

The Impact of Streetscape Morphology On Place Attachment: With Reference Commercial Streets in Colombo City

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Abstract

This paper examines the intricate link between urban streetscapes and people's attachment to a place, with a particular emphasis on selected streets in Sri Lanka. People use the streets as a part of their daily lives, and a country's road network directly affects the level of development and productivity of its population. Sri Lanka's street system is under development but is linked to community and social interactions and has a core of trust built with them. The study explores the significance of streetscape morphology in shaping human interactions and attachment to urban spaces. Through a blend of qualitative and quantitative methods, and adopting place attachment and enclosure theories, the research sheds light on the nuanced relationship between street design and place attachment, particularly within the selected context, Colombo-Sri Lanka. By comparing the data of five selected samples on the street section from Bambalapitiya to Kollupitiya, the study compares the morphological influence of the behaviour on the cultural and community elements of these places and the people there. Further, the study investigates public perceptions and preferences by examining factors including sidewalk width, building characteristics, and tree arrangement, and the final outcome highlights the need for streetscapes that prioritise pedestrian comfort, safety, and sociability and have important implications for urban planning and design. Altogether, the study contributes to advancing the understanding of how streetscapes promote thriving, diverse urban communities and provides recommendations on future advancements in feasible urban design.

Keywords: Urban Streetscape, Streetscape Morphology, Place Attachment, Community, Colombo-Sri Lanka

1. Introduction

Human use of cities has taken on a new meaning. There was more focus on public spaces, which are the created area of social interaction and comprise the source of communication between people (Aelbrecht & Stevens, 2021) and their definitions of public life. Public places offer personal benefits to the populace, facilitating movement and interaction and fostering social engagement within society (Torun et al., 2020). Streets, parks, and squares are a variety of public spaces, and the street is one of the most widely used public spaces in the world today. The streetscape is also considered a very important factor in architecture and urban design as well, as it affects the whole

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society and has an enormous impact on humans' quality of life. It can change people's behaviour and the way they interact in society and the public realm (Aelbrecht & Stevens, 2021). According to Fernando (2016), urban streets in cultural contexts such as Sri Lanka, are vibrant public and social spaces. Public life generates a significant ambience in the environment of such urban streets. But it may change from one place to another when considering the morphological characteristics of a street. And those characters contribute to giving cities a new perspective and new behaviour. The interrelationships that people have built up with these urban ecosystems have enabled them to maintain social activities. This spatial binding process varies with the physical characteristics of the spatial level of an individual or group. And that behavior is considered a psychological process (Ujang, 2012).

In this point, the research aims on studying the morphology of urban streetscapes, including their physical layout, patterns, and landscape elements, and provides an analysis of their spatial relationships between people and the levels of ability or inability to make an impact on the sense of place attachment of the people. This research aims to benefit professionals and individuals dedicated to improving communities and urban areas by promoting more functional and user-centric designs in the near future.

1.1. Need of study

Numerous research studies have focused on streetscapes that influence sense of place and human satisfaction, but these studies have primarily been conducted in European countries. Only a few have addressed the physical attributes of urban streets in Sri Lanka. By determining street morphological parameters that are prevalent in Sri Lankan commercial streets and emphasising their importance in fostering place attachment, the research seeks to fill those gaps.

1.2. Research question and objectives

To answer the research question, "How does streetscape morphology impact the place attachment of the user?" the following main research objectives have been formed:

01. To identify the current best practices/principles for urban streetscapes.
02. Establish to what extent these principles reflect the public's preferences and expectations to make a socially active, sensitive place and a vibrant street.
03. To study the psychological and physical impact of street morphology and human behaviour to place attachment.

2. Review of literature

In order to achieve the first two objectives, an in-depth literature review and a theoretical framework are presented in the study.

2.1. Street as a public space

Public spaces are vital to the physical and social structure of cities, described by Winston Churchill as the "big spaces between the great structures" (Magdi, 2014). These spaces, including streets and squares, offer significant benefits like conservation, leisure, and mental health, and their effectiveness depends on the integration of diverse activities (Lynch, 1980; as cited in Fouad, 2019). Streets play a crucial role in enhancing the appeal of public spaces by facilitating social interactions and economic activity. Vibrant, busy streets contribute to a sense of safety and community, making them essential to urban life (Jacobs, 1961; as cited in Fouad, 2019).

2.2. Street morphology and its impact on user

The streetscape significantly impacts individuals and their quality of life, making it a vital topic in urban design and architecture, as it shapes how people interact and behave in public spaces (Mohamed & El Khateeb, 2016). According to Carmona (2010), streetscape morphology, encompassing elements like sidewalks, buildings, and green areas, enhances both the aesthetic and functional qualities of urban streets. Key traits such as visibility, sequences, communication, and surfaces are essential for creating successful public spaces that are memorable, recognisable, and foster a sense of belonging and identity (Magdi, 2014).

2.3. Place attachment and formation of space as a functional environment

People experience and interact with space based on their perception of their surroundings, with their actions influenced by the environment (Rapoport, 1970). In urban settings, space serves different purposes for various societal groups, and its quality can be assessed by how well it meets the needs of its users (Kaika, 2004). The identity of a place is shaped not only by its physical features but also by the meanings and relationships that people form with it, influenced by cultural traits, perceptions, and functional demands (Ujang, 2012). These relationships lead to place attachment, where spaces become meaningful locations through the bonds people form with them, reflecting their experiences and aspirations (Tuan, 1977).

2.4. Theoretical approach

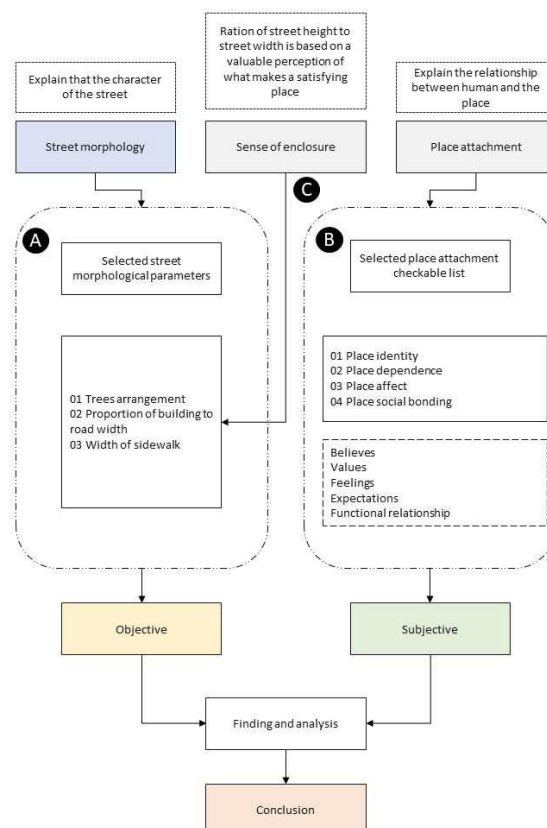


Fig. 1: Theoretical framework
Source: Author

The research involves a two-step process that is developed with a theoretical framework as shown in Figure 1. First, it identifies and measures street morphology through direct observations, focussing on how these elements enhance social engagement and connectivity. Part **A** shows the morphological parameters that can be measured in the road system of Sri Lanka, identified by direct observation during the site visit. Second, in part **B**, it explores how place ties affect satisfaction with the physical environment, using a checklist of place attachment indicators relevant to Sri Lanka. According to the study, both direct and indirect effects of street morphology contribute to place attachment, particularly through interactions between shopkeepers and road users. Also, frequent use of an area strengthens emotional connections, leading to greater attachment. These findings provide insights for urban planning to enhance community engagement and satisfaction.

2.4.1. Place attachment theory

The emotional connection people have with particular places is known as place attachment, and it involves both social and physical aspects that are influenced by individual characteristics such as personality, beliefs, attitudes, and memories (Zaidin et al., 2015). Sub-theories include place identification, affect, social bonding, and reliance, all of which contribute to the explanation of this attachment and provide a thorough understanding of how people interact with their surroundings. Design and planning techniques for better human-environment interactions are enhanced by integrating these sub-theories (Wahyudie et al., 2021).

2.4.2. Sense of enclosure theory

The significance of the street height-to-width ratio in providing users with a comfortable urban environment is covered in Part C, in Figure 1. A "feeling of enclosure," which is predicated on knowing what constitutes a beautiful place, is enhanced by this ratio. This feeling of enclosure improves security, offers semi-private space akin to an outdoor living room, and provides cover from the weather. By comparing the ratio of building height to road width, as shown in Figure 2, the spatial scale is another indication that can assess the feeling of enclosure. According to the sense enclosure hypothesis, a particular scale between 2:1 and 1:1 is preferable in urban planning for sidewalks (Tiesdell & Carmona, 2007).

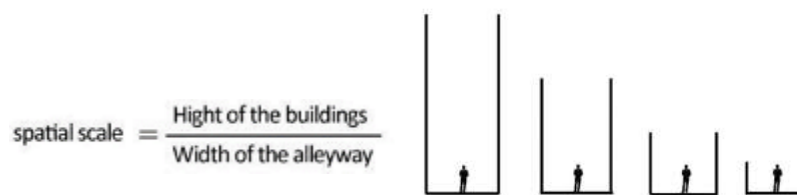


Fig. 2: Spatial scale: Relationship between spatial scale and space
Source: Author

3. Research methodology

3.1. Site selection

The major roadway in Colombo, from Bambalapitiya to Kollupitiya, serves as the background for this study. According to the Colombo Structure Plan, Colombo Galle Road serves as a venue for a variety of social and recreational events, encourages the preservation of nature and biodiversity along the coast, improves the aesthetic environment, and supports the city's economic growth. The selected study area is about 2 km in total, as shown in below Figure 3. This study utilised the "random sampling" approach, a non-probabilistic sampling technique. Due to the changing street pedestrian traffic and morphological factors according to the time and place, that method is appropriate for this investigation. As a result, randomness is used to choose the samples. In the

chosen case studies and at the chosen distance, this study explores the place attachment of the users/pedestrians.



Fig. 3: Case study area: Site location in Bambalapitiya to Kollupitiya road
Source: Google earth maps edited by author

3.2. Methodology framework

In below Figure 4, the methodological framework explains the process in relative phases of the study; it broadly discusses what methods are used in each phase and expected outcomes of the study.

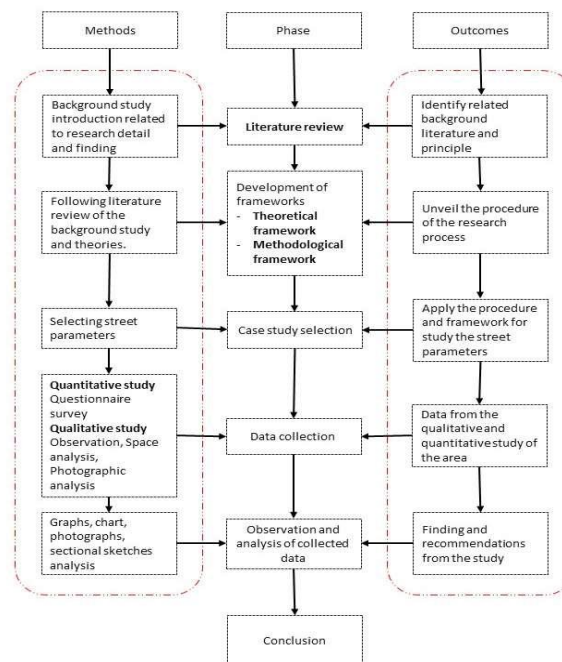


Fig. 4: Methodological framework
Source: Author

3.2.1. Data collection and methods of analysis

The theoretical framework encompasses both objective and subjective data. Consequently, the research utilises a variety of data collection methods and tools. The study makes use of a number of techniques to examine urban street spaces, including activity maps, canyon effect analysis, photography analysis through observations, and semi-structured interviews. Activity maps look at gathering places and human behaviour to help choose case studies. Based on the research of Tiesdell & Carmona (2007), canyon effect analysis examines the height-to-width ratio of streets to ascertain the feeling of spatial enclosure, with distinct ratios denoting varying degrees of containment. While semi-structured interviews and surveys evaluate social ties, place attachment, and satisfaction with street morphology, photographic analysis records physical

attributes and activities. The surveys use a Likert scale with responses ranging from "strongly disagree" to "strongly agree" and a spectrum scale with '-2, -1, 0, 1, 2', respectively, to measure commercial street satisfaction, user satisfaction, and social bonding. The scale method is based on prior research, and this makes it possible to assess opinions, attitudes, and levels of satisfaction, giving us insights into the qualities that people in these urban settings encounter.

4. Case study, data analysis, and findings

Colombo-Galle Road appears to be treated as a major urban roadway divided by a few significant nodes or crossroads made by arterial roads in recent redevelopment ideas. From Bambalapitiya to Kollupitiya, the numerous suggested land uses emphasise these nodal distinctions even further. Systematic observations as well as daily experiences indicate that there are more sub-units in the street; however, they are of a different caliber. The types of activities, the people who engage in these activities, and the qualities they produce instead serve as markers for these sub-units rather than the types of land use or the physical fabric (such as the type and scale of the structures). Among the existing morphological data, more than 20 samples were selected randomly. Due to the limitations of the study, five sample locations with clear morphological parameters were selected for analysis, as shown in Figure 5. The interviews were carried out by gathering opinions from 88 user samples randomly, including pedestrians/users, and considering all socioeconomic factors, including age category, gender, user category, route specifics, and data of living place.

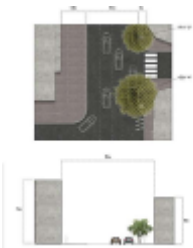
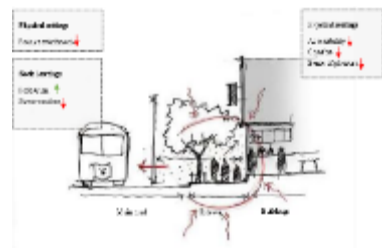
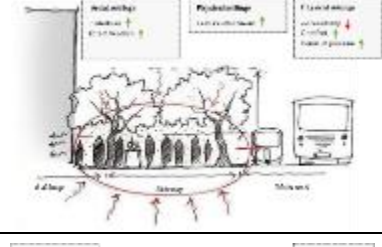
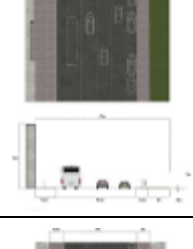
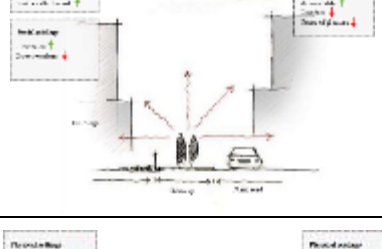
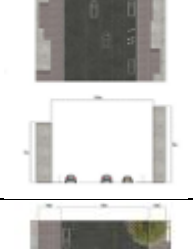
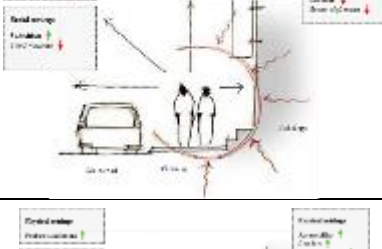


Fig. 5: Case study samples: From Bambalapitiya to Kollupitiya
Source: Google Earth Maps edited by author

The data from 88 individuals visiting Bambalapitiya to Kollupitiya street via Galle Road shows varied usage patterns. A significant number of people use the street monthly and occasionally, while a moderate number use it 2-3 times a week. Nearly all respondents utilize this urban street network without hesitation. The streets and sidewalks cater to diverse user categories, mostly with shoppers, leisure seekers, and daily commuters. A lesser number of respondents are working in the neighbourhood, and some are residents. Altogether, the findings highlight the varied demands and frequent usage of these urban spaces.

As per the observations and space analysis of the selected case studies elaborated in Table 1, it reveals that tree-covered sidewalks create an enclosed and shaded environment, significantly increasing pedestrian activity and vendor engagement and fostering a strong sense of place attachment (Samples A, B, and E). In contrast, sidewalks adjacent to high-rise buildings with open-air designs, while visually open and versatile, often lack the comfort provided by shaded areas, leading to reduced pedestrian use (samples C and D). Overall, the integration of trees and adequate shading in pedestrian areas is crucial for promoting active use and enhancing user satisfaction in urban streetscapes.

Table 13: Case sample study through observations and space analysis

Sample Study	Site Layout and Section	Site Photographs	Space Analysis for Street Characteristics and User Perception
Sample A			
Sample B			
Sample C			
Sample D			
Sample E			

4.1. Spatial scale analysis and findings of selected samples

According to Table 2, building height-to-street width ratios between 1:1 and 1:3 typically result in streets with a strong sense of enclosure. A ratio of 1:1 may be used to create a more personal street character. A ratio of 1:4 to 1:5 will make squares and courtyards seem enclosed. According to the above analytic data, samples B and E have a good enclosure effect. It leads to positional attachment.

Table 2: Spatial scale analysis

Samples	Ratio	Discussion
A	0.63	The general height of the lane is 12.5 m, and the width is 20 m. According to the above- mentioned measurements, identified the spatial scale is 0.63:1 in sample A.
B	1.14	The general height of the lane is 25 m, and the width is 22 m. According to the above- mentioned measurements, identified the spatial scale is 1.14:1 in sample B.
C	0.41	The general height of the lane is 11 m, and the width is 27m. According to the above- mentioned measurements, identified the spatial scale is 0.41:1 in sample C.
D	0.94	The general height of the lane is 25 m, and the width is 26.5 m. According to the above- mentioned measurements, identified the spatial scale is 0.94:1 in sample D.
E	1.04	The general height of the lane is 25 m, and the width is 24 m. According to the above- mentioned measurements, identified the spatial scale is 1.04:1 in sample E.

4.2. User satisfaction on character of the space

Gathered data through interviews by using the Linkert scale numeration mentioned in the research methodology section, the final distribution of data relation to user satisfaction covering A, B, C, D, and E samples overall is shown in below Table 3.

Table 3: User satisfaction on character of the space

Character of the space	Factor	Number of users	
		Satisfied	Not Satisfied
Tree arrangement	Do you feel safe when you go under the trees in the pedestrian walkways?	50	38
	Do you think you are comfortable with shade in the environment?	48	40
	Do your senses feel pleasure when you use pedestrian walkways full of trees?	36	52
Building height to width	Do you feel safe when you go under the high-rise building near the pedestrian walkway?	26	62
	Do you think you are comfortable with the shade of the buildings in the environment?	48	40
	Are you satisfied with the building ground floor opening?	38	50
width of the sidewalk	Do you feel safe when you walk on width sidewalk?	50	38
	Do you think you are comfortable with width sidewalk?	66	22
	Do your senses feel pleasure when you use width sidewalks relative to other?	50	38

The study reveals mixed satisfaction among 88 respondents regarding pedestrian walkways. While many appreciated the shade from trees and the width of sidewalks, there were concerns about safety, particularly under tree canopies and near high-rise buildings. A significant number of respondents felt unsafe due to these factors, and dissatisfaction was also noted with the lack of interactive ground-floor spaces. Overall, the findings highlight a general preference for shaded, wide walkways but also point to the need for improvements in tree density, building safety, and design of ground floor spaces to enhance walkability and public satisfaction in a standard manner.

4.3. User preferences on the character of the space

The data collected through interviews is analysed in the order of sample ABCDE. According to that, the distribution of data is shown in below Figure 6.

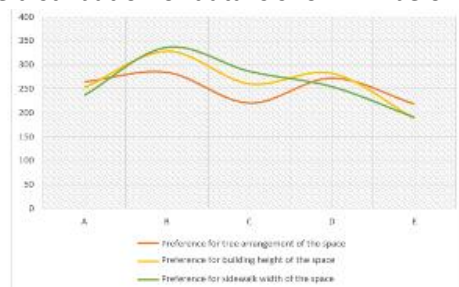


Fig. 6: User preferences: Selected Street parameters data distribution
Source: Author

The study reveals that respondents strongly preferred space B for its tree arrangement, building height, and sidewalk width, which contributed to higher comfort and attachment. In contrast, space E, with its narrower pedestrian ways and less open space, received the lowest preference. Overall, the case studies were ranked in the order of Sample B, D, C, A, and E. Therefore, as a conclusion, it appears from this study that the attraction of users is well directed to well-spaced roads with a good tree arrangement and medium-sized buildings in enhancing the appeal, functionality, and emotional connection to urban spaces, making them more livable and attractive to users.

5. Conclusion

In conclusion, the concept of place attachment has been extensively explored in design and landscape architecture over the past five years. This research highlights the significance of place attachment across various disciplines, emphasising the emotional and cognitive connections individuals develop with their environments. Although place attachment is inherently qualitative, efforts to quantify and generalise it through measurable assessments and statistical models have gained traction. The study commences by examining the impact of street morphological parameters on place attachment, categorising these factors from general to specific likability elements. The literature indicates that sociological aspects, such as appreciation, identity, and purpose of a place, significantly contribute to an individual's or group's attachment. Notably, interviews and observations reveal that these reasons are often linked to specific landscape characteristics. For instance, an individual's attachment to a street may stem from the arrangement of trees and the width of sidewalks, suggesting that landscape features play a crucial role in shaping place attachment. The findings indicate that users are particularly drawn to well-arranged greenery, moderate building heights, and wider sidewalks, all of which enhance the overall appeal of urban spaces. This research advocates for a greater focus on the designing and planning of streetscapes by identifying the importance of street morphological parameters in fostering place attachment. By recognising the psychological, social, economic, and environmental benefits of well-designed streets, we can create more meaningful and sustainable urban environments for future generations.

Recommendations through findings

- Considerable space should be provided between the pedestrian ways and the high-rise building entrance, which will facilitate the vision of the sidewalk users as well as the user comfort.
- Trees and plants should not be just planted unnecessarily to provide shade or for aesthetic appearance. It has to be done according to a standard way, addressing the user's comfort and safety under regulations.
- When creating a sidewalk on a major commercial, consideration should be given to the use of road surfaces that suit human needs, not just walking.
- Considering the significant attention to the morphology parameters of the road without being limited to the basic needs of vehicles and people can create a more effective road system.

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