URBAN STREETSCAPE IN SHAPING A HIGH-QUALITY PEDESTRIAN ENVIRONMENT FOR A LIVEABLE CITY COMMUNITY IN DHAKA, BANGLADESH

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by

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LIST OF ABBREVIATIONS

BNBC	Bangladesh National Building Code
BRTA	Bangladesh Road Transport Authority
CS	Case Study
CS1	Case Study 1
CS2	Case Study 2
DCC	Dhaka City Corporation
DTCA	Dhaka Transport Coordination Authority
DUTP	Dhaka Urban Transport Project
EIU	Economic Intelligence Unit
RAJUK	Rajdhani Unnayan Kartripakka
JICA	Japan International Corporation Agency
MRT	Mass Rapid Transit
TOD	Transit Oriented Development
UNDP	United Nations Development Programme
UAP	Urban Area Plan
UDD	Urban Development Directorate

LIST OF APPENDICES

LANDSKAP JALAN BANDARAN DALAM PEMBENTUKAN PERSEKITARAN PEJALAN KAKI BERKUALITI TINGGI BAGI KOMUNITI BANDAR BERDAYAHUNI DI DHAKA, BANGLADESH

ABSTRAK

Persekitaran pejalan kaki di Dhaka sangat mencabar, dengan laluan pejalan kaki yang sempit dan terhalang, persimpangan jalan yang tidak selamat, serta infrastruktur yang lemah. Pencerobohan oleh peniaga, kenderaan yang diletakkan, dan serpihan pembinaan sering memaksa pejalan kaki ke jalan, meningkatkan risiko kemalangan. Walaupun terdapat usaha untuk memperbaiki laluan kaki dan mengosongkan pencerobohan, infrastruktur pejalan kaki di bandar ini masih memerlukan peningkatan ketara untuk keselamatan dan aksesibiliti. Kajian ini bertujuan untuk mempromosikan aktiviti jalanan yang responsif kepada pejalan kaki sebagai pendekatan berkesan untuk meningkatkan landskap jalan bandar berkualiti tinggi yang menyumbang kepada kelestarian komuniti bandar seperti Dhaka. Oleh itu, objektif kajian ini adalah untuk menganalisis bagaimana ciri ruang dan faktor fizikal mempengaruhi aktiviti harian orang di Dhaka. Selain itu, kajian ini juga menawarkan kerangka cadangan untuk penambahbaikan dalam membentuk persekitaran pejalan kaki yang lebih baik, menjadikan bandar ini lebih mesra untuk pejalan kaki. Kajian ini menggunakan pendekatan kajian kes untuk menilai keadaan semasa landskap jalan di Dhaka dengan memberi tumpuan kepada dua kawasan sibuk: Jalan Mirpur (Dhanmondi 27 hingga New Market) dan Jalan Motijheel (Topkhana hingga Toyenbee Road). Lokasi ini dipilih untuk mewakili interaksi dunia nyata antara orang ramai dan kualiti ruang jalan bandar di Dhaka. Kajian ini menggunakan analisis sintaktik, tinjauan, dan pemerhatian fizikal untuk menangani persoalan kajian, menggunakan

Depth Map untuk analisis data ruang dan SPSS untuk mendapatkan pandangan persepsi pengguna, serta pemerhatian lapangan untuk menilai aspek fungsi landskap jalan. Kajian ini mendapati bahawa ruang awam bandar mesti mengutamakan landskap jalan, khususnya dalam reka bentuk laluan yang menyokong aktiviti jalanan. Ia mengesahkan ciri unik landskap jalan yang mesra pejalan kaki yang merangsang interaksi awam yang dinamik dan mengukuhkan peranan pelbagai fungsi jalan di bandar-bandar Asia. Penemuan ini menambah bukti yang semakin berkembang tentang kepentingan landskap jalan yang boleh diakses dalam membentuk pengalaman bandar, sambil menekankan hubungan kukuh antara persekitaran fizikal dan persepsi pengguna. Faktor-faktor ini mempengaruhi kualiti landskap jalan dan menyumbang kepada identiti Dhaka sebagai bandar yang mesra pejalan kaki. Berdasarkan penyelidikan ini, cadangan disediakan untuk menyelaraskan reka bentuk fizikal dengan keperluan pengguna, meningkatkan kelestarian, dan menyeru penambahbaikan infrastruktur untuk mencipta persekitaran pejalan kaki yang lebih inklusif.

URBAN STREETSCAPE IN SHAPING A HIGH-QUALITY PEDESTRIAN ENVIRONMENT FOR A LIVEABLE CITY COMMUNITY IN DHAKA, BANGLADESH

ABSTRACT

The pedestrian environment in Dhaka is highly challenging, with narrow, obstructed sidewalks, unsafe crossings, and poor infrastructure. Encroachments by vendors, parked vehicles, and construction debris often force pedestrians onto the streets, increasing accident risks. Despite efforts to improve footpaths and clear encroachments, the city's pedestrian infrastructure still needs significant improvements for safety and accessibility. This study aims to promote pedestrian-responsive street activities as an effective approach to enhancing a high-quality urban streetscape that contributes to the liveability of city communities like Dhaka. Hence, the objective of this study is to analyse how spatial characteristics and physical factors affect people's daily activities in Dhaka. Additionally, it offers to create a framework for recommending improvements to shape a better pedestrian environment, making the city more liveable for walkers. This study adopts a case study approach to assess the current state of Dhaka's streetscape by focusing on two busy areas: Mirpur Road (Dhanmondi 27 to New Market) and Motijheel Road (Topkhana to Toyenbee Road). These locations were selected to represent real-life interactions between people and the quality of urban street spaces in Dhaka. The study employs syntactic analysis, surveys, and physical observations to address the research questions, using Depth Map for spatial data analysis and SPSS for user perception insights, alongside field observations to assess the functional aspects of the streetscape. This study reveals that urban public spaces must prioritize streetscapes, particularly in the design of

thoroughfares that support street activities. It validates the unique characteristics of pedestrian-friendly streetscapes that foster vibrant public interactions and reaffirms the multifunctional role of streets in Asian cities. The findings add to growing evidence of the significance of accessible streetscapes in shaping urban experiences, highlighting the strong link between the physical environment and user perceptions. These factors influence streetscape quality and contribute to Dhaka's identity as a pedestrian-oriented city. Based on the research, recommendations are provided to align physical design with user needs, improving liveability and calling for further infrastructure enhancements to create a more inclusive pedestrian environment.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This study examines street activities and social interactions influenced by traffic and pedestrian movement, highlighting their potential as effective strategies for streetscape development in pedestrian environments. The goal is to enhance urban liveability and foster resilience within city communities like Dhaka. This approach aims to bridge the gap between current practices and the realities of Dhaka's urban context.

The purpose of this Chapter is to present an overview of the general components of this research. This begins by giving brief background information about the streetscape of Dhaka city. It is followed by the problem statement and the research gap for conducting the study. The research questions, aims and objectives, and techniques utilised to address the research issues are then presented in the chapter along with the research framework developed specifically for this study. The research's scope and limitations are discussed after that. Finally, the structure of the following chapters is laid out in the last section of this chapter.

1.2 Background of the study

Dhaka is one of the world's megacities that is expanding the fastest, with an anticipated 17.6 million people living in its 1528 square kilometre area and about 26 million by 2035 (RAJUK, 2016; The World Bank, 2022; UN-Habitat, 2022) and see Table 1.1. In the last few decades, Dhaka City has grown at its fastest rate ever—both physically and population-wise—becoming a megacity. 37% of the nation's urban population lives in Dhaka alone, following the traditional pattern of a primate city,

where the population of the largest city is more than the sum of the populations of the next three largest cities—Chittagong, Khulna, and Rajshahi (Khan. et al., 2018). Though everyday traffic congestion occurs due to the city's rapid population growth, motor vehicle traffic volume is still relatively high compared to other significant urban regions in Asia (Asian Development Bank, 2017). This puts unnecessary strain on the transportation system. Approximately 7,000 km (200 km principal road, 110 km secondary road, 50 km feeder road, and 2,640 km narrow road) make up Dhaka's road network, which accounts for 7% of the city's total built-up area (NOOR-E-ALAM, 2018). There aren't many alternate connection roads. The city is infamous for 'its chaotic traffic and traffic jams,' and numerous strategically important linkages are missing from the road network in addition to several locations having insufficient accessibility to the network (Feng, 2014). Additionally, urbanisation has instigated the street to be destroyed as a public space, affecting public life and urban users.

Table 1.1 A projection of Dhaka's population growth between 2000 and 2035

Year	Population	Growth Rate (%)	Growth
2030	27,374,000	12.50	3,043,000
2025	24,331,000	15.90	3,342,000
2020	20,989,000	11.10	2,091,000
2017	18,898,000	7.40	1,300,000
2015	17,598,000	19.50	2,400,000
2010	14,731,000	19.50	2,400,000
2005	12,331,000	19.90	2,046,000
2000	10,285,000	23.40	1,953,000
1995	8,332,000	25.80	1,711,000
1990	6,621,000	42.10	1,961,000

Source: Bangladesh Bureau of Statistics—Dhaka Information Statistics, 2017

Historically, the most prevalent mode of transportation in Dhaka has been the road. Nevertheless, unprepared road networks and an uneven distribution of vehicles have produced a complicated road system where cars must deal with the negative effects of frequent jams close to intersections. Rear-end collisions that occur suddenly are frequently caused by a car's shockwave. The amount of time passengers must spend

travelling is increasing to the point that lost hours on clogged roads are hurting the country's economy. Dhaka, like many other developing-nation cities, is beset by a severe traffic predicament that results from poor streetscape planning. Therefore, the main goals of this research were to enhance the environment and create more walkable areas that are welcoming to everyone. Walking is the primary mode of transportation in the Dhaka Metropolitan Area, accounting for 37.2% of trips, despite the congested and unsuitable conditions of the city's roads for pedestrians. The extra room between vehicles, merchandise, and various obstructions is typically designated as pedestrian space. They had to cross every area of the road, walking in the middle of the road, by the outside edges of the pavement, and even in between moving cars to get to the other side. As a result, urban spaces have been in a dilemma to widen streets for cars without even thinking of parking provisions. Furthermore, the entire existing road network has been developed with the notion that traffic is the priority. As a result, the BRTA statistics (Figure 1.1) demonstrate the sharp rise in daily reliance on automobiles. The never-ending cars take up road space even though they can accommodate fewer people than larger vehicles. Also, motorcycles are becoming more and more common in cities because they can manoeuvre through traffic. The overabundance of rickshaws on the roads of Dhaka is another source of congestion. However, it will be a political nightmare to try to restrict their use or force them into a single lane.

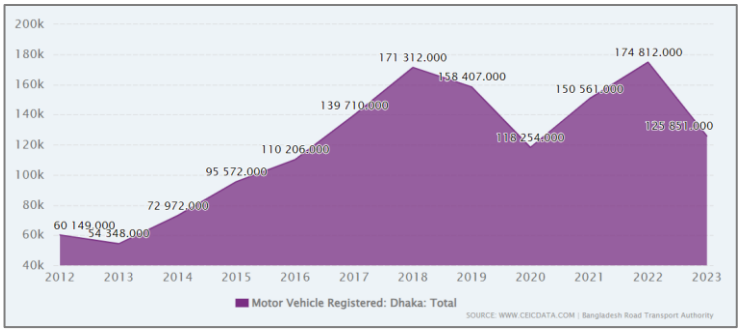

Figure 1.1 Motor Vehicle Registration in Dhaka (2009-2020)
Source: Bangladesh Road Transport Authority (BRTA)

The pedestrian amenities are also hampered by all of these problems. The absence of pavements, unpleasant street views, poor paving, and a host of other issues discourage people from using the streetscapes. Numerous scholars assert that streets worldwide suffer from being inhospitable and unfriendly to their users. According to (Khan et al., 2018), Bangladeshi urban planners have fallen short in offering a diverse array of activities and a user-friendly environment suited to Dhaka's climatic, physical, social, and economic conditions.

In this regard, a research proposal was carried out to understand the underlying reasons behind the disturbances impeding street features including smooth traffic flow and vibrant street activities along with explanations that will improve social sustainability to make a liveable city. This study will focus on two major roads of Dhaka city, named Mirpur Road (Dhanmondi 27 to New Market) and Motijheel Road (Topkhana to Toyenbee Road). These roads are two important arterial traffic corridors for the city. This research will recommend, through a comparison between the study zones which need to be programmed to encourage street activities responsive to vehicle and pedestrian movement; and social activities by assembling some 'Streetscape section' prototypes to develop accommodating zone-specific community modules by using spatial characteristics and physical features of current streetscape (i.e., variety, functions and pursuits, connectivity and accessibility, ease of use and security, and physical attributes). Therefore, this research will focus on three key subjects for examination in the literature review: streetscape design guidelines; social interaction and the theoretical principles of place-making, including factors influencing urban pedestrian environment formation; and the concept of social sustainability for creating a liveable city. Reviewing these concepts is crucial as they are deemed essential for nurturing and enhancing the liveability of sustainable urban

communities globally. The anticipated outcome of this study is to contribute not only to theoretical insights but also to advocate for the recognition of streetscape features as significant pedestrian environments within the city being studied.

1.2.1 Asian Cities' Transition: From Traditional to Modern, Global Cities

Urbanisation and growth have accelerated recently in South Asian cities, notably in Dhaka. Many cities are evolving from centres of global consumption, sophisticated services, and decision-making to traditional cities with exact cosmological order and socio-cultural patterns based on rural economics. They are expanding quickly and, in terms of infrastructure and services, are currently frequently far more developed than cities in the West (Cho. Im Sik. et al., 2022; UN- Habitat, 2022; 2022).

While Dhaka's population growth trajectory may resemble other mega-cities in the Global South, such as Rio de Janeiro and Mumbai, it possesses a unique, dynamic, and vibrant character akin to many major cities worldwide (United Nations, 2023). This character is shaped by a complex interplay of policies, power dynamics, and political interactions among city and government authorities, non-governmental organisations, and intermediaries, which influence the relationships between built environments and the identities, practices, struggles, and opportunities of everyday social life in the city (D.J.H. te Lintelo, 2018). The burgeoning population of Dhaka significantly impacts the demand for urban public spaces and community areas in urban settings (Islam et al., 2019; Nilufar, 2015), posing one of the most pressing concerns for the city, renowned for its dense and chaotic traffic. Between 2010 and 2018, Bangladesh witnessed a faster urbanisation process than South Asia overall (Mawla, 2017), with the proportion of its population residing in officially planned urban settlements increasing by 1.69% annually(Ahmed et al., 2018). Consequently,

congestion stands out as a primary challenge for Dhaka, with the average vehicular traffic speed in the city clocking in at 6.4 km/h, and individuals spending an average of 2.4 hours per day stuck in traffic, 1.3 hours of which are in gridlocks (Mahmud & Haque, 2014). All modes of transportation utilise the full width of the streets for movement, parking, and even halting. Pedestrians are forced to share roadways, as sidewalks are encroached upon by street vendors and often littered with debris. Notably, Dhaka's streets are also inundated with carts, traditional, lightweight pedal-operated vehicles driven by individuals, constituting 28.5% of trips in the Dhaka Metropolitan Area (Khan. et al., 2018).

Many Asian cities highlight the prevalence of informal activities particularly on the pavements. In cities like Tokyo, Jakarta, Kuala Lumpur, and Mumbai, street spaces are often bustling with informal businesses, vendors, and activities, showcasing a vibrant and dynamic urban culture. Scholars, including, (Conteh, F.M. and Oktay, 2016; Hall, 2012; Israt & Adam, 2017; Kiang et al., 2010; Marleau Donais et al., 2019; Mehta, 2014; Molaei et al., 2021; Sauter, 2008; Sulaiman, 2017; Weilguni, 2011) and many more have noted that there is a constant bustle of people in Asian cities. Also, it has been eloquently captured that the street spaces in Asian cities have a multifaceted nature. It emphasises how streets serve as hubs for various activities, ranging from commerce and socialising to artistic expression and activism. However, a significant challenge is the increasing dominance of cars, which infringes upon public spaces and limits their usability for pedestrians and other activities. This observation underscores the importance of reimagining urban planning to prioritise pedestrian-oriented environments that foster community interaction and cultural vitality (Gehl & Svarre, 2013; Sim, 2019)

1.2.2 Quality streetscape development for social sustainability

The term ‘quality’ likely refers to various aspects such as aesthetics, functionality, sustainability, liveability, and overall well-being of urban areas (Bruntlett & Bruntlett, 2021; Khan et al., 2015). It implies a shift in the priorities of urban planning and design towards creating environments that not only meet basic needs but also enhance the overall experience and satisfaction of inhabitants. Urban quality has also been used as a key component in a variety of related terms such as: *‘smart city’* (Cottyn & Nijenhuis, 2021) ; *‘environmental quality’* (Anapakula & Eranki, 2021; Hussein, 2018); *‘quality of life for neighbourhood’* (Din, 2012); *‘pedestrian access’* (Pasha et al., 2015; Sadik-Khan & Solomonow, 2016); *‘nature-based cities’* (Calfapietra & Cherubini, 2019; Lafortezza et al., 2018) ; *‘spatial quality* (Sulaiman, 2017; Zakaria & Ujang, 2015) and many more.

The concept of urban quality is expanding its scope beyond just the physical aspects of buildings, spaces, and street layouts. Kevin Lynch's work from 1981 highlights the idea that urban quality is not solely determined by the physical environment but is also influenced by how people interact with and perceive the space around them. Lynch's perspective emphasises the significance of understanding the dynamic between the built environment and the social dynamics of the community that uses it. Additionally, the mention of Rapoport's insights from 1986 further underscores the complexity of urban quality. It suggests that urban quality is not a singular, one-dimensional concept but rather a multifaceted phenomenon. It comprises elements that are universally relevant to all human societies, as well as aspects that are specific to particular cultures or contexts. In essence, these references emphasise the need for a comprehensive understanding of urban quality that goes beyond mere physical attributes, taking into account social, cultural, and contextual factors as well.

Over the past two decades, there has been a notable rise in efforts by civic leaders, urban strategists, and policymakers globally to enhance the positive and appealing perception of their cities, driven by intensifying competition among them (To & Nakaseko, 2017). Cultivating this favourable image can yield various advantages for the city, spanning economic growth and tourism. Yet, examining a city's image serves not only urban planning interests but also serves as a crucial gauge of citizens' contentment and pride (Bunnell, 2016).Sustainable urban thoroughfares, as described as ‘multimodal rights of way designed and operated for the benefits of movement, ecology, and community that together support a broad sustainability agenda embracing the three E's: environment, equity, and economy’ (El-Shimy & Ragheb, 2017), hold the potential to foster more vibrant and harmonious communities.

1.3 Problem Statement

Authors like (Anapakula & Eranki, 2021; Calvert, 2019; Carmona; et al., 2018; Carmona, 2019; Gehl & Svarre, 2013; Sousa, 2019) has emphasised the need for improved pedestrian environments and public transportation. Gehl's work highlights how urban design can improve city life by encouraging walking, but it overlooks the unique street characteristics of densely populated Asian cities, where informal street economies are integral. While Gehl’s research has become a general framework for urban planning in cities across the USA, Europe, Canada, and Australia, it falls short in considering the unique dynamics of Asian urban contexts and this limitation is also observed by the works of other authors.

(Rahman et al. 2018) and (Shamsuddin et al. 2018) highlighted the urgent need for focused research on Asian public spaces due to rapid urbanisation, which presents both challenges and opportunities. While literature and conferences often focus on

immaterial spaces or political and economic planning, physical locations like streets and markets are overlooked, with research typically emphasising their political or historical significance rather than practical or aesthetic value. As a result, Asian urban designers often rely on Western models, which do not account for the unique demographic, social, and economic contexts of Asian cities. This highlights the need for research on urban streetscapes in Southeast Asian cities, particularly Dhaka, to foster pedestrian-friendly environments and improve urban liveability.

1.3.1 Problem of urban streetscape

Presently, city streets primarily serve as thoroughfares for vehicle traffic rather than inviting, pedestrian-friendly public spaces (El-Geneidy et al., 2014; NACTO & GDCI, 2016; Weilguni, 2011). (Gehl & Svarre, 2013) characterised this trend as 'the invaded city,' where cars dominate urban areas, whether in terms of movement or parking, gradually encroaching upon street and square spaces. Consequently, many local and central authorities not only plan the construction of new roads or highways but also implement schemes to widen existing streets, often at the expense of reducing sidewalks and green areas and demolishing original street facades. This has led to a loss of urban heritage and the distinctive character of streets nationwide (Sholihah, 2016). However, street-widening initiatives fail to effectively balance the various functions of streets and often only serve to further empower automobiles. Paradoxically, the wider the street, the greater the demand for car ownership. Additionally, the pace of new street development outstrips the rate of annual automobile purchases (Lee et al., 2021; Tasic et al., 2015). Ultimately, nearly all street space is allocated solely to automobiles.

This study delves into the pedestrian environment quality in Dhaka, a developing city in Southeast Asia, aiming to complement existing research conducted

by urban scholars and practitioners worldwide on streets and public spaces. It addresses a significant gap in the literature by providing an Asian perspective on these issues. Historically, research on Asian cities and public spaces has been dominated by European and American institutions, prompting the need for more diverse perspectives. By initiating and organising the Global Asia Symposium Series (GASS), the Department of Architecture at the National University of Singapore aimed to address this gap and foster a truly Asian-centric approach to urban studies (Kiang et al., 2010). As pointed out by Jacobs (2010), there is a lack of in-depth examination into how people utilise streets and public spaces, which is crucial for informing ideas, programs, and designs. This research aims to uncover the unique characteristics of Dhaka's streetscape and explore the quality criteria of streetscape design that align with the behaviours and usage patterns of urban public spaces.

1.3.2 Problem of Dhaka

Dhaka is often ranked among the least liveable cities (Economist Intelligence Unit, 2018, 2023) due to poor city management, inadequate public transport, traffic congestion, and the lack of pedestrian-friendly streetscape design, issues frequently overlooked in urban planning and transport policies (Hasan, 2013). Figure 1.2 shows Dhaka ranked seventh among the world's least liveable cities in the Global Liveability Index 2023, based on stability, healthcare, culture, education, and infrastructure.

		2023						
City	Location	Rank	Index	Stability	Healthcare	Culture & environment	Education	Infrastructure
Douala	Cameroon	164	46.4	60.0	29.2	51.2	41.7	42.9
Kiev	Ukraine	165	44.0	40.0	41.7	54.2	75.0	23.2
Harare	Zimbabwe	166	43.8	40.0	29.2	56.7	66.7	35.7
Dhaka	Bangladesh	166	43.8	50.0	41.7	40.5	75.0	26.8
Port Moresby	Papua New Guinea	168	43.4	30.0	41.7	49.8	58.3	46.4
Karachi	Pakistan	169	42.5	20.0	50.0	38.7	75.0	51.8
Lagos	Nigeria	170	42.2	25.0	37.5	54.4	41.7	53.6
Algiers	Algeria	171	42.0	35.0	50.0	45.4	58.3	30.4
Tripoli	Libya	172	40.1	30.0	45.8	37.5	58.3	41.1
Damascus	Syria	173	30.7	20.0	29.2	40.5	33.3	32.1

Source: EIU.

Figure 1.2 Dhaka is rated as one of the world's least liveable city
Source: EIU, 2018 and 2023

Cities like Dhaka are experiencing rapid urban change, yet high-quality pedestrian-oriented streetscapes remain rare. Despite the Dhaka Metropolitan Development Planning draft (2016-2035) identifying key issues, transport policies neglect walking, cycling, and rickshaws and Dhaka lacks efficient public transit, with fragmented urban planning further compounding these challenges (Ahmed et al., 2018; Islam et al., 2019).

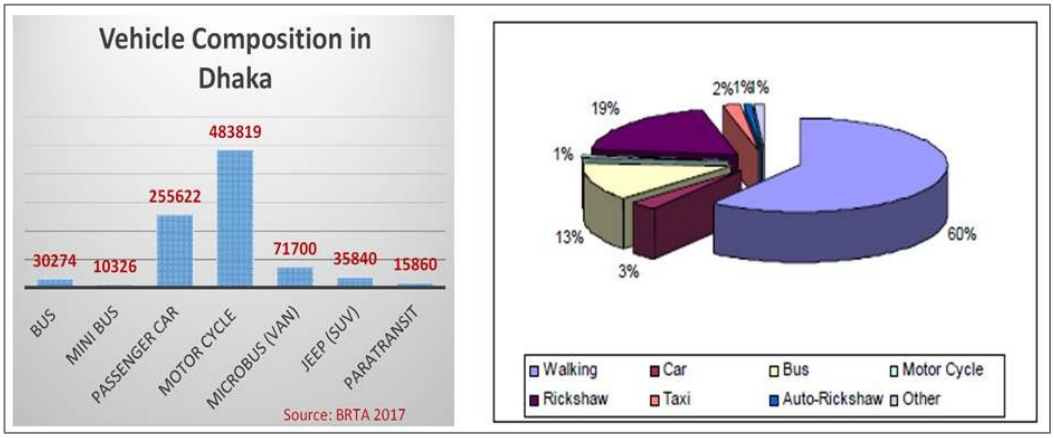

Figure 1.3 Vehicle Composition in Dhaka, Source: BRTA,2019 (left)

Figure 1.4 Percentage of different Modal Vehicles of Dhaka, Source, Jannat,2018 (right)

To make Dhaka livable by 2035, street-level improvements must prioritize pedestrians and the built environment. Despite various plans, inconsistent adherence, political instability, and low awareness have hindered effective implementation, leaving the city vulnerable (Israt & Adam, 2017; Musfiqur et al., 2020). Walking is common, especially among low-income residents, yet pedestrian facilities remain scarce and obstructed, with only about 400 km of footpaths within Dhaka City Corporation (see Figure 1.4) (Ahmed et al., 2018; B. Ahmed et al., 2014). Pedestrians forced to walk on roads face increased accident risks and disrupt traffic flow, leading to congestion, delays, and higher pollution levels.

In Dhaka, street studies as public spaces are recent and mostly unpublished; this research focuses on identifying obstacles to smooth traffic and vibrant street life, aiming to enhance social sustainability and resilience through a contextualised, multidisciplinary approach. This proposal focuses on Dhaka's Mirpur and Motijheel Roads to enhance pedestrian environments amid heavy traffic, aiming to improve social engagement, safety, and convenience. By analysing these corridors, an adaptable pedestrian environment will be developed, offering flexible, community-focused modules that prioritise accessibility and connectivity. Grounded in place-making theory, this research aims to create high-quality streetscapes that foster social sustainability, walkability, and vibrant public spaces, supporting Dhaka's long-term goal of sustainable, inclusive urban communities.

1.4 Research Gap

Research on pedestrian environments in Asian cities, particularly in Dhaka, highlights gaps in designing infrastructure that addresses the unique social, economic, and environmental dynamics of rapidly urbanising areas (Ahmed et al., 2018). Western design principles often neglect Dhaka's local context, including its informal economies, diverse pedestrian needs, and the lack of data on congestion and safety, which limits evidence-based planning (Israt & Adam, 2017; Khan. et al., 2018; Tariquzzaman, 2019). Climate resilience and community engagement are rarely considered, and vague pedestrian guidelines are seldom enforced, with performance metrics focused on vehicle speed rather than pedestrian accessibility. Strengthening walkability requires context-sensitive, data-driven approaches, stronger institutional support, and active involvement from civil society to develop safe, inclusive, and sustainable pedestrian spaces (Islam et al., 2019).

Theoretical gaps in pedestrian research for Asian cities like Dhaka stem from an overreliance on Western models that fail to account for dense, mixed-use environments, informal economies, and complex street dynamics. Existing theories prioritise linear, car-free walkways and vehicular efficiency over the multi-functional nature of Dhaka's footpaths, where pedestrians, vendors, and cyclists coexist. Metrics such as pedestrian level of service (LOS) often emphasise speed and flow, overlooking comfort, safety, and accessibility (Islam et al., 2019; Israt, 2016). Moreover, limited frameworks address climate resilience or community engagement in planning. A model attuned to Dhaka's socio-economic and environmental realities—incorporating informal space uses, pedestrian-focused metrics, and local climate needs—is essential to improve urban walkability.

1.5 Research Questions

The subsequent Research Questions have been formulated to fulfil the research goals, aligning with the research objective:

Research Question **01**: What is the relationship between the built environment and pedestrian experience in developing a high-quality urban streetscape relevant to the pedestrian environment of Dhaka?

Research Question **02**: To what extent do the spatial characteristics of Dhaka's streetscape affect the quality of the pedestrian environment?

Research Question **03**: How do the distinctive physical factors influence the quality of the pedestrian environment response to the walkable streetscapes of Dhaka city?

Research Question **04**: What model can be proposed for an urban streetscape that fosters a high-quality pedestrian environment and enhances the liveability of the Dhaka city community?

1.6 Research Aim and Objectives

This research aims to promote street activities that respond to vehicle and pedestrian movement, serving as an effective strategy to enhance the streetscape quality within the pedestrian environment and contribute to a more liveable community in Dhaka. The study objectives seek:

Research Objective **01**: To identify the relationship between the built environment and pedestrian experience in creating a high-quality urban streetscape relevant to the pedestrian environment in Dhaka.

Research Objective **02**: To evaluate the impact of the spatial characteristics of Dhaka's streetscape on the quality of the pedestrian environment.

Research Objective **03**: To investigate the physical factors that influence the quality of the pedestrian environment relevant to the walkable streetscapes of Dhaka city.

Research Objective **04**: To propose a model for an urban streetscape that fosters a high-quality pedestrian environment and enhances the liveability of the Dhaka city community.

Table 1.2 The relationship between Problem Statement, Research Question, Research Objective, and Methods

Problem Statement	Research Questions	Research Objectives	Research Methods
• Dhaka faces significant challenges in developing a high-quality urban streetscape that meets pedestrian needs due to rapid urbanisation and inadequate infrastructure, resulting in unsafe and uncomfortable conditions. • In Dhaka, many residents are hesitant to use existing pedestrian facilities due to various interrelated factors, posing a significant challenge for urban planners and policymakers in enhancing walkability and the overall pedestrian experience.	**RQ1** What is the relationship between the built environment and pedestrian experience in developing a high-quality urban streetscape relevant to the pedestrian environment of Dhaka?	**RO1** To identify the relationship between the built environment and pedestrian experience in creating a high-quality urban streetscape relevant to the pedestrian environment in Dhaka.	Quantitative method through Questionnaire survey and behavioural mapping
• Dhaka, one of the world's most densely populated cities, faces significant challenges in its pedestrian environment due to spatial characteristics that prioritise vehicular traffic, resulting in unsafe and uncomfortable conditions; this research aims to evaluate these spatial factors to enhance walkability and overall liveability for residents.	**RQ2** To what extent do the spatial characteristics of Dhaka's streetscape affect the quality of the pedestrian environment?	**RO2** To evaluate the impact of the spatial characteristics of Dhaka's streetscape on the quality of the pedestrian environment.	Quantitative method through Syntactic Analysis by Space syntax (depthmapX)
• In Dhaka, rapid urbanisation and high population density have led to a pedestrian environment compromised by distinctive physical	**RQ3** How do the distinctive physical factors influence the quality of the pedestrian environment	**RO3** To investigate the physical factors that influence the quality of the pedestrian environment	Quantitative method using Questionnaires with

factors like inadequate infrastructure, such as narrow sidewalks and poor lighting, which limits mobility and safety while discouraging walking in favour of motorized transport. • The absence of comprehensive studies examining how these physical factors affect the pedestrian environment limits urban planners' and policymakers' ability to implement effective design strategies.	response to the walkable streetscapes of Dhaka city?	response to the walkable streetscapes of Dhaka city.	SPSS analysis and Qualitative method through Direct observation
• In Dhaka City, the design and modification of roads and intersections often neglect the convenience and safety of pedestrians, resulting in inadequate infrastructure that hinders walkability and increases the risk of accidents for those navigating the urban environment. • There is a critical need to implement programs that promote street activities in a manner that effectively responds to both vehicle and pedestrian movement, ensuring a balanced and dynamic urban environment that enhances safety and accessibility for all users.	**RQ4** What model can be proposed for an urban streetscape that fosters a high-quality pedestrian environment and enhances the liveability of the Dhaka city community?	**RO4** To propose a model for an urban streetscape that fosters a high-quality pedestrian environment and enhances the liveability of the Dhaka city community.	The method of Triangulation of all results will help to produce a model.

1.7 Research Framework

This research is organised into four interconnected phases to provide thorough insights into evaluating the quality of Dhaka city's streetscape and its effects on the

pedestrian environment and overall liveability for social sustainability. Figure 1.5 illustrates the stages, with a description provided below.

The ***first stage*** of the study focuses on establishing the background and formulating the problem statement. This statement was crafted based on the contextual circumstances of the study and insights from previous research. Additionally, the problem statement for Dhaka city informed the development of the research questions, aims, objectives, and the study's scope and limitations.

The ***second stage*** of the study reviews the key literature on streetscape quality development. This phase presents the theoretical concept concerning the function of urban streets and urban public spaces and their attributes, social sustainability, resilient community and a new approach to street planning and design. After that, the relevant literature on the evaluation of street networks of Dhaka city and its attributes for filtering the current state of urban streetscape will support narrowing down the focus of the study.

The ***third stage*** discusses the method, data collection, and analysis technique of the research. Using the points identified in the literature review on the reason for the quality development of urban streetscape as a research theme, the user's perception will be investigated for making a resilient community using the case study approach employed with multiple sources of evidence. After identifying the relevant attributes and the methods to measure the users' perceptions, the next phase will be focused on collecting primary data in the case study areas. This will begin by analysing the three research instruments, namely the syntactic analysis, questionnaire, and survey through observation for two local contexts.

The ***fourth stage*** presents the research findings of the case study areas and the analysis of these findings. Following data collection; this will focus on data analysis by identifying the attributes of streetscapes' quality development relevant to gathering information on users' perceptions associated with the streetscapes' quality development. Reliability tests were run to see the relevance of research instruments. Syntactic analysis is presented as the key instrument to investigate the spatial characteristics of Dhaka's streetscape regarding the current pedestrian environment. Questionnaires and observation mapping on the quality development attributes are presented sequentially as they provide a multisource of evidence to validate each other. This phase also synthesises the analysis and presents it with evidence from existing literature to answer each research question those are used to reflect on the study. A conclusion to the study by summarising the findings, and discussing research recommendations for the quality improvement of the streetscape throughout Dhaka's central public areas. The attributes provide a set of recommendations on the area of users' needs. This could serve as a criterion in guiding the improvement to be made.

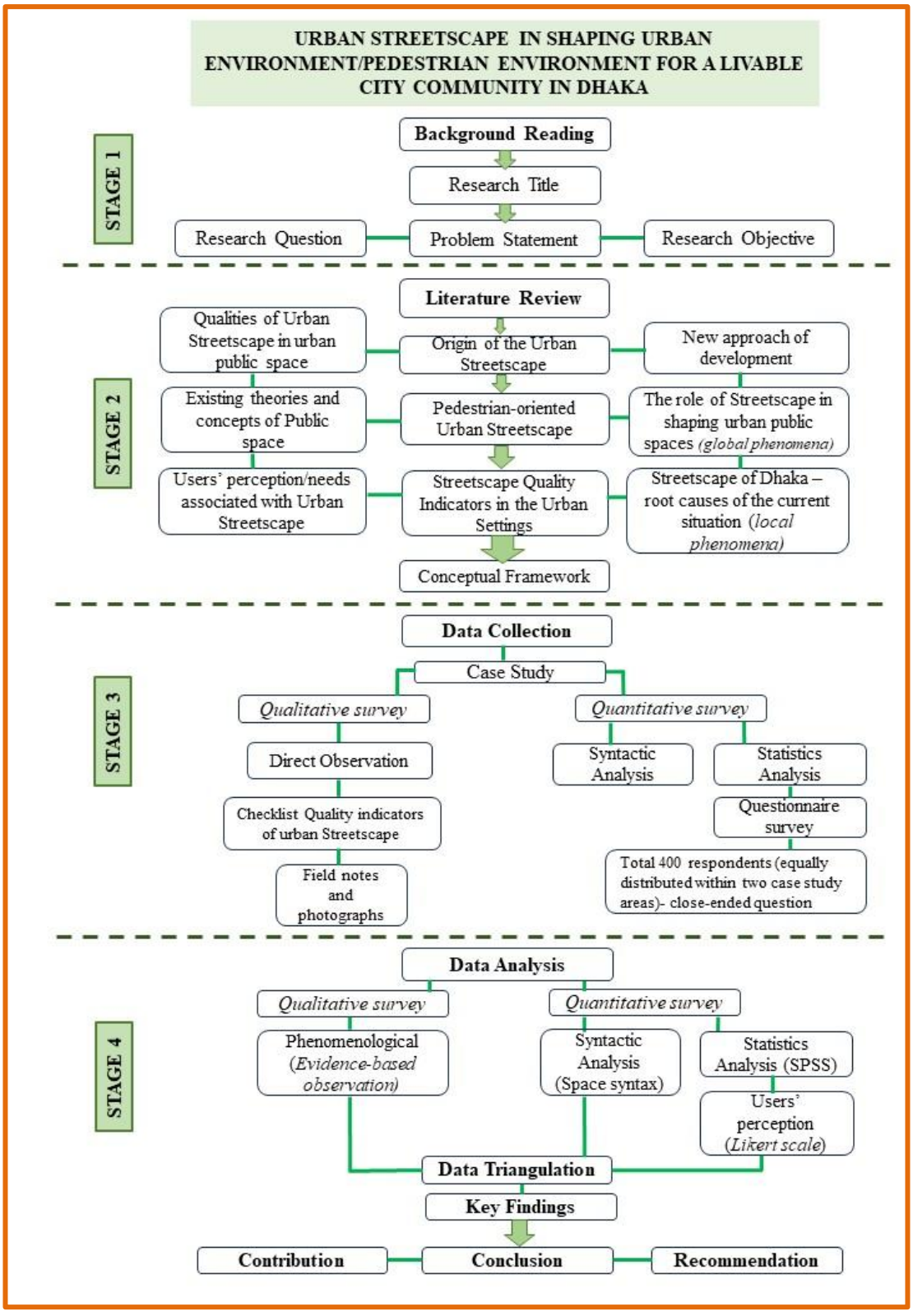

Figure 1.5 Research Framework

1.8 Scope of the study

Many researchers believe streets are not only the traffic corridors nor the only means of making the city resilient. It is also the pedestrians, who give life to the city through their movement and activities. Urban design scholars, for example, (Carmona; et al., 2018; El-Shimy & Ragheb, 2017; Guzman et al., 2022; Marleau Donais et al., 2019; Prelovskaya & Levashev, 2017; Rahman et al., 2018; Shamsuddin et al., 2018) and many more have agreed that a lively and convivial public place should offer attractive facilities in which to stay longer and an overall good quality experience for the users.

Correspondently, the author of this research found that there is less concentration on the quality of streetscape development for the pedestrian environment of Bangladesh especially in Dhaka city as an absence of inadequate data and statistics. Though (Nilufar, 2015), (Ahmed et al., 2018), and (Mawla, 2017) stated the need for an organised transport network, more urban open space, and proper policy-making to resolve urban chaos. There is no specific research on assembling a more vibrant streetscape to determine urban public space quality and open up the potential of street activities. This feedback is crucial to underscore the significance of specific elements within academic streetscape design guidelines. It's essential to enhance the quality of streetscape design to create a pedestrian-oriented environment and bridge the divide between theoretical concepts and practical implementation. As the city grew in trade and commerce to support the life system of the city and its' inhabitants, streets should be the focus for making a sustainable resilient community. As both an architect and a researcher—and simply as a member of society—the author feels a responsibility to address this issue, which inspired further research.

1.9 The significance of the study

For the field of knowledge and student*:* The main theoretical implication of this study is that it contributes to our understanding of the literature on urban planning in the context of Bangladesh, particularly about street configuration, street culture, street quality, and street features. Students studying architecture, urban design, urban planning, and sociology in particular will benefit from this study's enrichment of their knowledge as it will present them with traditional street issues and problems and provide insight into how to measure the streetscape quality in urban public spaces using the methods this study offers.

For the practitioner*:* The study provides a framework for designing and improving streets in both new and existing urban settings, focusing on key elements such as configuration, materials, and architectural quality. It highlights how street patterns, scales, and proportions impact legibility and vibrancy, showing that narrow, vendor-crowded pavements deter walking and window shopping, while open public spaces, particularly near corners, encourage social and recreational activities. The findings emphasize the importance of streetscape design in enhancing walkability and energy. Proper pavement materials, adequate seating, and well-designed street facilities contribute to comfort and safety. Additionally, green spaces and shaded areas significantly improve the street's livability, making environmental comfort a critical consideration in urban design.

The study stresses the need to preserve and enhance the unique qualities of traditional streets, both tangible and intangible, in future practices. Multidisciplinary collaboration among urban designers, architects, planners, economists, sociologists,

and city managers is essential for developing urban regulations that safeguard and enhance these qualities, particularly in Dhaka's context.

For the policymakers: The research findings indicate that the two case studies implemented the bare minimum of appropriate regulation. Planning and management are desperately needed, particularly for Mirpur Road and Motijheel Road. This includes creating criteria for urban design and conservation. The field observation indicates that regulation in both investigated sectors is not yet sufficiently enforced, which led the respondents to claim that simply having regulations in place is insufficient without adequate enforcement. Ultimately, the local government will put these rules into effect to preserve and improve the quality and applications of walking routes.

The need for the establishment of a street management board/agency is also revealed in this study. The local authority is expected to formulate this board to manage the streets in day-to-day operation. The board/agency will work with broader authority and responsibility regarding the management of user-friendly streetscape. Also, since these streets are worth regarded as urban legacy, there is a necessity to formulate conservation planning and action before these unique places vanish because of the rapid development of Dhaka city.

For the general public*:* This study may benefit the general public by giving awareness of the importance of streetscapes for a high-quality pedestrian environment, cultural spaces, and urban heritage. This study also highlighted the evidence that current streetscapes have special meaning for people mainly related to the existence of these streets as urban corridors. This study can also benefit the general public regarding the revelation of streetscape quality development so that the public may enjoy better

and more qualified walkways in particular and urban public spaces in general in the future. The policymakers and practitioners should bind to safeguarding such streets and design existing streets using the findings of the study as one of the considerations/approaches. This study reveals the respondents as part of the general public in the opinion and expectations of the future of the case studies. Overall, the respondents express their aspiration for better management and quality of these streets. Therefore, this study also delivers an essential message to the general public to actively participate in using, maintaining, and developing better streetscape quality through various efforts including maintaining the street spaces' cleanliness, legalisation for hawking activity, walkways ensuring the environmental comfort of pedestrian flows, so on and so forth. Hence, the contribution of all stakeholders, including the general public to continue maintaining the quality of urban streetscape is important to ensure their sustainability to be handed down to future generations.

1.10 Limitations of the study

This research has several limitations. The study is primarily limited by its sample size. The sample size could not be increased because of the limited time of the research and the cost incurred to invite students and general people for data collection. Furthermore, the time allocated for the research will not permit an in-depth and full exploration. This limitation also occurred due to the study's limited cost and manpower for the study. Another restriction was the inadequate quality of prior research and secondary data sources on this subject.

1.11 Summary of the Chapter

This chapter is a summary of the entire thesis, highlighting the subject of how quality development of streetscape for social sustainability can benefit city dwellers. This study has five chapters as follows:

Chapter 1

This chapter introduces an overview of Dhaka city's streetscape evolution. The problem statement and the rationale for conducting the study come next. The research questions, aims, and methods utilised to address the research questions are then presented in the chapter along with the research framework developed specifically for this investigation. Then, the scope and constraints of the study are explained. Lastly, the thesis structure of this study lays out the format for the subsequent chapters.

Chapter 2

This chapter begins by defining urban streetscapes, outlining their components, and exploring the concepts and impacts of functional planning and liveable city communities. It reviews existing literature across diverse fields, including urban design, public spaces, and pedestrian environments, focusing specifically on streetscape quality development in urban areas.

In addition to discussing the components of the study topic, the chapter presents insights from previous scholars, identifies dynamics for analysing streetscape quality, and draws theoretical conclusions from the existing literature. It outlines methodologies, their definitions, and their application in prior streetscape studies, including syntactic measures, statistical analysis, and direct observation, to identify key indicators for evaluating urban streetscape quality. The chapter also explores street