space, whilst the flexibility of its use reflects the robustness of the public space. The design aspects and visual appropriateness of street furniture relate to visual suitability, whilst the quality of materials and design details enrich the richness of the spatial experience. Patterns of public use of street furniture also reflect the potential for personalisation within public spaces (Bentley et al., 1985; Carmona, 2021; Shania Adilla Wildhalini et al., 2025).

Public appreciation is understood as users' responses to the quality of public spaces as experienced first-hand, encompassing visual perception, comfort levels, and the experience of using the space (Carmona, 2021; Gruosso et al., 2025; Mehta, 2014; Shania Adilla Wildhalini et al., 2025). Within the framework of the Responsive Environment, public appreciation is the result of the interaction between the physical elements of a space and users' perceptions.

A number of studies have shown that the quality of street-supporting elements, particularly street furniture, influences users' perceptions of comfort, safety and satisfaction with public spaces. However, research that explicitly integrates Bentley's indicators and Shirvani's design elements to assess the relationship between the quality of street furniture and public appreciation along historic street corridors in Indonesia remains limited (Ameijde et al., 2025). Therefore, this study positions public appreciation as an evaluative indicator to assess the success of the Asia-Africa Road Corridor as a responsive public space.

3.2 Conditions at the Research Site

This study was conducted along the Asia-Africa Street Corridor, which is divided into three segments based on the nature of activities and the intensity of public space use:

Segment 1 (Alun-Alun Bandung): This segment has the highest visitor traffic for family recreation, so the need for a variety of street furniture functions is more prominent, as shown in Figure 2. Segment 2 (Merdeka Building): As a heritage icon, the design of street furniture here is crucial for visual appropriateness and the area's image, as shown in Figure 3. Segment 3 (Braga-Hotel Preanger): Places greater emphasis on circulation, where surface materials and the placement of streetlights are key factors in pedestrian comfort, as shown in Figure 4.



Figure 3.1 Segmentation of Asia Afrika Street Corridor, Bandung
(Source: Google Earth.com, 2025)



Figure 3.2 Corridor Reference Points within Segment 1 of Asia Afrika Street
(Source: Primary Survey, 2025)



Figure 3.3 Corridor Reference Points within Segment 3 of Asia Afrika Street
(Source: Primary Survey, 2025)



Figure 3.4 Corridor Reference Points within Segment 3 of Asia Afrika Street
(Source: Primary Survey, 2025)

3.3 Overview of Street Furniture

As noted in Permen PUPR No. 4/2023, Permen PUPR No. 5/2023, dan PSU (Permen PUPR No. 38/2015 revisi 2018), the street furniture observed includes: Benches/seating; Streetlights and decorative lighting; Planters and greenery; Trash cans; Traffic signs and information boards; Signage; Street name signs; Canopies; and Pedestrian seating. Street furniture serves as a supporting element of the street that enhances the comfort, safety, and aesthetics of urban spaces.

3.4 Regression Results Based on the Variable Relationship Diagram

The study examined the influence of design, materials, function and construction on comfort during activities among 147 respondents. The following table shows the coefficients of influence of each street furniture variable on environmental quality, as well as the influence of environmental quality on user comfort, as illustrated in the model diagram.

Table 1. Regression Results According to the Model Diagram: Design, Materials, Function and Construction in Relation to Environmental Quality

Relationship between Variables	Coefficient	Description
Design – Environmental Quality	0.366	A direct and significant effect
Materials – Environmental Quality	0.224	A direct and significant effect
Functions – Environmental Quality	0.278	A direct and significant effect
Construction – Environmental Quality	0.005	Indirect influence (a minor influence, but one that still makes a contribution)

(Source: Analysis Results, 2025)

Table 2. Regression Results Based on the Environmental Quality Model Diagram and Comfort

Environmental Quality - Comfort	0.366	A direct and significant effect

(Source: Analysis Results, 2025)

Tables 1 and 2 show that environmental quality acts as a crucial mediator between the physical elements of street furniture and user comfort. The Design variable has the highest coefficient of influence (0.366), followed by Function (0.278) and Material (0.224). This indicates that the aesthetic aspects of the layout are the primary factors that the public first appreciate.

Conversely, the construction variable has a very small direct effect (0.005), but still contributes indirectly to the sustainability of the function through the stability and safety of the elements. Overall, environmental quality has a very strong direct effect on comfort, with a coefficient of 0.623.

3.5 Interpretation of Regression Results

The design, function, and materials of street furniture have a direct impact on the environmental quality of the corridor; thus, these three variables are the primary determinants of users' perceptions of public space comfort. Construction, while having an indirect impact, is nonetheless crucial to the long-term functionality of these elements, particularly in terms of stability and safety. Environmental quality has the strongest influence on comfort, meaning that the quality of public space serves as the primary mediator between the physical condition of street furniture and the user experience.

3.6 Findings

Based on the results of the regression analysis, the following diagram was obtained, illustrating the relationships among the variables based on the regression analysis results. It shows that design, function, and materials have a direct effect on environmental quality, while construction has an indirect effect, and environmental quality has a direct impact on user comfort.

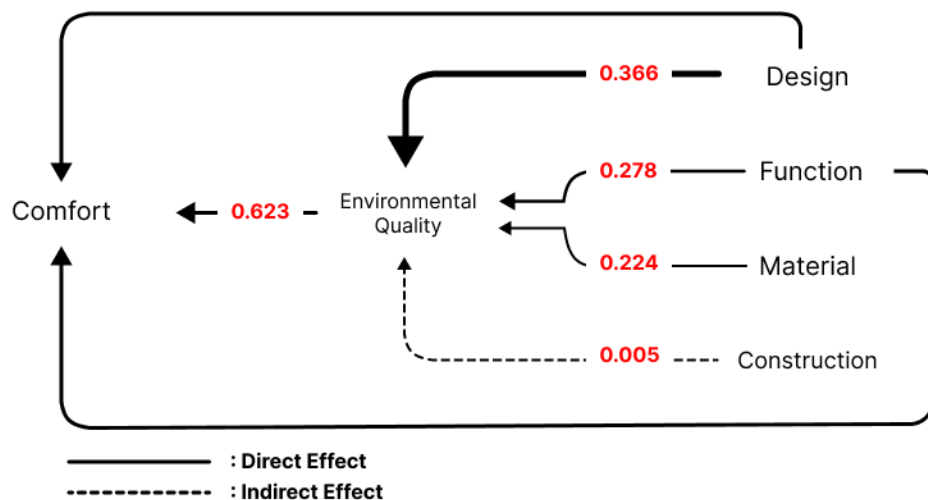


Figure 3.5 Relationship Model between Street Furniture Variables, Environmental Quality, and Comfort

(Source: Analysis Results, 2025)

Figure 5. Illustrates the model of relationships among variables in the study on the influence of street furniture quality on environmental quality and user comfort along the Asia-Africa Street Corridor in Bandung. This model was constructed based on the results of regression analysis and the perceptions of 147 respondents, as described in the study abstract.

1. The Role of Environmental Quality as a Mediator

Environmental quality serves as the primary mediating variable linking street furniture elements to user comfort. A coefficient value of 0.623 indicates that environmental quality has a strong and significant influence on comfort, meaning that users' perceptions of comfort in public spaces are shaped through their assessment of the overall environmental conditions.

2. The Influence of Design on Environmental Quality

Design aspects have the greatest direct influence on environmental quality, with a coefficient value of 0.366. This indicates that the visual quality, aesthetics, and suitability of street furniture design to the character of historic districts significantly determine perceptions of urban open space quality.

3. The Influence of Function and Materials on Environmental Quality

The variables of function and materials also have a direct influence on environmental quality, with coefficient values of 0.278 and 0.224, respectively. These findings indicate that the function of street furniture elements in supporting usage activities, as well as the selection of appropriate materials, contribute to improving environmental quality, although their influence is smaller compared to design.

4. Indirect influence of construction aspects

Unlike other variables, construction aspects have an indirect influence on environmental quality with a very small coefficient value of 0.005. This indicates that construction is not directly perceived by users but still plays a supporting role in maintaining the physical quality and sustainability of street furniture elements.

3.7 Discussion

In this section, the research findings are interpreted to explain the direct relationship between design, function and materials and quality of life, as well as the indirect influence of construction in shaping users' actual experiences along the Asia-Africa Corridor. Quantitative findings and the structure of the relationships between variables indicate that environmental quality acts as a key mediator between the physical condition of street furniture and the level of comfort experienced by the public. This interpretation yields a systematic understanding that the quality of public space is the integrative result of the performance of all supporting street elements working simultaneously.

1. Comfort as the Primary Outcome

Comfort emerges as an outcome variable directly influenced by the quality of the environment, which is shaped by the design, function and materials of street furniture in each segment of the corridor. This relationship indicates that the experience of comfort stems not only from the physical aspects of the elements, but also from the quality of the space created through the integration of visual appeal, functionality and maintenance standards. Consequently, improving the quality of the environment has been shown to have a direct impact on the intensity of space usage and public acceptance of public facilities.

2. Design as the Most Influential Factor in Shaping Environmental Quality

Design has the greatest direct influence on environmental quality, as aesthetic aspects, layout, proportions and the legibility of space are the first elements assessed by users when interacting with street furniture. Unresponsive design diminishes the perceived quality of the environment even if the function or materials are in good condition, so its role is highly dominant in creating visual order and spatial comfort. These findings indicate

that design quality is the primary foundation for creating a positive public space experience in heritage corridors such as Asia-Afrika.

3. A direct determinant of environmental quality

Functionality makes a direct contribution to environmental quality, as the effectiveness of street furniture depends on the extent to which such facilities meet users' needs. A mismatch in functionality or a lack of facilities reduces environmental quality, even if the design and materials are in good condition and visually appealing. Therefore, ensuring that functionality aligns with pedestrian activity patterns is one of the key factors in guaranteeing that public spaces provide comfort throughout the entire corridor.

4. Materials as a Factor Influencing Users' Physical Comfort

Materials have a direct impact on the quality of the environment, as users physically interact with the surfaces of street furniture, particularly seating areas, canopies and shade elements. Materials that become too hot, are slippery or deteriorate quickly reduce comfort and lower the perceived quality of the environment, even if the design or function has been well thought out. Conversely, materials that are safe, weather-resistant and easy to maintain enhance the perceived quality of public spaces and provide a sense of security for users.

5. Construction as an Indirect Influencing Factor

Construction does not have a direct impact on environmental quality, but it does make an indirect contribution through perceptions of stability, safety and the sustainability of street furniture maintenance. Unstable or damaged structural elements can undermine users' confidence in the safety of the facilities, even if their function and design are in good condition. Thus, construction acts as a long-term supporting factor that reinforces the reliability of street furniture elements along the corridor.

6. The Integration of Two Sets of Data: Comfort Shaped by Design, Materials and Construction Management

Research findings indicate that environmental quality acts as a key mediator linking design, function, materials and construction to user comfort in public spaces. Good environmental quality creates a more stable, aesthetic and functional spatial experience, thereby significantly enhancing user comfort levels. The reciprocal relationship between comfort and environmental quality suggests that improving one of these elements will reinforce positive perceptions of the public space as a whole.

4. CONCLUSION

Based on the analysis of respondents along the Asia-Africa Street Corridor in Bandung, this study found that the quality of street furniture has varying effects on environmental quality and public appreciation. Design aspects are the factor with the greatest influence on environmental quality, followed by function and materials, while construction does not show a significant direct influence but still contributes indirectly through the stability, safety, and sustainability of the elements. Environmental quality was found to act as the primary mediating variable linking the physical characteristics of street furniture to users' comfort levels and appreciation of public spaces.

The study's findings indicate that user comfort increases when environmental quality is enhanced through design integration responsive to the area's character, functions aligned with users' activity needs, the use of safe and environmentally resilient materials, and well-maintained construction. Along the Asia-Africa Street Corridor, the condition of street furniture in several segments still requires improvement, particularly regarding materials and construction maintenance to sustain environmental quality over the long term.

Based on these findings, this study recommends that area managers and the city government prioritize enhancing the design quality of street furniture to align with the historical character of the Asia-Africa Street Corridor, accompanied by optimizing the functions of supporting street elements according to user activity patterns. Additionally, the use of more durable, safe, and low-maintenance materials is necessary, along with a regular maintenance program to preserve construction quality and the sustainability of public facilities. Further research is recommended to examine the impact of street furniture on other aspects, such as area identity, social activities, and users' multisensory experiences, thereby yielding a more comprehensive understanding of the quality of public spaces within historic urban corridors.

ACKNOWLEDGEMENTS

The authors would like to express his deepest appreciation and gratitude to Mr Eggi Septianto, the supervisor, for the guidance, supervision and academic input provided throughout the preparation and conduct of this research. The support, critical discussions and scholarly insights he provided have greatly contributed to refining the conceptual framework, methodology and quality of this manuscript. The authors would like to express his deepest appreciation and gratitude to Mr Eggi Septianto, the supervisor, for the guidance, mentoring and academic input provided throughout the preparation and conduct of this research. The support, critical discussions and scholarly insights he provided have greatly contributed to refining the conceptual framework, methodology and quality of this manuscript.

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