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## **EVALUATING THE WALKABILITY OF OLD TOWN IN SIBU, SARAWAK, MALAYSIA, THROUGH THE ASSESSMENT OF PEDESTRIAN WALKWAY QUALITY**

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### **Abstract**

Walkability is essential for healthy, sustainable cities and resident well-being. This study evaluates pedestrian walkway quality in Sibul town. In total, on-site observations, satellite maps, and photos were used to analyse the connectivity, comfort, and safety of 21 streets. The results based on the scale of walkability developed in this study showed that Sibul's old town has an average score of walkability, which may deter the use of pedestrian walkways. The findings revealed that pedestrian walkways in old town Sibul have an intermediate level of comfort and safety, but their connectivity exceeds 82%. Safety concerns plagued 20% of these streets being walkable. Although most pedestrian walkways were wide and clean, the pavement quality, shading, and resting spots remained problematic. Sibul's old town has a 65% walkability rating from our scale of study. These findings can help urban planners enhance pedestrian walkways' connectivity, comfort, and safety to improve walkability.

**Keywords:** Pedestrian Walkway, Pedestrian Walkability, Pedestrian Walkway Comfort, Pedestrian Walkway Connectivity, Pedestrian Walkway Safety

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## **INTRODUCTION**

Walking is the primary means of transportation around the world. Lambert (2021) defines walkability as the “quality of walking situations” to determine the accessibility, safety, connectivity, comfort, and aesthetics of a city’s public walking infrastructure. Numerous researchers have examined walkability (Shamsuddin et al., 2012; Lo, 2009). Nevertheless, most of them were focused on observing the pedestrian rate. Hence, there is a demand for more stimulating research focused on evaluating the standard of pedestrian walkways. Walkways should be designed to be convenient, cost-effective, low-risk, and accessible to a broad demographic (as per Litman, 2018). Universally accessible pedestrian facilities and surrounding spaces exhibit attributes of continuity, connectivity, safety, and sustainability, aligning with the transportation-related interpretation of accessibility, as outlined by the Hong Kong Architectural Services Department in 2007. Good streets are safe from physical danger, where one is not likely to get hit by a car or a truck. Outstanding streets possess the attribute of providing physical comfort. Public roads are the most superior as they are universally accessible. They do not exclude anyone. These streets are also diverse and actively encourage the public to walk along the walkway.

Pedestrian pathways are critical for walkability. The existing state of information indicates that traveling by foot is more complicated and requires more planning than driving a car (Shay, 2003). Their research suggested that cities with automobiles overlook pedestrian pathways, displacing pedestrians from their designated zones (Barter, 2000). They may even vanish totally in other circumstances, with pedestrians barely integrating into transportation means (Grava, 2003; Southworth, 2005).

Sarawak, however, has not yet practised moving around with commuters, so getting from point A to point B would be slightly inconvenient for pedestrians, particularly in Kuching and Miri, if they are not using vehicular transportation. The point of one location to another is somewhat remote compared to the old town, Sibul, which is more conducive to pedestrian walkability due to its proximity and accessibility by a five-foot path connecting one shophouse to another. This is likely because Sibul has yet to have proper town planning. Global city centres across the globe now adopt sustainable urban transportation networks for resilient transformation and resilience (Adam, 2013).

## **LITERATURE REVIEW**

In recent years, there has been a significant surge in interest in research on pedestrian walkability. Individuals’ behaviours have a positive and negative effect on walkability. Pedestrians maximise a utility function that predicts the trade-off between the benefits of performing activities in a different location and the benefits of performing activities in the current location (Fisher et al., 2017).

They should exercise caution when developing their chosen route to ensure that the positive outcomes of a walkable city are attractive and straightforward and solve community problems.

The observable physical attributes of pedestrian walkability have been simplified to provide guidance in the design of pedestrian walkways and the implementation of measures to assess their walkability score. The collected data help to generate built environment attribute mapping. This made it easier to understand the attributes involved, and a framework was prepared using attribute mapping. Pedestrian walkability branches out into three main attributes, namely comfort, connectivity, and safety (Adam & Bakar, 2016; Keat et al., 2016; Nasrudin et al., 2018; Ruslan et al., 2023), then further branches to their respective sub-attributes.

The walkability of the study area has a direct impact on the well-being of individuals, making it a crucial factor in the creation of sustainable and pedestrian-friendly cities. The study primarily focused on environmental outcomes of sustainable transportation. Currently available literature has conclusively demonstrated the advantages of walking as a means of transportation in relation to urban development, economic viability, and social viability (Adam, 2013). It is therefore important to change how society views the importance of walking as a mode of transport.

The walkability evaluation involves three main attributes and twelve secondary attributes. The main attributes include pedestrian walkway comfort, connectivity, and safety. Each of these has specific sub-attributes. For comfort, there are six sub-attributes: width, flat and easy walking surface, shade, lack of disruptions, cleanliness, and the availability of seating (Frank, 2010; Speck, 2018; Zakaria & Ujang, 2015; Akmar et al., 2011; Southworth, 2005; Nasrudin et al., 2018; Litman, 2012; Miyakoda, 2004). The second attribute, pedestrian walkway connectivity, has four sub-attributes: length, permanent obstructions, temporary obstructions, and the existence of walkways (Saito et al., 2017; Litman, 2012; Miyakoda, 2004; Adam & Bakar, 2016; Keat et al., 2016). Lastly, the third attribute is pedestrian walkway safety, focusing on street lighting and zebra crossings (Hamsa et al., 2009; Nasrudin et al., 2023). The lack of shaded areas on sidewalks contributes to the overall dullness of the cityscape, and the proximity of automobiles can negatively impact the walkability experience (Keat et al., 2016).

## **RESEARCH METHODOLOGY**

Research suggests using a checklist for a qualitative analysis of pedestrian walkways, involving on-site observation, satellite maps, and images. The checklist, tailored to the study's context, required minimal validation testing due to the short study timeframe (less than one year). It served as a practical tool for

collecting primary data, aiding in the examination of specific pedestrian walkway characteristics in Sibul's old town. Researchers utilised the checklist as reference items for quality assessment and providing feedback.

The study focused on Sibul's old town precisely because of its limited urban planning, high pedestrian and vehicular density, especially during peak hours, making it the heart of Sibul. The research addressed public walking issues in Sibul, which necessitated active observation to understand its impact on pedestrians. The three research objectives were to determine comfort levels, assess connectivity and safety, and evaluate walkability in Sibul's old town. Table 1 provides a comprehensive overview of the 21 roads that were examined in the specified region.



**Figure 1:** Sibul old town 21 road names within study site coverage.

Source: <https://www.google.com/maps/place/Sibu,+>

In this study, two sets of criteria were used to quantify the degree to which each walkway is conducive to pedestrian traffic: Pedestrian Walkway Scoring Scale 1 and Pedestrian Walkway Scoring Scale 2. These scoring scales were used to measure the quality and level of pedestrian walkways in terms of effectiveness and convenience. Scale 1 of Table 1 illustrates the Pedestrian Walkway Scoring Scale 1, which was used to measure the scores for pedestrian walkability attributes upon using the checklist. It was used to identify some features (bad, acceptable, or sound), and it allowed for a more detailed description of the facilities offered to pedestrians in the remark section provided in the checklist. Scale 2 of Table 1 shows that Pedestrian Walkway Scoring Scale 2 was used to determine the overall Pedestrian Walkway Scoring Scale upon comparison with different pedestrian walkways, namely PW1 to PW21. These

two pedestrian walkways were chosen at random from the overall 21 roads in the study area of Sibú’s old town.

**Table 1:** The coding of the 21 road names in Sibú’s old town and the randomly selected pedestrian walkway (PW).

No.	Road Name	PW
1	Jalan Sanyan	PW-1
2	Jalan Morshidi Sidek	PW-2
3	Jalan Ramin	PW-3
4	Jalan Wong Nai Siong	PW-4
5	Jalan Central	PW-5
6	Lebuh Tanah Mas	PW-6
7	Jalan Chambers	PW-7
8	Jalan Mission	PW-8
9	Jalan Bengkel	PW-9
10	Jalan Lembangan	PW-10

No.	Road Name	PW
11	Jalan Tinggi	PW-11
12	Jalan Market	PW-12
13	Jalan Channel	PW-13
14	Jalan Lintang (Cross)	PW-14
15	Jalan Chew Geok Lin	PW-15
16	Jalan Temple	PW-16
17	Jalan Bank	PW-17
18	Jalan Wharf	PW-18
19	Jalan Power	PW-19
20	Jalan Pulau	PW-20
21	Jalan Tukang Besi	PW-21

*Source: Author*

**Table 2:** Pedestrian Walkway Scoring Scale

Scale 1	Scale 2
Used to measure diagram of attributes mapping	Used to measure pedestrian walkways comparative scoring chart

*Source: Author*

Pedestrian Walkways: PW4				Remarks: Jalan Wong Nai Siong
No.	Attributes	Walkability Score		
1.0	<b>Pedestrians Comfort:</b>			
1.1	The clear width must be at least 2m in order to accommodate two wheelchair users at the same time and must be entirely free of obstructions.	Unsuitable	Partially Suitable	Suitable
				✓
1.2	Pedestrian Walkway is relatively flat and easy to walk. (Steps with risers not exceeding 150 millimetres)	High Steps	Acceptable Steps	Flat
			✓	
1.3	There are trees/ shelters along walkway to provide shed	Non-Existence	Partially	Continuous
			✓	
1.4	Even PW without any disruptions	Disruptive Surfaces	Somewhat Acceptable	Continuous Material Use
			✓	
1.5	Cleanliness od PWs	PW is not Clean	PW is somewhat Clean	PW is Clear
		✓		
1.6	PWs seats (To rest)	Not Available	Somewhat Available	Well Provided
			✓	

Figure 2: Sample of pedestrian walkability checklist filled in.

Source: Author

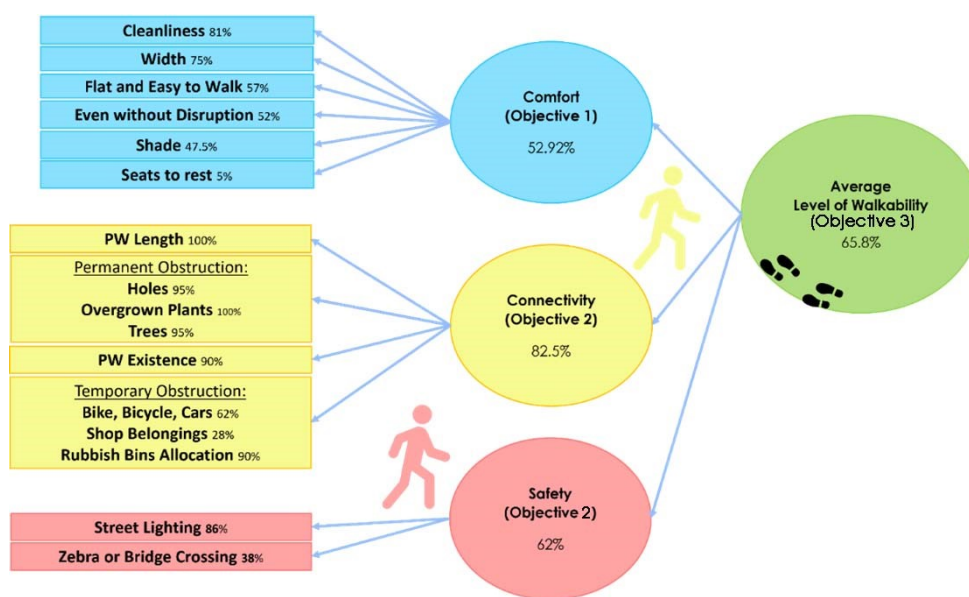
Table 2 displays the checklist that was included in the document observations and evaluations of the selected pedestrian walkways. The respective columns pertain to the “bad, acceptable, or good” aspects of the walkability scoring section. Any remarks would be noted and recorded through other means such as voice recording, digital images, sketches, and video recording.

## ANALYSIS AND DISCUSSION

The study thoroughly evaluates pedestrian walkways in Sibul’s old town, focusing on comfort and connectivity. The overall comfort level was reported at approximately 53%, with cleanliness being the most influential attribute, followed by width, flatness, ease of walking, shading, and seat availability. These findings underscored the importance of cleanliness and ample space in enhancing pedestrian comfort. In addition, the study investigated the level of connectivity, which yielded a rating of 82%. The scores considered attributes like walkway links, permanent obstructions, and temporary obstructions, which provided valuable insights into factors influencing both comfort and connectivity.

Safety scores slightly above average, with a 62% rating, attributed to street lighting and zebra crossings. Figure 3 indicates that improving connectivity, comfort, and safety could enhance the overall pedestrian walkway

quality, currently at 65%. Table 2 categorises pedestrian walkways as good, average, or bad, with Sibú’s old town achieving a favourable 69% rating, while only 9% indicate fewer desirable attributes. Specifically, PW-7 Jalan Chambers stands out with an 87.5% score, classifying it as a well-rated location. Detailed results for each pedestrian walkway are available in Table 3, focusing on individual ratings, and Table 4, provides attribute ratings based on the pedestrian walkability scoring scale.



**Figure 3:** Pedestrian walkability attributes mapping  
*Source: Author*

PW-10 Jalan Lembangan has the highest rate of poor scores compared to other pedestrian walkways. The bad scoring rates are due to width, flatness, ease of walking, seating availability, and shopping opportunities, which score 25%. With the width of the pedestrian walkway obviously sufficient to walk, it becomes narrower when the shops place their merchandise on the pedestrian pathway, thus blocking and interfering with the pedestrian walkway. As for the flatness of the walkway, it is inconsistent because some shops have upgraded the frontage of their shop to make them considerably higher while some of the original designs are still on a lower platform. Upon walking, pedestrians would have to go up and down the pedestrian walkway due to the inconsistency of the walkway. Lastly, PW-4 of Jalan Wong Nai Siong scores the highest percentage for the category of the average pedestrian walkways in Sibú’s old

town area. The pedestrian walkability score is rated at 56%, indicating a neutral or average performance across all attributes. This is classified and categorised under the average, referring to the Pedestrian Walkway Scoring Scale 2.

Tables display the percentage of walkability for each attribute. This data indicates that the attributes of overgrown plants and pedestrian walkway lengths have the highest scores among all other attributes, with a perfect score of 100% for both. No overgrown vegetation has been observed along the pedestrian walkways in the old town of Sibul. This is likely due to the diligent oversight of the Sibul Municipal Council, which ensures proper maintenance of these aspects across the town. Noticeably, certain buildings had vegetation that had grown excessively. In addition, the pedestrian walkway length does not exceed 100m, which limits access to other areas within walking distance. Sibul's old town was specifically designed to be pedestrian-friendly and encourage safe crossing. Places are in close proximity to each other, making them easily accessible by foot. In addition, the attributes of seats and rest receive the lowest scores. This is clearly due to a lack of public seating available in the studied areas. Presumably, this is intended to motivate pedestrians to continue walking and exploring Sibul old town. Based on these findings, we can readily identify the attributes that received the highest scores in this study area, which can serve as a benchmark, as well as the attributes that performed poorly and require improvement.

This study helps us learn more about how the built environment affects pedestrians' actions while walking. The literature reviews allow for the recording of opinions in an unbiased way. This study investigated both the qualitative and quantitative aspects of the design features and physical attributes of the area. The findings indicated that the interventions aimed at altering people's walking habits yielded positive results. Both the visual survey and the walkability checklist prioritised the objective evaluation of the physical characteristics that impact pedestrians' experiences along the PW. Based on this checklist analysis, it is clear that a high-quality PW requires the presence of a number of elements and attributes in order to establish a good score. The varied characteristics require design choices at various spatial dimensions, and they should all be taken into account by those working to make cities safer and more pleasant for pedestrians. The quality of the existing pedestrian walkways was scored 65.8% in average level of walkability, which is within the average scale for having a walkable walkway. The findings demonstrated the extent of the walkability of the existing pedestrian walkways in Sibul's old town b. The pedestrian walkway's comfort and safety scorings were 52.92% and 62%, respectively, which can be categorised as average in the pedestrian walkability scoring scale. The score for pedestrian walkway connectivity was 82.5%, which scored the highest among all 3 attributes. It was categorised as having good pedestrian walkway connectivity.







## CONCLUSION

This research offers valuable knowledge about how the built environment influences the behaviour of pedestrians while they walk. Both the visual examination and the walkability assessment focus on objectively evaluating the physical aspects that affect pedestrians' experiences along the pedestrian walkway (PW). According to the checklist analysis, it is evident that a high-quality PW necessitates the inclusion of certain features and attributes to achieve a favourable score. The diverse characteristics necessitate design decisions across various spatial dimensions, and all of these factors should be considered by those working to create safer and more enjoyable urban environments for pedestrians. The overall quality of the existing pedestrian pathways achieved an average walkability score of 65.8%, falling within the typical range for a walkable walkway. These findings revealed the extent of walkability in the Sibu old town. Specifically, the comfort and safety of pedestrian pathways scored of 52.92% and 62%, respectively, classifying them as average according to the pedestrian walkability scale. In contrast, pedestrian walkway connectivity received the highest score of 82.5%, placing it in the category of excellent pedestrian walkway connectivity within the scoring scale.

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