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Research Article

User Perception based Evaluation of Bus Terminal Facilities in Dhaka City, Bangladesh

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Abstract

In urban transportation network, bus terminals are critical nodes that serve the citizens largely. The Mohakhali Bus Terminal in Dhaka, Bangladesh, a pivotal inter-district transport hub facilitating approximately 800 daily trips, currently experiences significant constraints due to infrastructural and managerial inadequacies. Grounded in user perception, this research employs an evaluation framework to thoroughly analyze the terminal's facilities and operational conditions, identifying core deficiencies and formulating evidence driven, sustainable solutions. Adopting an exploratory and descriptive methodology, the research integrates passenger interviews (n=110), stakeholder interviews (n=10), and secondary data analysis. The key findings reveal systemic shortcomings in passenger amenities, including inadequate sanitation facilities, suboptimal lighting, limited universal accessibility, and the absence of digital information systems. Further, functional inadequacies in bus bay design, pedestrian infrastructure, and on site security further hinder the overall user experience. Additionally, institutional weaknesses, including insufficient staff facilities and lack of structured maintenance protocols, exacerbate these functional challenges. To address these challenges, the study recommends comprehensive improvements including infrastructural upgradation, integration of digital system, and administrative coordination by Dhaka North City Corporation.

Keywords: Bus terminal infrastructure; user satisfaction; passenger amenities; terminal facilities; terminal management; Dhaka City

Introduction

Passenger transport terminals, including bus, minibus, and taxi terminals, are essential nodes in urban transport networks, enabling seamless transfers between various travel modes such as walking, private vehicles, and public transit (Rusanen and Wiest, 2023). Their design and spatial organization significantly impact transit efficiency, passenger experience, and overall accessibility (Ahmadinejad *et al*., 2023). Well planned terminals can reduce congestion, improve connectivity, and enhance service reliability, whereas poorly designed or mismanaged terminals lead to inefficiencies, longer transfer times, and passenger dissatisfaction (Ahasan and Kabir, 2019). Bus terminals, whether off street or on street, serve as critical hubs for boarding, alighting, and vehicle layovers. Their efficiency depends on infrastructure, management, and integration with transit systems, influencing dwell time, operational speed, and congestion (Liu *et al*., 2017).

Efficient and well-equipped bus terminals are crucial for facilitating public transportation and significantly affecting passenger satisfaction and operational efficiency (Al - Mudhaffar, *et al*., 2016). In rapidly growing urban centers like Dhaka, the provision of adequate terminal facilities has become increasingly challenging due to space constraints, rising passenger demands, and infrastructural limitations (Rahman *et al*., 2023). Bus terminals serve as vital nodes that integrate various transportation services, impacting mobility, urban congestion, and passenger convenience (Lyu *et al*., 2019).

The Mohakhali Bus Terminal, one of Dhaka's three major inter-district terminals, spans 36,400 square meters, accommodating 300 buses and 800 daily trips across 60 routes (RSTP, 2015). Located centrally, this terminal serves as a significant transportation hub linking Dhaka to other regions of the country. Despite its strategic importance and high passenger throughput, it faces severe operational challenges such as congestion, inadequate parking, insufficient amenities, inefficient management, and safety concerns, negatively impacting service quality and passenger experience (Rahman *et al*., 2023; Ansary and Ansary, 2023; Podder *et al*., 2024). These deficiencies not only decrease passenger satisfaction but also impair overall transport system performance, contributing to broader urban mobility challenges (Wijerathna, 2019; Keeprasit, 2007). Passengers experience at bus terminals is influenced by multiple factors, including physical design, ease of navigation, clarity of provided information, and implemented safety measures (Wijerathna, 2019; Rahman *et al*., 2023; Keeprasit, 2007). Sustainable development principles also advocate for integrating user -friendly and environmentally conscious design features, such as energy -efficient facilities and comfortable, accessible spaces (Lyu *et al*., 2019).

Research highlights the importance of effective management and adequate facilities at bus terminals, emphasizing waiting areas, restroom conditions, ticketing efficiency, and security measures as critical determinants of passenger satisfaction (Podder *et al*., 2024; Keeprasit, 2007). A case study at Gabtoli bus terminal, another significant terminal in Dhaka, revealed passenger dissatisfaction due to inadequate drinking water facilities, poor restroom conditions, insufficient parking, and ineffective information systems (Podder *et al*., 2024). These findings underline the necessity of comprehensive assessments and improvements at Mohakhali Bus Terminal.

Given these considerations, this study aims to evaluate the facilities of the Mohakhali Bus Terminal primarily through the lens of user perception. The core objectives are to analyze the condition of current terminal facilities based on feedback from passengers and staff; identify critical issues and service gaps as perceived by daily users; and propose actionable, user -centered recommendations to enhance terminal performance and satisfaction. By systematically addressing these objectives, this research intends to contribute to the improvement of public transport infrastructure in Dhaka, aligning with broader goals of urban sustainability and enhanced public transportation services.

Study Area Profile

The Mohakhali Inter District Bus Terminal is a vital transportation hub in Dhaka, Bangladesh, established in 1984 (Fig. 1). As one of the city's three main inter-city bus stations, it primarily serves routes to northern Bangladesh. The terminal underwent significant renovations in 2005, enhancing its facilities and capacity to accommodate the growing number of passengers The spacious 9 acre (36, 400 m^2) site can handle up to 300 buses simultaneously, facilitating approximately 800 daily trips across 60 different routes as of 2015. This makes the Mohakhali Bus Terminal a bustling center of activity, crucial for both passenger transport and economic activity in the region (RSTP 2015).

Fig. 1: Mohakhali Bus Terminal, Dhaka

Materials and Methods

This study adopts a systematic methodology, incorporating a combination of literature review, field surveys, interviews, on site observations, and analytical techniques to assess the existing conditions of the Mohakhali Bus Terminal and propose evidence based improvements. Data collection for this study was conducted during January 2025.

Research Design

This study follows an exploratory and descriptive research design to evaluate the current state of terminal facilities, operational efficiency, and passenger experiences at the Mohakhali Bus Terminal. The exploratory aspect was employed to identify and diagnose core operational and infrastructural challenges, while the descriptive element aimed to quantify passenger satisfaction, infrastructure gaps, and service conditions.

Primary data collection involved structured passenger surveys, in depth interviews with key stakeholders, and systematic on site observations. These were supported by

secondary data drawn from official reports, urban transport policies, and spatial data resources. This combined approach enabled a comprehensive understanding of the terminal's functional landscape and management realities.

Literature Review

A detailed literature review was undertaken to develop a conceptual understanding of bus terminal operations, infrastructure design, passenger satisfaction, and relevant transport policy frameworks. The sources included:

Academic Publications: Peer reviewed journal articles, conference proceedings, and scholarly books focused on transportation planning, public terminal design, and transit system optimization.

Technical and Institutional Reports: Official documents from the Bangladesh Road Transport Authority (BRTA), Dhaka North City Corporation (DNCC), and Ministry of Road Transport and Bridges.

Policy and Planning Documents: Strategic transport plans and technical manuals such as the Revised Strategic Transport Plan (RSTP 2015-2035).

Study Area Selection

The Mohakhali Inter District Bus Terminal was selected as the study area due to its strategic location and functional importance within Dhaka's intercity transport network. As one of three major terminals in the city, it facilitates approximately 800 daily bus trips across 60 routes, linking Dhaka with northern and central districts of Bangladesh. The terminal's persistent operational bottlenecks such as congestion, infrastructure deterioration, and managerial inefficiencies make it an ideal case for in depth evaluation. The selection was based on the terminal's passenger volume, regional connectivity, complexity of traffic and management challenges, and its potential to represent similar facilities across other urban areas. Lessons drawn from this case can inform broader urban mobility and terminal redevelopment policies in Bangladesh.

Data Collection Methods

To ensure a comprehensive and representative assessment, both primary and secondary data collection techniques were employed.

Primary Data Collection

1. Passenger Surveys

A total of 110 passengers have been interviewed using structured questionnaires focused on terminal conditions, cleanliness, congestion, lighting, safety, and satisfaction with key amenities. Respondents were selected using purposive sampling to capture diverse demographics and experiences.

2. Key Informant Interviews

A total of 10 in depth interviews were conducted with Bus Operators, Ticket Counter Staff, Terminal Management Officials. These interviews aimed to gather operational insights, institutional constraints, and stakeholder perspectives on the existing conditions and future potential of the terminal.

3. On Site Observations

Systematic field observations were conducted throughout January 2025 to monitor,

- Passenger boarding and departure patterns
- Parking and bus bay conditions
- Waste management and sanitation practices
- Accessibility of various terminal zones
- Lighting, signage, and overall environmental quality

Observations were documented through field notes, sketches, and photographs to validate and supplement survey and interview findings.

Secondary Data Collection

Secondary data were sourced from urban transport master plans and policy documents, such as the RSTP 2015 -2035 and BRTA annual reports, as well as academic publications on transport infrastructure. These secondary resources enriched the historical and policy context of the study and aided in triangulating the primary data.

Data Analysis

The collected data were analyzed using a mix of quantitative and qualitative methods. Survey responses were tabulated and analyzed using Microsoft Excel to generate descriptive statistics, frequency distributions, tabulation and other graphical representations. Qualitative interview transcripts were reviewed thematically to identify recurring challenges and stakeholder priorities. Observational data were categorized and compared against international standards to evaluate physical and operational gaps. This analytical process enabled a holistic understanding of terminal conditions and informed the development of actionable recommendations.

Despite trying to employ a thorough and diverse methodological framework, the study still faced some limitations including limitations concerning time and budget, as well as the possibility of response bias occurring during the data gathering process. Nonetheless, the utilized triangulated, multi -source data approach guaranteed that the results are solid and representative of the terminal's comprehensive circumstances.

Results and Discussion

Terminal Facilities of Mohakhali Bus Terminal

From literature reviews it has been observer that a bus terminal facility varies from country to country and even within the same country. For this study bus terminal facilities have been categorized into three major types, i.e.

passenger amenities, staff facilities and facilities for bus maintenance. Mohakhali Bus Terminal is shown in Fig. 2.

Fig. 2: Mohakhali Bus Terminal

Passenger Amenities

The passenger amenities of Mohakhali Bus Terminal were evaluated against a global standard practiced by Washington Metropolitan Area Transit Authority as presented in Table 1.

Compared with global standards, it has been observed that some amenities, such as a landing pad and left luggage and lost property office, are absent from Mohakhali Bus Terminal. The absence of landing pads may hinder the ease of boarding for passengers, especially those with mobility challenges. Similarly, the lack of left luggage and lost property office could lead to inconvenience for travelers needing temporary storage or assistance with lost items. Among other amenities, information cases are present but show limited information, and the number of trash receptacles is adequate and well placed (Fig. 3, 4, 5,6 &&).

Staff Facilities

The staff facilities of Mohakhali Bus Terminal and the standards (Hoque, 2011) are shown in Table 2. Compared to the standards, it was observed that some facilities, such as the canteen, recreation area, and locker room, are absent from Mohakhali Bus Terminal. The absence of these facilities may affect staff morale and overall operational efficiency. Furthermore, the existing restrooms and toilets are reported to be in unsatisfactory conditions, potentially impacting on the health and well - being of the staff.

Table 1: Passenger Amenities of Mohakhali Bus Terminal

Amenities	Standards	Existence in study area
Bus terminal Sign	Yes	Yes
Landing pad	Yes	No
Sidewalk	Yes	Yes
Lighting	Yes	Yes
Seating	Yes	Yes
Bus bay	Yes	Yes
Shelter	1(50^{+} boardings/day)	Yes
Trash Receptacle	Site specific	Yes, adequate in number
Information case	Yes	Yes, but less detailed
Ticket counter	Yes	Yes
Waiting room	Yes	Yes
Toilet	Yes	Yes
Vending facilities	Yes	Yes
Prayer room	Optional	Yes
Restaurant	Yes	Yes
Left luggage and lost property office	Yes	No

Table 2: Existing Staff Facilities

Facilities	Standard	Existence in study area
Rest room	Yes	Yes
Canteen	Yes	No
Toilet	Yes	Yes
Recreation area	Yes	No
Locker room	Yes	No

a b c

Fig. 3: (a) Bus Bay, (b) Terminal footpath (Back) and (C) Terminal footpath (Side)

a b c

Fig. 4: (a) Signage, (b) Seating arrangement-1, (c) Seating arrangement-2

a b

Fig. 5: (a) Terminal prayer room, (b) Dedicated prayer area for women

a b c

Fig. 6: (a) Terminal Compound, (b) Toilet facility, and (c) Trash receptacles

a b c

Fig. 7: (a) Repairing facilities, (b) Facilities for operators and staffs, (c) Garaging facility

Facilities for Bus Maintenance

The bus maintenance facilities of Mohakhali Bus Terminal compared to the standards (Hoque, 2011) are shown in Table 3.

Table 3: Existing Bus Maintenance Facilities

Facilities	Standard	Existence in study area
Repair workshop	Yes	Yes
Washing facilities	Yes	Yes
Garage facilities	Yes	Yes
Fueling	Yes	No

Compared to the standards, it was observed that all necessary bus maintenance facilities such as repair workshops, washing areas, and garage facilities are available at the Mohakhali Bus Terminal, as outlined in Table 3. However, the terminal lacks an on-site fueling station, requiring buses to refuel elsewhere, which may increase operational costs and cause scheduling inefficiencies.

Satisfaction Level of Passenger Amenities

This study assesses passenger satisfaction regarding amenities by conducting surveys of the terminal passengers.

Total 110 passengers have been interviewed to evaluate their satisfaction level on bus terminal amenities, major problems and their suggestions for better management of the terminal.

The detailed profile of the respondents is shown in a brief in Table 4. Among the respondent's 68.18 percent male and 31.82 percent female were surveyed. 35 - 39 and 40 - 40+ year categories are the majority age group of the respondents (25.25% and 22.73%) followed by 25 to 29 (16.36%) and 30 to 34 (16.36%). The educational background of the respondents indicates that the largest proportion (40%) possess an undergraduate degree, while 20.91% have completed the Secondary School Certificate (SSC) and 17.27% hold the Higher Secondary Certificate (HSC).

Table 4: Respondents' Profile

Criteria	**Percentage**	**Criteria**	**Percentage**
Gender		**Occupation**	
Male	68.18	Unemployed	5.45%
Female	31.82	Student	20%
Total	100	Private sector employee	17.27%
Age Group		Public Service	3.64%
15 - 19	4.55%	Garment Worker	3.64%
20 - 24	14.55 %	Daily labor	2.73%
25 - 29	16.36 %	Business	27.27%
30 - 34	16.36 %	Housewife	13.64%
35 - 39	22.73 %	Farmer	1.82%
40 - 40^{+}	25.45 %	Other (Mechanic, Sales women, Imam)	4.55%
Total	100	Total	100
Years in Education		**Income (BDT per Month)**	
Illiterate (0)	7.27%	<1000	30%
Primary (5 years)	6.36%	1000 – 5000	0%
Secondary School Certificate, SSC (10 years)	20.91%	5001 – 9000	5.45%
Higher Secondary School Certificate, HSC (12 years)	17.27%	9001 - 14,000	10%
Under -Graduation (16 years)	40%	14,001 - 19,000	3.64%
Post -Graduation (18 years)	8.18%	19,001 - 24,000	10.91%
Total	100	24,001 - 29,000	9.09%
		29,001 - 34,000	10.91%
		34,001 - 39,000	1.82%
		39,001+	18.18%
		Total	100

Table 5: Satisfaction Level of Passenger Amenities

Passenger Amenities	Satisfaction Level (%) [n=110]				
	1	2	3	4	5
Bus terminal sign	0	18.18	22.73	57.27	1.82
Sidewalk	2.73	40.91	20.91	32.73	2.73
Lighting coverage	5.45	43.64	25.45	23.64	2.73
Seating arrangement	0	5.45	17.27	60.91	16.36
Bus bay	36.36	18.18	26.36	17.73	1.82
Shelter coverage	0	2.73	17.27	72.73	7.27
Environment of shelter	0	15.45	29.09	50.00	5.45
Trash Receptacle	4.55	30.91	32.73	23.64	8.18
Ticket counter condition	0	0.91	12.73	79.09	7.27
Information booth	0	1.82	22.73	70.91	4.55
Toilet	0	0	14.55	64.55	20.91
Vending facilities	0	2.73	14.55	71.82	10.91
Coverage of prayer room	0	2.73	22.73	61.82	12.73
Condition of prayer room	0	1.82	25.45	54.55	18.18

(Here, 1 = Extremely dissatisfied, 2 = Dissatisfied, 3 = Neither satisfied nor dissatisfied, 4 = Satisfied and 5 = Extremely satisfied.)

The largest group of respondents is associated with business activities, comprising 27.27%, followed by students at 20% and private sector employees at 17.27%. Furthermore, a significant portion of the respondents, specifically 30%, reported having no income. Following this, 18.18% fell into the income bracket exceeding BDT 39001, while 10% are within the range of BDT 9001 to 14000, and 10.91% fell between BDT 19001 and 24000.

The survey employed the Likert scale to evaluate the quality and condition of passenger amenities, using a rating scale from 1 to 5, where 1 indicates extreme dissatisfaction and 5 indicates extreme satisfaction (Johns, 2010). Table 5 illustrates the satisfaction levels regarding passenger amenities at Mohakhali Bus Terminal, revealing that no respondents expressed extreme satisfaction with any of the amenities.

Notably, in the list of the passenger amenities, the ticket counter received the highest satisfaction, with 79.09% of respondents expressing satisfaction. This suggests efficient ticketing services. Shelter coverage also scored well, with 72.73% satisfaction, indicating adequate protection from weather elements.

Conversely, a significant majority of 54.54% of respondents are dissatisfied with the provision of bus bay, among them 36.36% are extremely unsatisfied and 18.18% are unsatisfied. This points to potential issues such as overcrowding or poor maintenance in the bus bay area.

Satisfaction Level of Staff Facilities

Satisfaction levels of staff facilities were also collected as a part of the key informant interviews and presented in tabular form. Table 6 shows the designated roles of the 10 respondents interviewed within the terminal.

Table 6: List of Respondents (Staff)

S. N.	Roles	Location of work
1	Ticket Counter Staff	Inside Terminal Main building
2	Bus Operator	Outside Terminal Main building
3	Ticket Counter Staff	Inside Terminal Main building
4	Ticket Counter Staff	Outside Terminal Main building
5	Ticket Counter Staff	Outside Terminal Main building
6	Ticket Counter Staff	Inside Terminal Main building
7	Bus Operator	Outside Terminal Main building
8	Ticket Counter Staff	Inside Terminal Main building
9	Ticket Counter Staff	Inside Terminal Main building
10	Terminal official	Inside Terminal Main building

The satisfaction level of staff for their facilities provided in Mohakhali Bus Terminal, which indicates that both of the staff facilities are fostering a positive satisfaction level as seen in Table 7.

Table 7: Satisfaction Level of Staff Facilities

Staff Facilities	Satisfaction Level (%) [n=10]				
	1	2	3	4	5
Toilet coverage	0	0	10	50	40
Toilet condition	0	0	0	60	40

Here, while 50% are satisfied with toilet coverage, and 60% with toilet condition, the absence of other amenities like canteens and locker rooms may affect overall job satisfaction and comfort.

Satisfaction Level of Facilities for Bus Maintenance

The satisfaction level of terminal's bus maintenance facilities shown in Table 8 is based on the interviews, which indicates that none of the bus maintenance facilities falls under extremely satisfied or extremely dissatisfied according to any respondents.

Table 8: Satisfaction Level of Bus Maintenance

Bus Repair and Maintenance Facilities	**Satisfaction Level (%) [n=10]**				
	1	**2**	**3**	**4**	**5**
Repair workshop	0	0	10	90	0
Washing facilities	0	0	30	70	0
Garage facilities	0	50	30	20	0

Staff feedback on bus maintenance facilities, detailed in Table 8, shows high satisfaction with repair workshops (90%) and washing facilities (70%). However, garage facilities received a 50% dissatisfaction rate, suggesting issues such as inadequate space or maintenance concerns that need to be addressed to ensure efficient bus operations.

Identified Issues at Mohakhali Bus Terminal

Cleanliness and Hygiene Issues

The terminal experiences significant deficiencies in cleanliness, frequently resulting in unpleasant odors. Requirement for consistent sanitation and hygiene protocols. The situation is exacerbated by deteriorating wall paint and neglected flooring. There is also a deficiency in cleaning supplies and neglected waste receptacles.

Accessibility Issues

There are insufficient facilities for passengers with disabilities and the elderly, including ramps and accessible infrastructure. It is difficult to access facilities such as prayer rooms.

Inadequate Lighting and Security

The terminal and bus areas lack adequate lighting. The lighting fixtures are either not maintained or broken, and cheaper, temporary alternatives are functioning below capacity. Inadequate lighting coverage results in potentially dangerous circumstances following darkness after sunrise. Insufficient security and monitoring.

Bus Parking and Organization

The bus parking at the terminal is markedly disorganized, resulting in delays and congestion. Buses obstructing access points to the terminal render it inaccessible for numerous buses and prevent them from reaching the bus bay. Which leads to passenger inconveniences.

Technology and Connectivity

The terminal facilities lack adequate technological attachments. Incorporating the absence of public Wi-Fi connections within the terminal. Absence of real -time digital information systems. Technology integration for passenger guidance and services is significantly constrained.

Inadequate Repair and Maintenance of Facilities

The terminal encounters significant repair issues, with the exception of the restrooms and counter booths, which are well-maintained. Additionally, these encompass worn out wall paint, soiled and stained windows, malfunctioning lights, floors not being clean, and damaged or missing signage. There are also dirty and oil-spill-filled bus bays. This significantly impacts the passenger experience and the overall functionality of the area.

Recommendations

The following recommendations have been formulated based on the findings of this study, drawing upon internationally recognized standards and best practices in terminal management, urban infrastructure, and public service delivery. These recommendations are intended to address the identified challenges and to support the development of more efficient, sustainable, and user - centered terminal operations.

1. As the entire terminal is found to be not very clean, most of the respondents emphasize the terminal's cleanliness 89.09% ranked this as first priority and 9.09% ranked this as second priority. Regular monitoring and attention should be held with representatives from lessees of bus terminal (Motor Labor Union), toilets and vendors to ensure cleanliness of terminal area.
2. The majority of people also prioritized increasing lighting after cleanliness (4.55% ranked this as first priority 78.18% ranked this as second priority and 17.27% ranked it as their third priority; Fig. 8).
3. Initiatives for immediate repair and renovation of all terminal facilities (passenger amenities, staff facilities and bus maintenance facilities) should be undertaken.
4. Some terminal facilities such as left luggage and lost property office, separate waiting room for women should be introduced in the terminal.
5. Role of Dhaka North City Corporation on the overall operation and management of bus terminal, toilets and market should be identified. There should be regular monitoring and evaluation of functionality and facilities even after lease agreement by the DNCC.

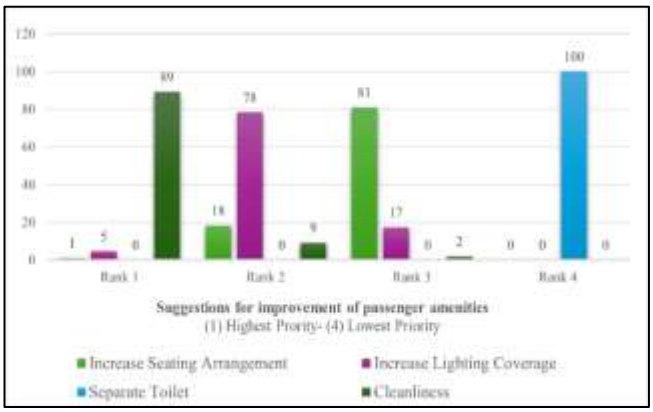

Fig. 8: Respondents' Preference to Improve Passenger Amenities

Conclusion

Mohakhali Bus Terminal is among the largest and most congested terminals in the southern region of Bangladesh, with numerous passengers relying on it for intercity transit. This study found that while the terminal includes facilities that meet global standards, their condition is often perceived as subpar. According to user feedback, the overall condition of the terminal area is characterized by inadequate cleanliness and insufficient maintenance. Key functional issues highlighted by passengers include the dysfunctional bus bays and sidewalks and the lack of separate seating for female passengers. While user perception data shows satisfaction with some amenities, it also reveals that overall satisfaction is critically undermined by poor cleanliness and the condition of the bus bay. The absence of adequate monitoring and maintenance is a primary cause of this progressive deterioration. Therefore, the Dhaka North City Corporation and Terminal Authority must promptly implement coordinated initiatives focused on cleanliness and facility maintenance to improve the user experience. These findings contribute to the discourse on sustainable urban transport infrastructure in rapidly urbanizing Global South contexts.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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