

Report | October 2026

Are Microbuses Suitable as Public Transport Vehicles?

Authors Anannya Jha
 Himani Jain

Pilot on Narrow, Medium-Demand Routes
in Raipur, Chhattisgarh



Copyright © 2026 Council on Energy, Environment and Water (CEEW).



Open access. Some rights reserved. This work is licenced under the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) licence. To view the full licence, visit: www.creativecommons.org/licenses/by-nc/4.0/legalcode.

Suggested citation: Jha, Anannya, and Himani Jain. 2026. *Are Microbuses Suitable as Public Transport Vehicles? Pilot on Narrow, Medium-Demand Routes in Raipur, Chhattisgarh*. New Delhi: Council on Energy, Environment and Water.

Disclaimer: The views expressed in this report are those of the authors and do not reflect the views and policies of the Council on Energy, Environment and Water.

Cover image: CEEW.

Peer reviewers: The authors of this study would like to thank the following reviewers for providing critical feedback and comments to refine this report: Dr. Nitika Bhakuni, Sr. Associate Professor, CEPT University; Dr. Vivek Agnihotri, Assistant Professor, NIT Raipur; Karthik Ganesan, Fellow and Director, CEEW; Dr. Neerav Sharma, former Programme Associate, CEEW and Dharshan Siddarth Mohan, Programme Associate, CEEW.

Publication team: Archana Chandrashekar (CEEW); Alina Sen (CEEW); Shreyas Sharma; FACET Design; and FRIENDS Digital Colour Solutions.

Acknowledgments: This project is undertaken with the support of Bosch India Foundation.

Authors thank Shri Jaideep, ex-OSD Urban Transport and Shri Yogesh Antil, Director from MoHUA for their regular guidance. We are grateful to Shri S. Prakash, Secretary, Transport Department, Government of Chhattisgarh, and Shri Sambit Mishra, Municipal Commissioner, Raipur Municipal Corporation, for their mentoring and support. We thank officials from Raipur Nagar Nigam Transport Limited and Mr. Aman Jain and team from Manish Travels for their constant support throughout the pilot.

We owe gratitude to our team members at CEEW — Divyanshu Yadav, Mahaveer Jain and Khushi Prakash for collecting the datasets and monitoring operations in the field; to Sourav Dhar for engagements with the key stakeholders; to Saoni Sanyal and Udit Narayan for supporting the training sessions and launch event; and to Rishi Singh for engaging and managing media. We thank Urban Design Dynamics team for operations of pilot buses and outreach to the users.

Organisation: The Council on Energy, Environment and Water (CEEW)—**a home-grown institution** with headquarters in New Delhi—is among the **world's leading climate think tanks**. The Council uses **data, integrated analysis, and strategic outreach** to support public policy, transform markets, shape technology, and nudge behaviour. It addresses pressing regional and global challenges through an **integrated and internationally focused** approach. The Council prides itself on the independence of its high-quality research and strives to **impact sustainable development at scale**.

Council on Energy, Environment and Water

ISID Campus, 4 Vasant Kunj Institutional Area

New Delhi – 110070, India

+91 11 4073 3300

info@ceew.in | ceew.in |  @CEEWIndia |  ceewindia

Are Microbuses Suitable as Public Transport Vehicles?

**Pilot on Narrow, Medium-Demand
Routes in Raipur, Chhattisgarh**

Report | October 2026

Anannya Jha and Himani Jain



Microbus parked at the railway station after completing a trip during the pilot in July 2026

Foreword



**Ministry of Housing
and Urban Affairs**
Government of India



Shri Tokhan Sahu

Minister of State,
Ministry of Housing and Urban Affairs

India's cities are at the heart of the country's growth and transformation. As urbanisation continues, building cities that are productive, inclusive and sustainable is essential. Cities must ensure that people can move safely, affordably and efficiently.

Public transport has a central role in this transformation. Government of India A strong and accessible public transport system can reduce dependence on private vehicles, ease congestion, improve air quality and expand access to economic and social opportunities. For many small and medium-sized cities, however, the challenge is to develop public transport solutions that are suited to their road networks, travel demand and local context. Thus, our public transport systems must evolve to meet the needs of cities of different sizes and forms.

Microbuses can play an important role in addressing this gap. Their smaller size and operational flexibility can provide affordable public transport on corridors - where conventional buses may not be suitable. Microbuses can improve the supply and services of public transport to clean air, reduce congestion.

I am pleased to see the Council on Energy, Environment and Water (CEEW) has taken the initiative of micro-buses for smaller cities - conducted the pilot, and is examining the potential of microbuses. This report brings timely evidence to an important question for the future of mobility in our cities. I commend CEEW for undertaking this work with Raipur city and working closely with the Transport Department, Chattisgarh.

I hope that its findings will support City Transport Undertakings and Urban Local bodies in building public transport systems that are accessible, affordable and efficient.



Conductor cleaning the microbus at the depot before the start of service during the pilot in July 2026

Foreword



**Ministry of Housing
and Urban Affairs**
Government of India



Shri Satendra Singh, IAS

Secretary, Ministry of Housing and Urban Affairs

Translating the vision of inclusive urban mobility into working systems on the ground is one of the central responsibilities of this Ministry. It is important for city governments to have multiple options suited to their citizens' requirements, as the mobility needs of Indian cities are diverse.

Smaller and emerging cities often have narrower roads, dispersed travel demand and different operating conditions from large metropolitan centres. In such contexts, public transport solutions need to be flexible, right-sized and responsive to local needs. Microbuses can provide an important option by extending organised public transport to corridors and areas that may not be suited to conventional buses.

The experience of cities and towns across India demonstrates the importance of developing mobility solutions that respond to local conditions. Microbuses can complement existing public transport systems and, where appropriate, offer a practical pathway for cities that are yet to develop formal bus services. With suitable planning, vehicle choices and operating models, such services can be adapted and scaled across cities with similar mobility needs.

This report by the Council on Energy, Environment and Water (CEEW) contributes to this effort by examining the role of microbuses in strengthening urban public transport. I appreciate CEEW's efforts to generate evidence from the field and examine a practical mobility solution for Indian cities. I hope the findings of this report will help states, urban local bodies and transport agencies plan and scale public transport systems that are accessible, efficient, clean and fit for purpose.



Microbuses at the Pandri bus-depot of Raipur, 13th July 2026

Council on Energy, Environment and Water

INTEGRATED | INTERNATIONAL | INDEPENDENT

The Council—a **homegrown institution** with headquarters in New Delhi—is **among the world's leading climate think tanks**. We use **data, integrated analysis, and strategic outreach** to support public policy, transform markets, shape technology, and nudge behaviour. CEEW addresses pressing regional and global challenges through an **integrated** and **internationally focused** approach. It prides itself on the independence of its high-quality research and strives to **impact sustainable development at scale**.

CEEW IN NUMBERS

16 years
16 research teams
400+ team members
680+ peer-reviewed studies

240+ policies & plans informed
80,000+ livelihoods enabled

770+ convenings
800+ opinion articles
52 mn reached via films & documentaries

CEEW'S LEADERSHIP

Board: Mr Jamshyd Godrej (Chairperson);
Dr Suresh Prabhu; Mr Amitabh Kant; Dr Janmejaya Sinha;
Mr Montek Singh Ahluwalia; Dr Naushad Forbes;
Mr S. Ramadorai, and Ms Vinita Bali

CEO: James Abraham

CEEW'S STRATEGIC PILLARS

Clean electricity penetration
Low-carbon industrialisation & circularity
Security of fuels of the future
Quality of life
Green economy & livelihoods
Sharing lessons from India

SELECT POLICY ENGAGEMENTS

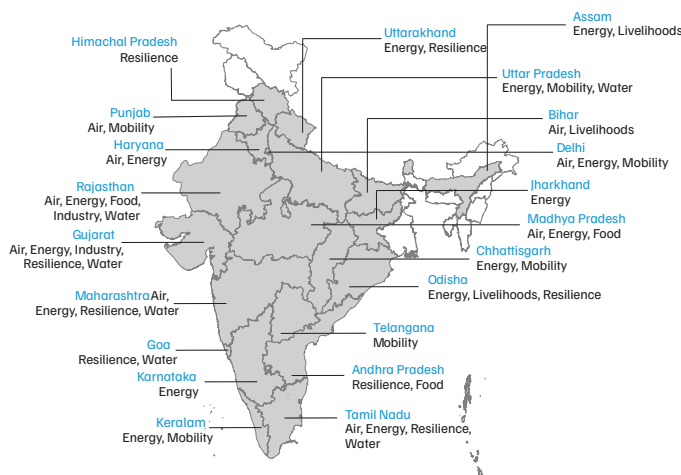
NATIONAL/INTERNATIONAL

2011 | National Water Resources Framework
2014 | 175 GW renewables target
2015 | International Solar Alliance
2016 | PM Ujjwala Yojana
2017 | *Saubhagya Scheme*
2019 | *India Cooling Action Plan*
2021 | Net Zero by 2070
2022 | *Mission LiFE*
2022 | *National Bioenergy Programme*
2022 | E-waste (Management) Rules
2023 | G20 Green Development Pact
2023 | *National Green Hydrogen Mission*
2024 | Green Steel Taxonomy
2024 | *PM Surya Ghar Yojana*
2025 | *National Critical Mineral Mission*
2025 | Rajya Sabha Guidelines on Crop Residue Burning
2025 | India's Carbon Credit Trading Scheme (CCTS)
2025 | IFSCA's Framework for Transition Bonds
2026 | Disaster Risk Index for 16th Finance Commission
2026 | India's NDC 3.0
2026 | India's Scenarios towards Viksit Bharat and Net Zero

STATE

2022 | *Rajasthan Organic Farming Mission*
2022 | *Jharkhand State Solar Policy*
2022 | *Uttar Pradesh Vidyut Sakhi programme*
2023 | *Rajasthan Renewable Energy Policy and Green Hydrogen Policy, 2023*
2023 | *Uttarakhand Solar Policy*
2025 | Green Odisha Initiative
2025 | *Maharashtra Climate Action Plan 2.0*
2025 | *Delhi Clean Air Action Plan*
2026 | *Delhi EV Policy 2.0*
2026 | Bihar Promotion of New and Renewable Energy Sources
2026 | Gujarat Integrated Renewable Energy Policy and Green Hydrogen Policy
2026 | *Uttarakhand Mukhyamantri Saur Swarojgar Yojana*
2024-26 | Directives of Commission on Air Quality Management
Net Zero Roadmaps (BH, GJ, TN, UK)
Agroforestry Roadmaps (AS, MH, OD)
140+ Heat Action Plans (GJ, MH, OD, TN)
Treated Used Water Reuse Plans (MH, UP)
Flood Risk Mitigation Plans (GJ, MH)

21 STATES SUPPORTED





रेलवे स्टेशन
⇌
टाटीबंध चौक
मात्र ₹25

Elderly passengers using microbus for their commute during the pilot in Raipur, July 2026

Contents

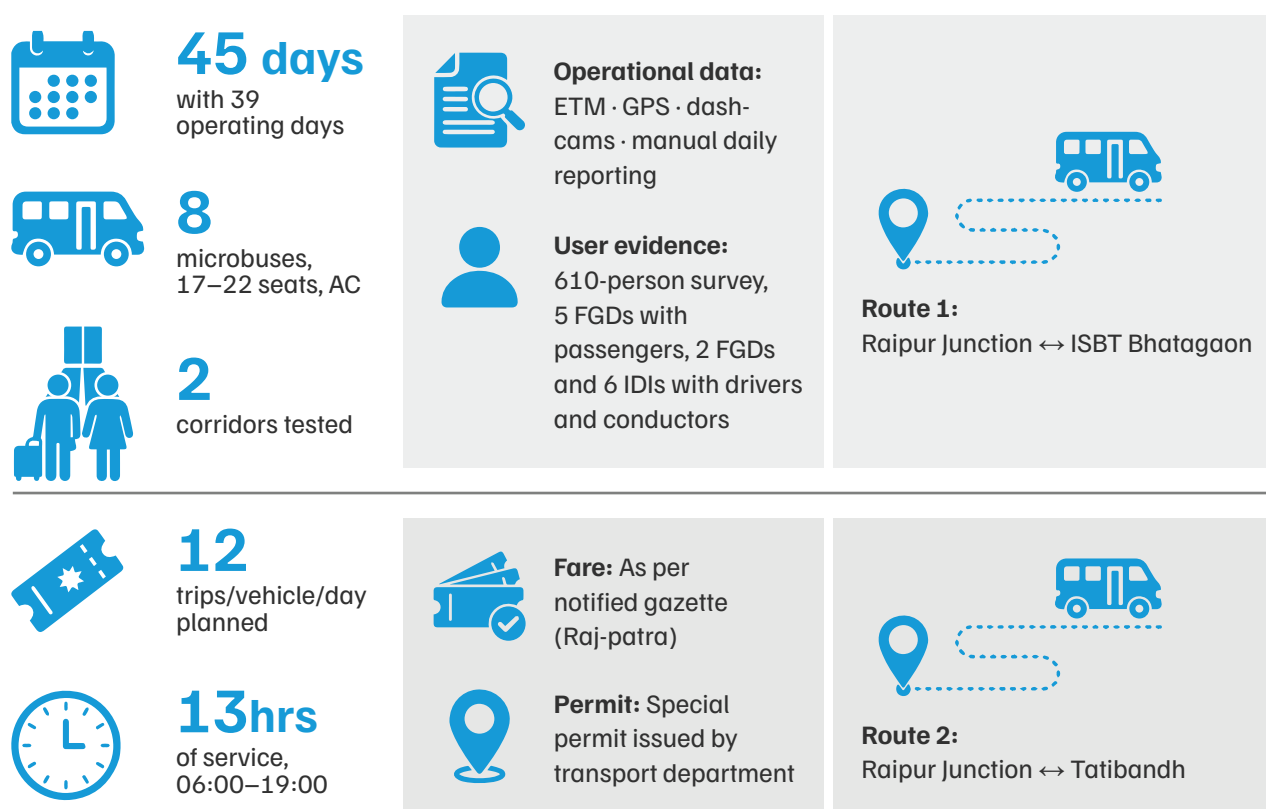
Section	Pg
Executive summary	1
1. Introduction	4
2. About the microbus pilot	5
2.1. Pilot design and rationale	5
2.2. Route selection	6
2.3. Service design	7
2.4. Data collection and analysis methodology	8
2.5. Limitations of the designed pilot plan	9
3. Findings from the pilot	11
3.1. Proposition 1: Operational viability of minibuses	11
3.2. Proposition 2: Vehicle suitability for stage-carriage operations	19
3.3. Proposition 3: User acceptance and affordability	23
4. Recommendations and way-forward	28
4.1. City level recommendations: Operations and service design-related	29
4.2. Scaling at state level	30
4.3. Central Government nudge to build the market	31
4.4. Next step to analyse the other parameters of pilot performance	31
Acronyms	33
References	34

Executive summary

India will have about 4,200 cities by 2031. Of these, roughly 4,000 small and medium towns do not have any formal public transport system. The *PM-eBus Sewa* scheme only covers up to 169 cities (with populations of three lakh and above). Small and medium towns lack the passenger volume for a standard bus, and have narrow congested roads that have evolved organically over decades. We estimate urban India will need about 6.5 lakh stage-carriage microbuses by 2031, 77 per cent of them in these towns, acting as the missing mode between the auto-rickshaw and the full-size bus (Jain et al. 2026).

Microbus¹ pilot examines the three key propositions of operational viability, vehicle suitability and user acceptance: To test whether a microbus can fill the gap as formal public transport, the CEEW, with the support of Government of Chhattisgarh, under guidance from the Ministry of Housing and Urban Affairs (MoHUA), designed and conducted a 45-day pilot in Raipur in June–July 2026. Raipur is a representative city, with only about 30 active city buses against an estimated need of 600 to 900 buses. This gap, today is served by informal shared auto- and e-rickshaws, amid narrow roads in the core old-city area, medium-dispersed demand corridors, and mixed traffic.

Figure ES1. Overview of the microbus pilot planned and implemented by CEEW in Raipur



Source: Authors' analysis

¹ Microbus has no standard definition. CEEW study considers a microbus as M2 category vehicle with seating capacity between 10 to 22.

Table ES1. Key pilot findings examines and develops the takeaway for each proposition

Proposition	Takeaway
A. Is the microbus operationally viable for a scheduled stage-carriage service, especially on medium-demand urban corridors? • Robust services during pilot: The pilot achieved 98.4 per cent service availability, covering around 36,000 kilometres, over 3,200 trips. The service recorded an average seat-fill² ranging between 30 and 80 per cent across 39 operating days. • Demand built fast: The pilot recorded 18,682 boardings—an average of 479 a day, a peak of 722, and a weekly mean never below 430 except the first week. Outbound Route 1 experiences crowding in peak hours, with standing passengers - suggesting additional microbus supply in 8:00-13:00 hours. • Operating costs are higher on the narrow stretches of the route: Weekday and weekend performance variation is significant on one Route 2—the demand spreads even further from peak over weekends. The 17-seater seat vehicle matched demand. The speed on Route 1 fell to 7.5 kilometres per hour in the congested narrow stretches—lowering the fuel efficiency in comparable vehicles by almost 15-20 per cent.	Yes
B. Are currently available microbus models suitable as per varied stakeholders, and especially on narrow roads? • Narrow roads manoeuvrability: Pilot completed 88 per cent of planned trips, sustaining a scheduled service on the constrained Route 1 that no city bus had operated on before—and managed to do so with no incident attributable to vehicle width. • The vehicle, not the vehicle class, is the constraint: Contract-carriage models pressed into stage-carriage duty caused some maintenance incidents; no electric variant exists in the 10-22 seat band; and the shortfall in trips traced to extended layover time, rather than to any limitation of the vehicle class.	Partially
C. Do users accept the microbus service and can mostly afford it? • Users: The microbus users surveyed inside the vehicle are mostly workers (52%), commuting at around four times a week (about 50%) and often cover 4-12 kilometres in each trip. • Acceptance and their shift: 95.8 per cent users were willing to continue using the service; 63.7 per cent of all users had shifted from auto- and e-rickshaws, and 13.8 per cent from two-wheelers, drawn by lower fares (78 per cent), air-conditioned and comfort (74 per cent), and safety (55 per cent). • Affordable—most of all for the lowest income group: Individual transport expense to household income ratio fell from 6.9 to 3.1 per cent on average; for the poorest households, the percentage fell from 13.9 to 6.6 per cent, improving the level of service from four to two.	Yes

Source: Authors' analysis

² Seat-fill or seat utilisation = total boarding ÷ seats offered (seats × trips operated). It is a capacity-utilisation measure and is not distance-weighted; it does not represent the average number of passengers on board at a given point on the route.

Recommendations: Mode shift delivered net cuts of about 2.23 kg of PM2.5, 20.3 kg of NOx, and 7,249 kg of CO₂ equivalent (CO₂e), modelled for 39 days of operations. Each microbus trip replaced roughly 3.5 auto- or e-rickshaw trips, and formal operation

supports about four direct jobs per vehicle. To translate these benefits into action, we developed key recommendations at different governance levels (figure ES2).

Figure ES2. Key recommendations at different governance levels- city, state, and national

	Right-size the vehicle	Design the service	Plan ahead for the cost
Act now City Raipur	• Match vehicle size to corridor demand and road width same corridor gives 80% occupancy on a 17-seater against 42% on a 9-metre bus	• Schedule to observed demand, not a commuter template peak varied on both corridors • Build permanent, signed stops at high-turnover nodes generates trust amongst the user • Consider auto and e-rickshaw operators as crew reduces pushback from existing auto drivers	• Hold the fare, earn from a small premium tier commute spending fell from 6.9% to 3.1% of income • Budget for the narrow-corridor cost penalty 20% lower fuel efficiency, 5 km/hr slower
Scale next State Chhattisgarh	• Plan for testing and deployment of vehicles sized by demand and width in the remaining 16 small and medium cities populations of 50,000 to 300,000	• Extend trials to other PM-eBus Sewa cities of the state two are already allocated mini buses, acknowledging demand is typically below the standard-bus	• Contract multi-city and long-term competitive bids can uncover a CPK lower than 9-metre e-bus after subsidy
Build the market National India		• Issue a model contracting and governance template micro-buses are nascent modes in stage-carriage operations in India	• Fund multi-model, multi-fuel trials limited models are available currently; no electric variant exists

Source: Authors' analysis

Beyond these priorities, the pilot points to a further set of actions.

For Raipur: a permanent, signed network of intermediate stops is critical. The costing of transit systems is different in width-constrained corridors, due to low speeds, delays and low mileage, thus, CTUs must account for it. State government, original equipment manufacturers (OEMs), and vehicle body builders must collaborate to redesign vehicle interiors and ergonomics around boarding, standing passengers, aisle width and seats layout to develop purpose-built vehicles.

The MoHUA must convene to develop microbus vehicle specifications, model-aggregated

procurements, and standard contracting templates. We highly recommend a multi-model and multi-fuel trial programme to close the evidence gaps.

In a nutshell, the Raipur pilot demonstrates that the microbus can run as formal, affordable, and well-accepted city public transport, on precisely the same narrow corridors India's small and medium cities struggle to serve. Turning the Raipur pilot into a national initiative now rests on two moves; cities and states further test the operations-learning from the pilot, and the national government funds these pilots and develops the microbuses market with specifications developments, contracting templates and governance models.

1. Introduction

India is expected to have around 4,200 statutory cities by 2031 (UN DESA 2025), of which about 4,000 will be in the small and medium category with populations between 20,000 and 300,000 people (Kumar, Prasad and Akileswaran 2026). Around 120 cities nationwide have formal public transport systems, of which only 31 cities have a dedicated city transport undertaking (ASRTU, MSRTC and ITDP 2023). The *PM-e bus Sewa* scheme championed by the Ministry of Housing and Urban Affairs (MoHUA), Government of India, aims to sanction 10,000 electric buses to 169 cities with a population over three lakh as per Census 2011 (PIB 2023). But over 4,000 small and medium cities (between 20,000 and 300,000 people) fall outside the scheme, as most lack the critical passenger volume for a viable standard bus system.

There is a need to identify the right vehicle for public transportation in small and medium cities, one that can optimally meet passenger demand while addressing the level of service expectations. A microbus can be a potential solution. Such a vehicle could provide cities with a formal bus transit system to address the challenges of congestion, affordable mobility, and passenger transport emissions. A CEEW report estimates that urban India will need 6.5 lakh stage-carriage microbuses in 2031, with fixed routes and stops, of which 77 per cent of the demand lies in small and medium towns (Jain et al. 2026).

Pilots of microbuses shall help assess the feasibility of existing vehicle models in the market by testing them for stage-carriage public transport. It also assesses their suitability for serving constrained and medium-demand corridors and narrow roads. To assess their potential for scaling across the 4,000 small and medium cities in India, CEEW conducted microbuses pilot in Raipur. Before the pilot, we analysed seven select case-cities across India. Several discussions with stakeholders like government and industry, vehicle and technology consultations with OEMs and operators under the guidance of MoHUA, informs the pilot design.

Why Raipur?

Raipur, the capital city of Chhattisgarh, with an estimated population of around 15 lakh, currently operates around 30 city buses against an estimated requirement of 600 to 900 buses³. The city is expected to receive 100 nine-metre-long e-buses under the *PM-eBus Sewa* scheme (MoHUA 2026), to cover the partial gap in public transport supply. Multiple important routes in the city have low-to-medium demand and/or narrow roads that cannot be served by nine-metre midi- and standard buses. Microbuses could be a potential solution for such roads, enhancing formal public transport, and complementing the existing and planned bus network.

We selected Raipur as a case city to test this proposition under real operating conditions. Before finalising the pilot design, we consulted several senior government officials from Raipur city and Chhattisgarh state to identify local transport needs, operational constraints, and opportunities to integrate microbuses into the city's public transport system.

Right-sized public transportation vehicle can optimally serve passenger demand, while meeting the level of service.

³ According to standards set by the MoHUA, cities require 40 to 60 buses per lakh urban population.

2. About the microbus pilot

The CEEW, under the guidance of MoHUA and the Government of Chhattisgarh, designed the pilot and also implemented it in Raipur in June 2026. The Member of Parliament for Raipur flagged off the pilot, in the presence of the local MLA and the Secretary,

Transport Department, Government of Chhattisgarh. The microbus initiative received strong early interest and support from local authorities, Raipur Municipal Corporation, Raipur Nagar Nigam Transport Limited (RNNTL), other key stakeholders, and the media.



Image: CEEW

Shri Brijmohan Agrawal, MP, Raipur, flagged off the microbus pilot in Raipur in the presence of Shri Purandar Mishra, MLA, Raipur City North and Shri S. Prakash, Transport Secretary, Chhattisgarh, at Town Hall, Raipur, on 11 June 2026.

2.1. Pilot design and rationale

The pilot was designed for 45 calendar days, with eight M2-category vehicles deployed on two corridors, and operating as a scheduled stage-carriage service with fixed stops and a defined fare.

- **Why 45 days—** The duration was settled through consultation with academic and industry experts and agreed with state and city agencies, allocating 10 to 14 days to route familiarisation and outreach and four to five weeks to structured data collection.
- **Why stage-carriage—** This allowed the microbus to be assessed as part of a formal public transport

system rather than as an informal or demand-responsive service. Selected vehicles received a special permit from the Transport Department to perform up to six round trips daily on one of the selected corridors.

The pilot aimed to examine three propositions:

1. **Operational viability –** Is the microbus operationally viable for a scheduled stage-carriage service, especially on medium-demand urban corridors?

2. **Vehicle suitability** – Are currently available microbus models suitable as per varied stakeholders, and especially on narrow roads?
3. **User acceptance and affordability** – Do users accept the microbus service and can mostly afford it?

2.2. Route selection

Two corridors were chosen for the pilot operations so that the pilot could test different operating conditions: a constrained, congested corridor where no city bus service had sustained, and a wider corridor with medium demand that had carried no city bus for years.

We proposed multiple route options to RNNTL, the city transport undertaking (CTU). The options spanned a mix of narrow stretches, residential coverage, mid-demand corridors, and sections of major corridors, so that the pilot could be assessed across the full range of operating conditions. Out of the proposed options, the final two routes were nominated by RNNTL in view of corridor importance and certain constraints⁴. The special permits to operate on nominated routes

were issued by the Transport Department because regular permits to operate as stage-carriage were not applicable for this vehicle segment, as per the existing law. Table 1 presents the details of selected corridors

- **Route 1—Raipur Junction to ISBT Bhatagaon via Pachpedi Naka**— examines operations under physical constraints and congestion. The route has small stretches with an effective carriageway below 5.5 metres, heavy traffic, and strong resistance from intermediate para transit (IPT) drivers, which the city bus service could not sustain; hence, no city buses operated on this route even the route being notified. The question this route tries to answer is whether a smaller vehicle can hold a scheduled service where a standard bus could not.
- **Route 2—Raipur Junction to Tatibandh via GE road**—The carriageway is wide enough for standard buses throughout, and the city's incoming electric buses are expected to serve it, but the corridor has had no city bus service for more than half a decade. It serves seven colleges; several were on semester break during the pilot, so institutional trip demand ran below what a normal academic term would generate. That placed the corridor squarely in the medium-demand band.

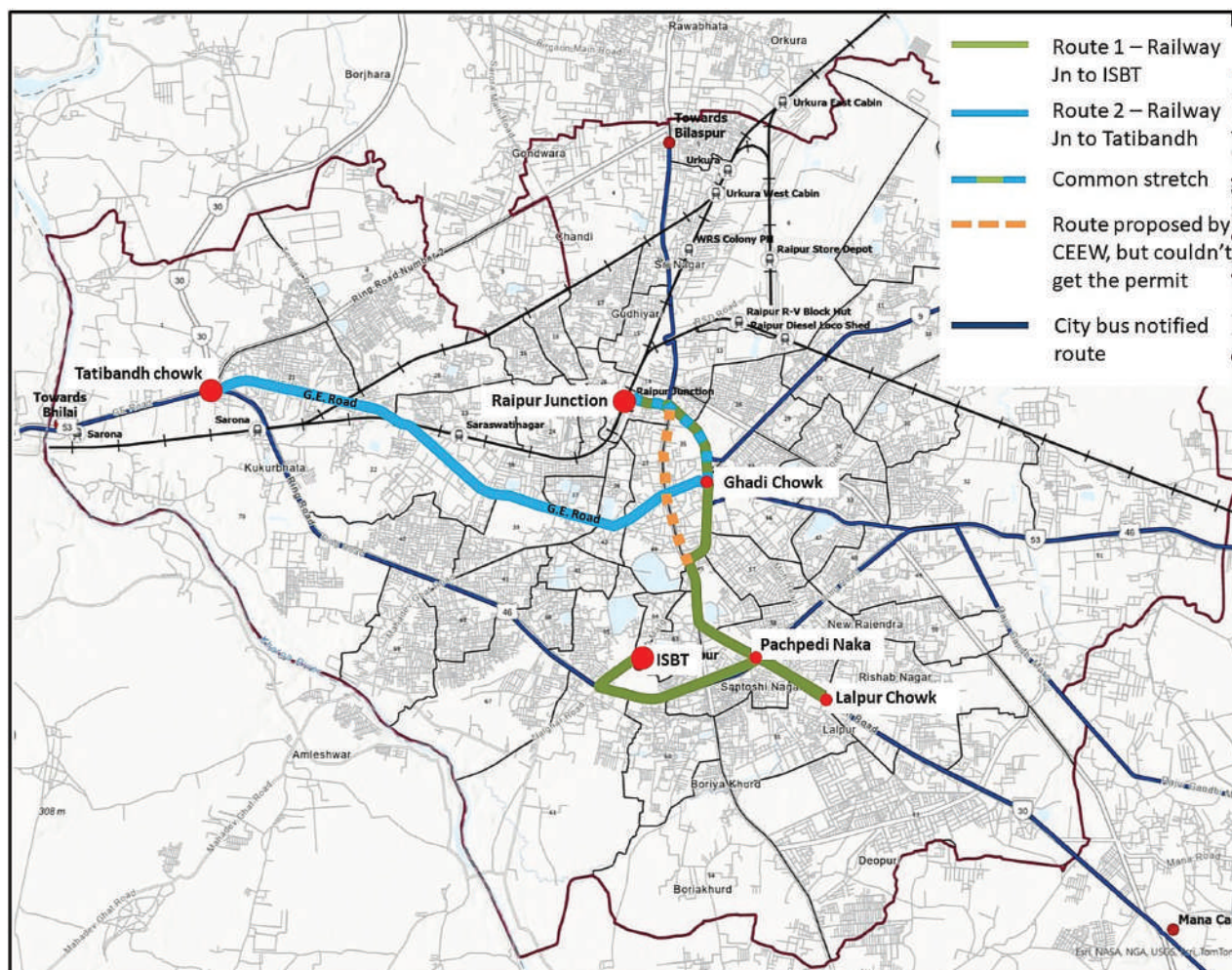
Table 1. Both the selected corridors connect the Raipur Junction railway station to important city nodes like hospital, colleges, bus terminus, and key markets

Parameter	Route 1: Raipur Junction–ISBT Bhatagaon	Route 2: Raipur Junction–Tatibandh
Route length (km)	12.3	10
Important nodes/ junctions	Ghadi Chowk, Siddharth Chowk, Pachpedi Naka Chowk, MMI Laalpur, Bhatagaon Chowk	7 colleges (AIIMS, NIT, Ravishankar University, Sanskrit College, Science College, Ayurved College, and RK College) and 4+ major commercial hubs (Ravi Bhawan complex, Shastri Bazar, Lalganga Shopping Mall, Shaheed Veer Narayan Singh Parisar)
City bus service history	City bus operation couldn't sustain here due to constrained stretches interlocked between the full stretch, congestion, and pushback from IPT drivers.	No city bus operating currently. Route last had a bus service more than half a decade ago.

Source: Authors' compilation

⁴ Constraints included the absence of public transport infrastructure, the location of sensitive and high-profile buildings, high-footfall areas congested throughout the day by private vehicles, and corridors of low demand or limited strategic importance.

Figure 1. Selected routes for the microbus pilot span two key city corridors in Raipur



Source: Authors' analysis

2.3. Service design

Eight air-conditioned Force Motors vehicles (Traveller and Urbania) - seating capacity 17 to 22, different model and body configuration, age ranging one to eight years, and diesel fuelled with mixed BS IV and BS VI engines (Table 2) were rented from existing operators and deployed as stage-carriage services on the two routes. The service was planned for 40 operational days, running from 06:00 to 19:00 hours daily. Stops were designated in advance: some were pre-notified locations with pre-built passenger infrastructure, and the rest were landmarks the project team marked with signage. Four vehicles deployed

on each route, each planned for six round trips (or 12 one-way trips) daily, at gazette notified slab-wise fare (INR 13 for 0-4 kilometres, INR 19 for 4-8 kilometres, INR 24 for 8-12 kilometres and INR 30 for more than 12 kilometres). Drivers came with the vehicles, and conductors were hired separately, which kept passenger-counting and fare-reporting independent of the operator. The CEEW contracted a local firm, Urban Design Dynamics Raipur (UDDR), to manage fleet deployment, manpower, and daily operations. Our team engaged in pilot implementation, monitoring and data collection at site for the entire project duration.

Table 2. Fleet age ranged from under a year to eight years, with five of the eight vehicles aged one year or less

Nomenclature for the report	Year of registration	Age (during pilot)	Emission norm	Seat (modified to fit the pilot use-case) ⁵
MB-1	2025	1	BSVI	17
MB-2	2019	7	BSIV	22
MB-3	2026	0	BSVI	21
MB-4	2018	8	BSIV	22
MB-5	2025	1	BSVI	21
MB-6	2025	1	BSVI	18
MB-7	2026	0	BSVI	20
MB-8	2021	5	BSIV	18

Source: Author's analysis

2.4. Data collection and analysis methodology

The pilot was assessed through a mixed-method feasibility assessment, drawing on automated and manual operational records, passenger surveys, focus group discussions (FGDs), and in-depth interviews (IDIs). The approach was designed to establish how the service operated, how passengers used the service, and how users perceived the service.

Operational data were collected through electronic ticketing machines (ETMs), global positioning system (GPS), and closed-circuit television (CCTV) cameras, supplemented by manually maintained logbooks. Passenger feedback was collected through a survey of 610 users and non-users, and five FGDs; crew evidence from two FGDs with conductors and six IDIs with the drivers. Figure 2 provides an overview of the instruments used and the evidence generated by them.

Operational data and quality control: The vendor maintained vehicle-wise operational logs daily, covering the operating timetable, vehicle utilisation, trips performed, ridership, fare collected, refuelling, maintenance and breakdowns. The CEEW's on-

ground team reviewed these at regular intervals and cross-checked with vehicle odometer readings, refuelling payment slips, driver-conductor logbook and field observations. Ridership was derived from ETM records, supplemented by manual ticketing drawn from conductors' ticket books, which accounted for around 15 per cent of total ridership; reported ridership therefore carries a small projected component. We cross-checked reported operations against dash-cam footage three to four times a week. GPS data were analysed to establish operating speed, dwell time, and route adherence. Fuel efficiency was computed at vehicle level, from total distance travelled against fuel consumed between refuelling events.

Pilot captured data from automated records using GPS, ETM, and dashboard cameras along with manual records of fuel, crew log-book and operational roadblocks.

⁵ Some vehicles, though built on an 17–22 seater body type, were fitted with more than 22 seats; the extra seats were removed during the pilot to make them suitable for the pilot's operational requirements.

- **The permitted route contained two stretches of narrow corridors:** Manoeuvrability in narrow conditions could be partially assessed; however, the results must be read in context to site conditions and cannot be a commentary on the vehicle-design.
 - **The pilot ran through the monsoon:** Almost a week of the six-week pilot operated in rainfall and on waterlogged roads which impacted the ridership. Riderships observed during pilot must be read as conservative results.
 - **Colleges on Route 2 were on semester break during the pilot duration:** Majority of commuters on Route 2 are reportedly youth, college students from seven large institutions. Thus lower educational trips are expected in overall ridership.
- This report presents only an overview of the microbus pilot performance across the three propositions. The detailed analysis requires further efforts and deep-dive using the collected datasets. This will be followed in upcoming studies.



Image: CEEW

CEEW's Anannya Jha in discussion with Team UDDR during field monitoring of the microbus pilot in Raipur on 13 July 2026.

3. Findings from the pilot

This section presents the findings of the pilot against the three propositions set out in Section 2. It draws on daily operational records for the eight vehicles—reported by the contracted vendor, verified independently by a CEEW field supervisor, and

cross-checked against ETM, GPS and CCTV data for each vehicle—together with the user and non-user surveys and FGDs/IDIs with passengers, drivers and conductors.

3.1. Proposition 1: Operational viability of minibuses

This sub-section examines whether the minibus is operationally viable for a scheduled stage-carriage service, especially on medium-demand urban corridors and creates insights for the first proposition if minibuses can be deployed for scheduled stage-carriage services, especially in narrow roads and medium, dispersed demands. For the purposes we quantitatively assess key parameters typically used for bus performance.

Service delivery

The pilot was planned for 45 calendar days. The first four days were used for technical, behavioural, and emergency response training of drivers and conductors, and the last day for collecting their feedback through FGDs and IDIs, leaving a 40-day operational window. Service was suspended for one

full day under a traffic advisory, so **operations ran on 39 days**, one of which was cut to a half-day due to waterlogging on key route stretches.

Eight vehicles across 39 operating days gives 312 scheduled vehicle-days. One vehicle-day was lost outright and the half-day suspension due to waterlogging cost four vehicle-days, leaving 307 vehicle-days held, resulting in a minibus **service availability of 98.4 per cent**. Around a dozen of those were run on a replacement vehicle due to minor breakdowns, cleanliness issues.

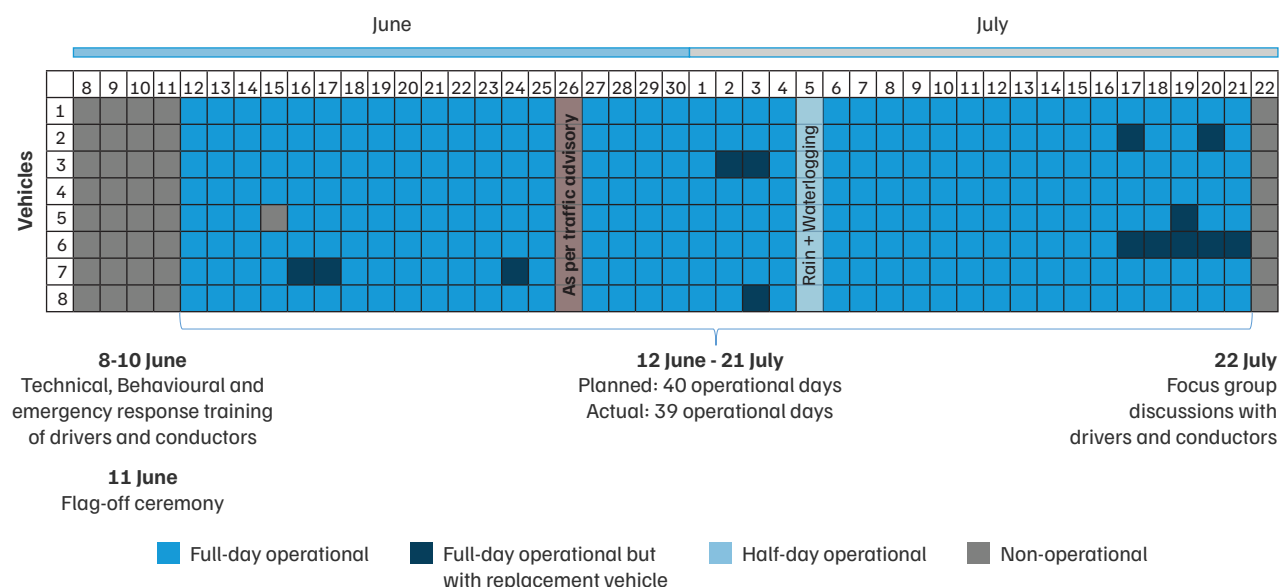
Against a schedule of 12 one-way trips per vehicle per day, vehicles completed about 10.5, or 88 per cent of planned trips, at an operated headway of about 20 to 25 minutes on both corridors. The pilot fleet operated for around **36,000 minibus-kilometres, with over 3,200 trips**.



CEEW's Saoni Sanyal and Udit Narayan conducting behavioural training for conductors ahead of pilot operations in Raipur on 8 June 2026.

Image: CEEW

Figure 3. During the 39 operating days of pilot, service availability was maintained at 98.4%



Source: Authors' analysis

Utilisation

Utilisation averaged 115 kilometres per vehicle per day on Route 1 (Raipur Junction–ISBT Bhatagaon), compared to 120 on Route 2 (Raipur Junction–Tatibandh), where comparatively higher mean operating speed and shorter route length allowed more kilometres within the same service hour. The maximum utilisation variation across the eight vehicles was about 15 per cent, ranging from a daily average of 109 to 126 km. Average utilisation was maintained at about 119 kilometres per vehicle per day, except for vehicle 4, which is the oldest of the fleet (eight years old).

Fuel efficiency

Following a similar pattern, fuel efficiency separated the corridors rather than the vehicles—4.76 kilometres per litre on Route 1 against almost six kilometres per litre on Route 2—a gap of 20 per cent on near-identical daily running—costing INR 21.6 per kilometre on Route 1 against INR 16.8 per kilometre on Route 2, at a diesel price of INR 101.32 per litre (June 2026 in Raipur).

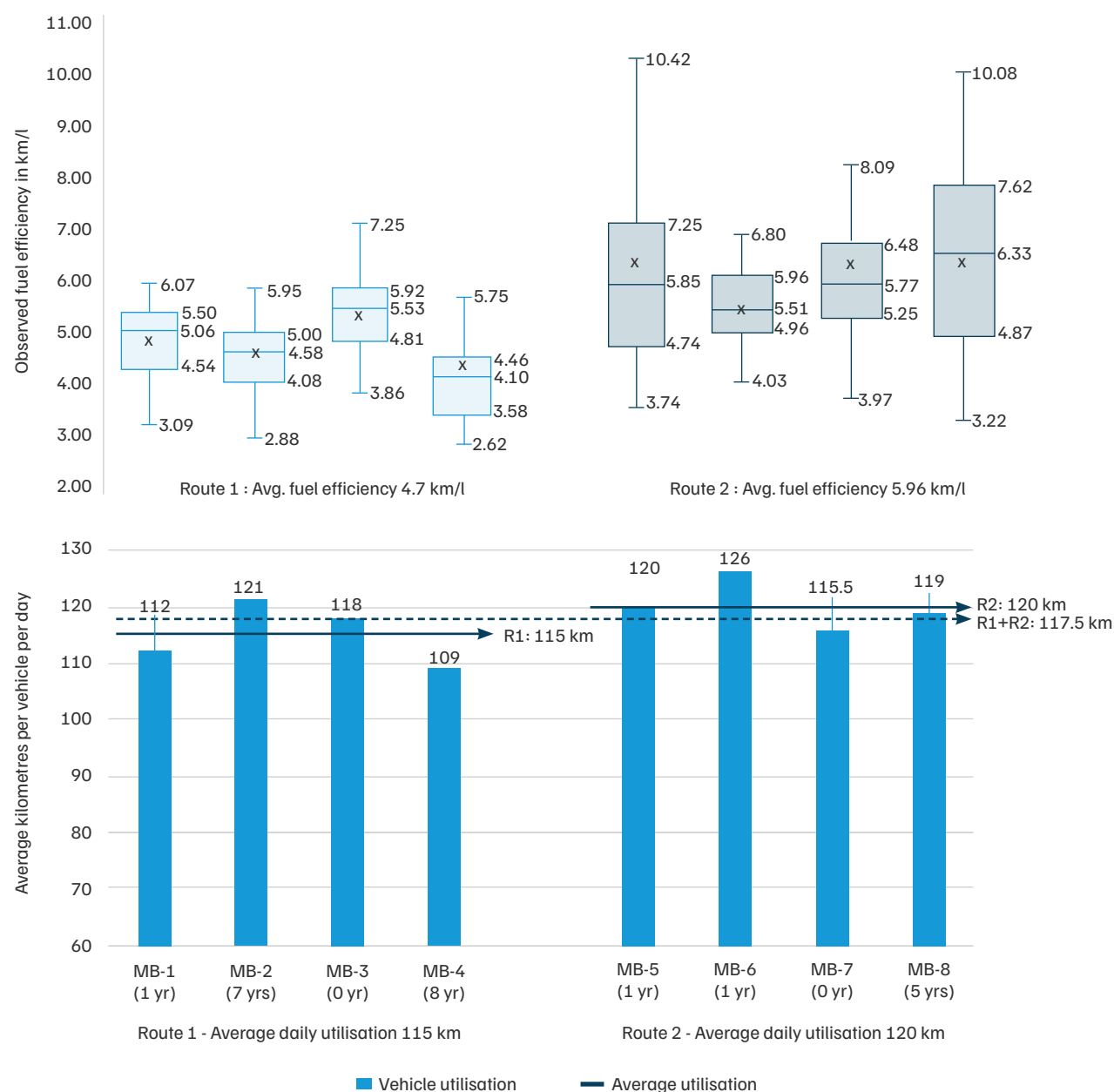
Weekday and weekend performance variation is insignificant in case of Route 1 which remains almost the same at 4.77 kilometres per litre on weekdays

against 4.76 at weekends, a negligible difference of 0.2 per cent. However, Route 2 improved by 7.6 per cent at weekends, from 5.82 to 6.26 kilometres per litre. It could partially be explained by lesser congestion levels due to lower education and commercial activities.

When compared for different microbus models, the fuel efficiency spans a factor of 1.5x. It ranges from 4.18 kilometres per litre for the MB-4 to 6.33 kilometres per litre for the MB-8. However, given the six different models, of varied age (table 2), results interpretation and comparisons must be made carefully. We observe 5.06 kilometres per litre on Route 1 against 5.77 on Route 2 of the vehicles with the same age and model (MB-1 and MB-7), which means around 15 per cent lower on Route 1. The select vehicle average daily utilisation at Route 1 is 112 kilometres as against the 115.5 kilometres for Route 2. This highlights that a similar set of vehicles deployed on a width-constrained stretch performs, may offer similar utilisation, but at around 15 to 20 per cent lower fuel efficiency.

Microbus operated at 15-20% higher cost on the constrained corridor.

Figure 4. Average daily vehicle utilisation was 117.5 km, with average fuel efficiency at 5.3 kmpl across vehicles



Source: Authors' analysis

Force Motors' real-world test of the 17 seater Traveller reported an average fuel efficiency of eight kilometres per litre in city use under a contract-carriage setup (Force Motors 2021). In comparison, fuel efficiency in stage-carriage operations was around 22 per cent lower at 6.2 kilometres per litre, based on the observed

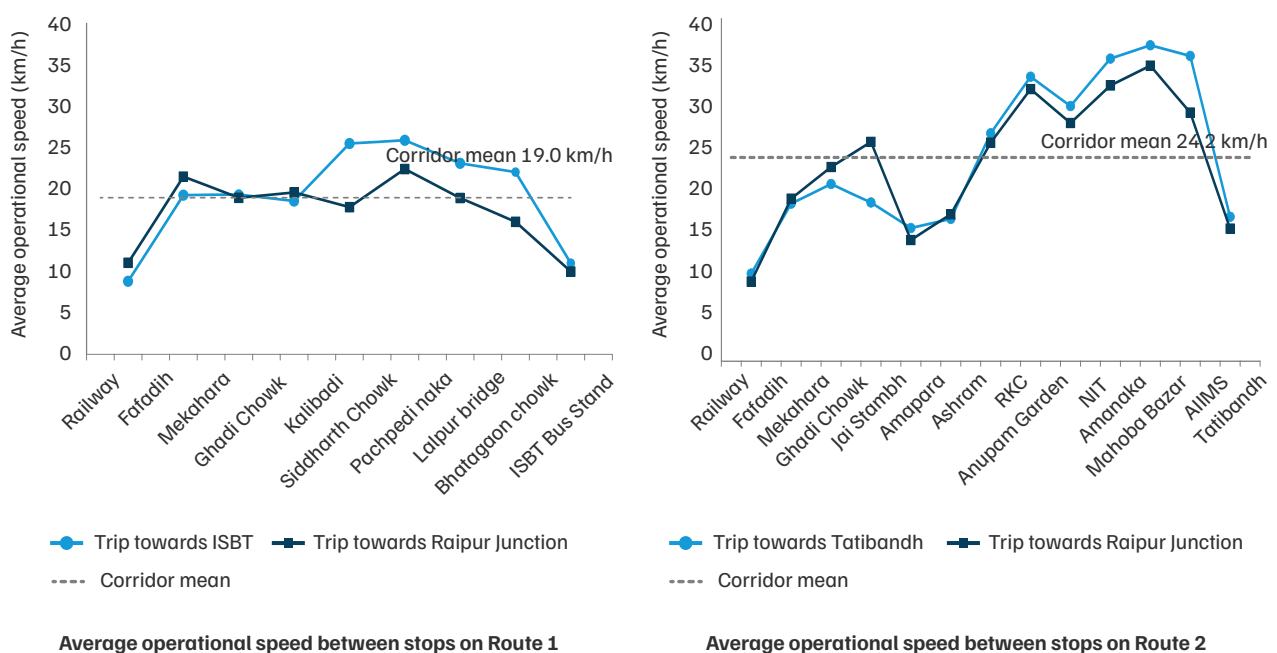
performance of 0–1 year-old vehicles (excluding older fleets). For reference, published benchmarks for stage-carriage bus services indicate fuel efficiency of 3.5–4 kilometres per litre for 9 metre buses, and 5–6 kilometres per litre for seven metre AC and non-AC buses (Khandekar et al. 2018).

Average speed and dwell-time

The speed on Route 1 fell to 7.5 kilometres per hour, in the congested narrow stretches while leaving the Raipur Junction, and recover to 25 kilometres per hour along its length. Route 2 ranged from 10 kilometres per hour at its slowest stretches, to 35 kilometres per hour at its uncongested segments, with the slow sections near terminal ends and the fast sections in between. Dwell-time at intermediate stops on Route 2 averaged

eight seconds, rising to 39 seconds at AIIMS, Jai Stambh and Ghadi Chowk, where boarding-alighting concentrates. On Route 1, dwell-time averaged two seconds, except at Bhatagaon, Lalpur, and Pachpedi Naka, where it reached about two minutes. The route faced heavy boarding at Railway station and ISBT stand, with minimal boarding alighting in-between.

Figure 5. Average speed on Route 1 was observed to be lower than Route 2 by 5 kmph



Source: Authors' analysis

Figure 5 charts the justification for the utilisation shortfall. At 117.5 kilometres over 10.5 trips within a 13-hour service day, each trip gets completed on a 74-minute cycle. At the observed speeds, running the vehicle at route accounts for roughly half of the cycle time, and cumulative dwell time at the bus-stops for under ten minutes. The balance is layover time at the trip first-stops. Field observation recorded an average of 25 minutes of layover between trips, against a planned 15 minutes. This could be partially explained by key reasons - disproportionately higher boarding-alighting at the first trip-bus-stops, and basic cleaning.

This provides evidence that the **fleet did not run short of kilometres because the vehicles were slow or unreliable, but because a large share of each trip-cycle was spent at first-stops.**

Microbus models used in pilot proved robust and reliable in daily scheduled stage carriage operations.



Passengers travelling comfortably aboard the microbus during the Raipur pilot.

Observed Ridership

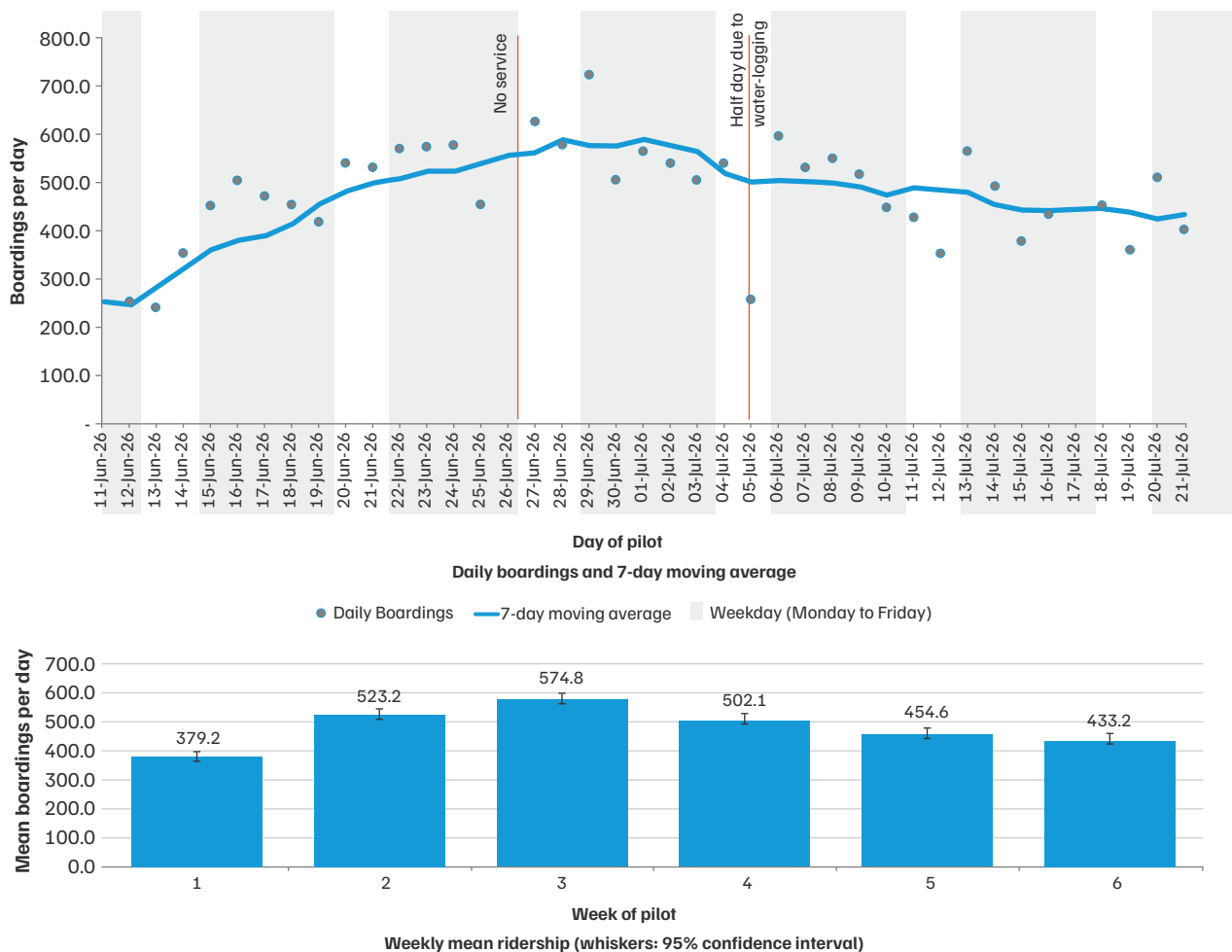
The pilot carried 18,682 boardings over 39 actual operational days, out of which, 85.5 per cent were captured on ETM and 14.5 per cent were manual ticketing - when the alternative set of ETMs did not work efficiently. Manual tickets do not offer granular insights of boarding bus-stop and alighting bus-stop for each passenger. We linearly project the ETM records to account for the missing data during manual ticketing days. Throughout the pilot duration, an average of 479 riders per day was recorded, with a single-day maximum of 722 at mid-pilot. Of the total ridership, Route 1 served the majority, accounting for 65 per cent of tickets sold.

Weekday and weekend ridership showed variation. An average of 501 boardings per day was recorded on weekdays during pilot; against 429 at weekends, placing weekend ridership at 85.5 per cent of the weekday level. The ratio was almost the same on both routes - 85.9 per cent on Route 1 and 85.3 per cent on Route 2. Variation within the weekdays was notable, with almost 1.5 times more riders on Monday than Friday on both the routes.

Weekly mean boardings ran from 379 to 575 in the first three weeks, then fell across the next three weeks to settle at 433 at the end of pilot. Demand increased gradually in the first two weeks, as the microbus service was new and was operating on new routes. However, services declined by about 25 per cent in the final week. Two possible explanations could support this fall of ridership: monsoon rainfall disrupting services and reliability, and possibly lower efforts in outreach and declined media coverage.

Around one-third seats were filled on an average in each microbus. Average seat-fill on Route 1 was higher than on Route 2 for both up and down trips. On both routes, demand grew quickly due to non-existent scheduled service. This growth was driven mainly by the outreach - posters, route details, social media promotion, hoardings, etc, rather than existing travel habits. Occupancy estimation based on seat-kilometres must be calculated for developing detailed insights on route performance.

Figure 6. Ridership reached maximum of 722 at mid of the pilot with average weekly mean of 575 during that week



Source: Authors' analysis

Peak hours, vehicle seat-fill

Peak-hour travel accounted for 52.6 per cent of riders on Route 1 and 47.6 per cent on Route 2. The busiest hours observed varied by the routes, 8:00 to 13:00 on Route 1 outbound, around 11:00 on inbound trip; 09:00 to 13:00 on Route 2 outbound and 10:00 to 13:00 inbound. In the evening, the situation differed—Route 1 carried a second peak at around 16:00, while Route 2 was at half its morning volume. The variation in the peak is because of the type of destination it connects i.e. railway station, hospital, ISBT etc, where trips are not associated with regular commute. An additional microbus

service between 08:00 and 12:00 on Route 1, could better serve the peak hour observed demand.

Vehicle seat-fill followed the same asymmetry. The vehicle averaged 53 per cent of seated capacity at the Route 1 outbound. 14 per cent of piloted trips carried more than 17 passengers (more than seats offered) in the peak hour, in that direction. The other three serviced directions averaged at around 50 per cent seat-fill during peak hours. Seat-fill estimations of 30 to 80 per cent—in one direction at one hour of day—the 17-seat vehicle matched the demand that materialised.

Figure 7. Route 1 recorded higher peak-hour demand than Route 2, with morning demand towards ISBT reaching nearly twice the level observed on Route 2



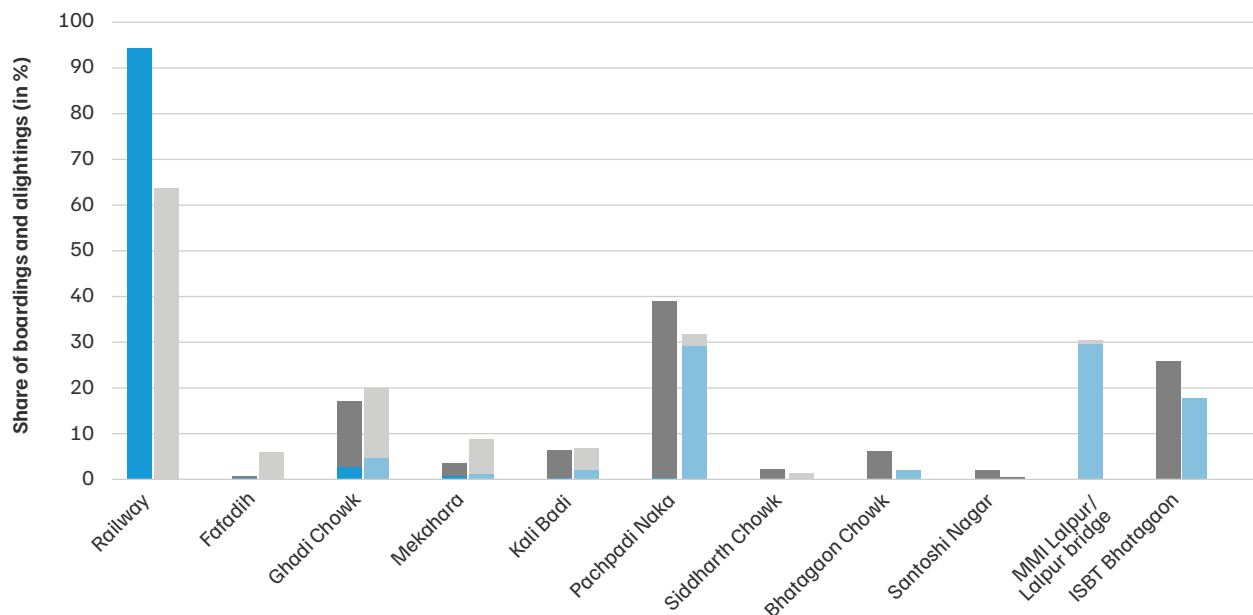
Source: Authors' analysis

Boarding alighting pattern

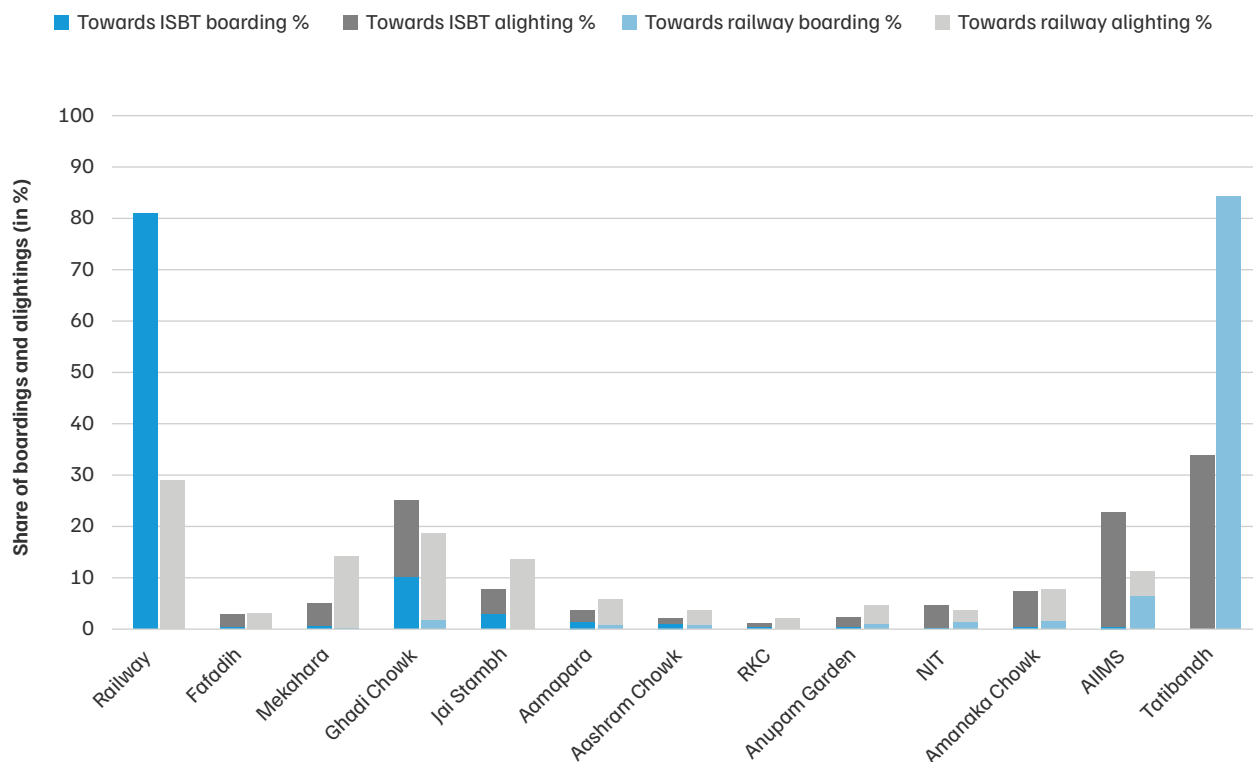
Boardings are heavily first-bus stop-anchored, with 83 to 95 per cent of passengers boarding at the originating bus-stop of the route (in three of the four directions), while alightings are not. On the Route 1 outbound, Pachpedi Naka Chowk takes 40 per cent more passengers off the vehicle than the end-stop

does, making it the busiest single alighting point in the pilot. The corridor, therefore, distributes alightings along its length, even though it does not collect boardings along it. Detailed boarding -alighting analysis by bus stops and routes is warranted as data becomes available to refine route and schedule.

Figure 8. Boarding was concentrated at terminals on both routes, except on Route 1 inbound trip, which recorded more distributed boarding along the corridor



Boarding-alighting pattern on Route 1 (Raipur Junction to ISBT)



Boarding-alighting pattern on Route 2 (Raipur Junction to Tatibandh)

■ Towards Tatibandh boarding % ■ Towards Tatibandh alighting % ■ Towards railway boarding % ■ Towards railway alighting %

Source: Authors' analysis

Maintenance and Repairs

Fourteen maintenance events were recorded on the days replacement vehicles were used. Five were mechanical failures, four of them self-start faults across three vehicles. The concentration in the

vehicle-start and wiring system is what that duty cycle change would be expected to produce. However, it is an observed pattern with limited vehicles and models used in pilot.

Box 1. Financial performance of minibuses during the pilot

We estimated the cost per kilometre of a diesel Force Traveller under a long-term contracting model, using actual pilot expenditure on manpower, fuel at observed efficiency, insurance and permits, along with the vehicle's ex-showroom price and prevailing market rates. At 120 kilometres of daily utilisation, the estimated operating cost is INR 40.5 per kilometre, increasing to INR 47.5 per kilometre on a total-cost-of-ownership basis, assuming a 12-year vehicle life and 80 per cent debt financing over five years.

Under the same operating conditions, an electric variant of the vehicle could reduce operating cost per kilometre by 45–55 per cent, operating cost per seat-kilometre by nearly 30 per cent, and total cost of ownership by about one-third. The pilot generated INR 10.7 per kilometre in fare revenue. This could increase with higher ridership and longer-term operations.

In lower-demand corridors of Raipur, such as DDU, Didwania, Samta Colony, Sadar Bazar etc, where demand may not support efficient utilisation of a 17-seater vehicle, a smaller 10 seater electric microbus such as the Tata Magic electric vehicle could be tested as an alternative vehicle size, subject to corridor-level assessment of demand, road width and operating requirements.

For more details refer to the Annexure.

3.2. Proposition 2: Vehicle suitability for stage-carriage operations

This section explores the second proposition on microbus models used in pilot for their suitability as stage-carriage vehicle for intra-city demand. We examined it using manoeuvrability, performance in congested areas, safety perceptions of other road users and the stakeholders (users, Driver, conductors, Traffic police, CTU and Transport department) perspectives on vehicle design.

Manoeuvrability in different conditions

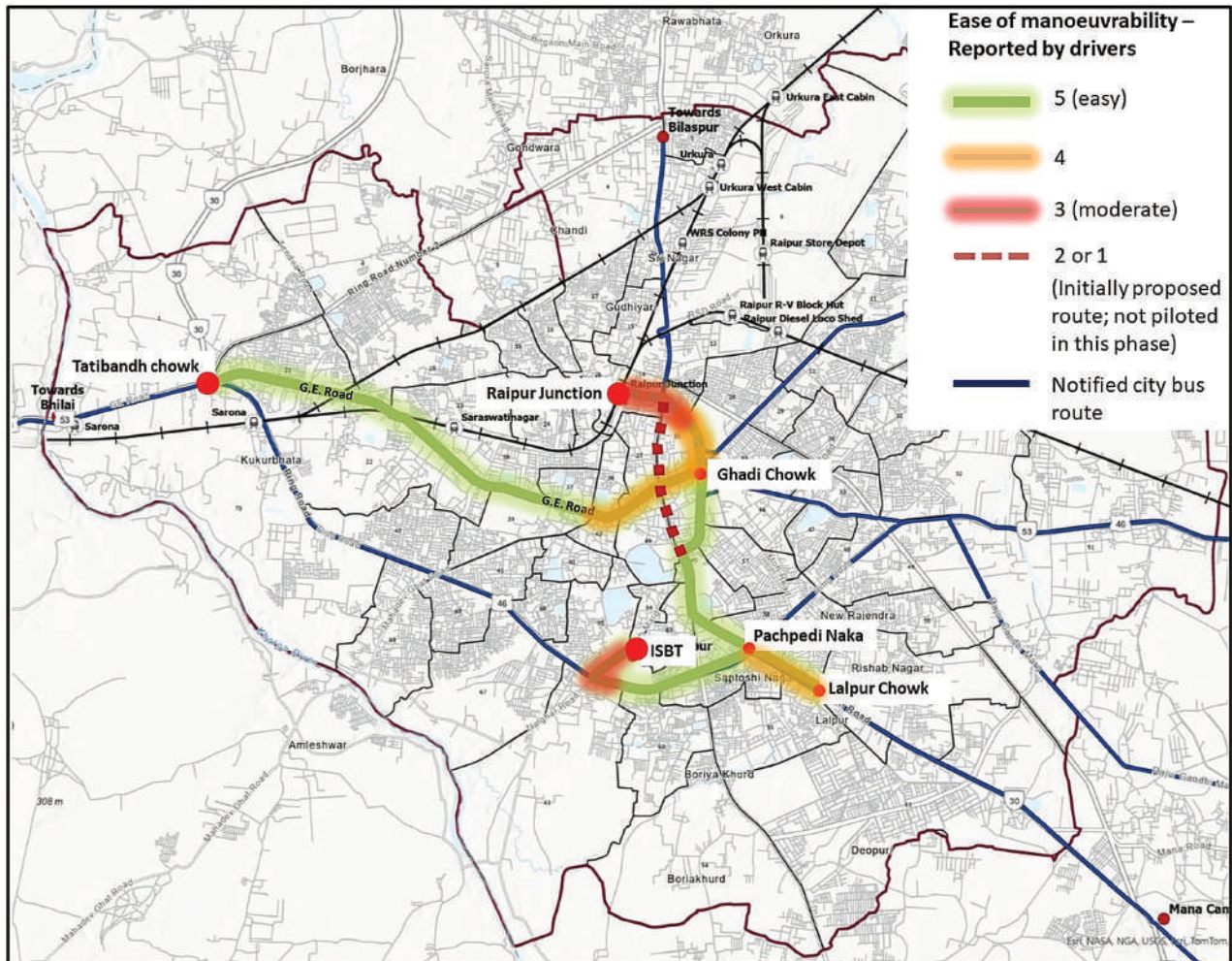
The two corridors in the pilot offers very different road geometries. Route 2 is bus-able—medians are there throughout and the carriageway offers two

lanes in each direction. Hence, microbus faces no real spatial constraint. Route 1 is more demanding, about 60 per cent of its carriage-way is divided, carrying roughly one-and-a-half lanes in each direction and largely free of encroachment, but two stretches are not. The first (common stretch) is the narrowest, it is without a median and heavy on-street parking, with 3.0 to 3.3 metres of road width remains usable on each side—testing our microbus in pilot. The second is also undivided and somewhat wider, but heavily congested: office and commercial land uses, the heavier vehicles and utility traffic drawn by the ISBT and the Municipal Corporation zonal office, mixed with cars, and, as the city's political and administrative hub, seeing frequent jams.

We infer from the operations data that a vehicle of this size can hold a scheduled service through above discussed conditions. Over the 39-day operating period, the microbus navigated narrow, parking-constrained stretches and the congested stretch—without route deviation and with no width-attributable

incident, while maintaining 98.4 per cent service availability. The microbus kept the service running, manoeuvring through mixed traffic, undivided carriageways and heavy boarding-alighting, where a standard bus could not be initiated.

Figure 9. Drivers reported ease of manoeuvrability as moderate to high on both routes, including the constrained stretches of Route 1



Source: Authors' analysis

Congested Roads

We infer that the operating speeds in the pilot reflect the corridor context, and are not the reflection on the vehicle models. On Route 1 microbuses operated at an average of around 19 kilometres per hour against 24 kilometres per hour on Route 2. Almost this entire difference is due to two short, width-constrained stretches where the speed drops to average 7.5

kilometres per hour. Speed recovered over the rest of the route-alignments, where Route 1 held up to 20-25 kilometres per hour. Yet, microbuses were noted to perform well, navigating congestion of mixed vehicles in mixed, public-semi-public land uses, junctions and boarding-alighting.

This narrow stretch carried a quiet but measurable productivity cost. This is the main reason average daily utilisation on Route 1 settled near 115 kilometre against 120 kilometre on Route 2. We observed six to eight minutes loss per trip due to this congested, narrow segment. Thus, across the 10.5 trips a vehicle completes in a 13-hour service day, that accumulated to a time loss of roughly 60 to 80 minutes per vehicle, over the day. Its equivalent to the time a vehicle needs for one additional trip. Yet the minibuses served an intense ridership in these old city areas, commercial PSP areas, providing disproportionately higher riderships and microbus usage.

Safety perception for other users on road

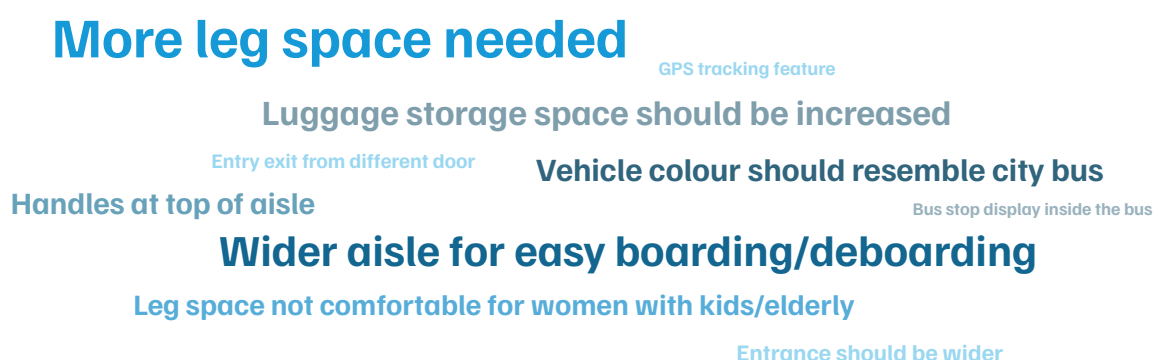
We infer from the FGDs that the microbus was not perceived as a road-safety threat by other road users, in the way a standard bus is on the Route 2 corridor. Those sharing the narrow, mixed-traffic streets alongside minibuses on Route 1 did not report the intimidation, where its width and turning movements crowd smaller vehicles and non-motorised users.

The microbus's comparatively smaller footprint let it merge into mixed traffic without displacing or pressuring those around it, and its introduction neither aggravated nor diminished the prevailing sense of road safety. For a city authority, this is a material inference: a vehicle of this size can add missing scheduled public transport services to such narrow, shared streets without the perceived safety trade-off that deters standard-bus operation in such settings.

Users perspective

Users highlighted several areas for improving the microbus design to enhance comfort and accessibility. The most common suggestions were increasing leg space and providing a wider aisle to facilitate easier boarding and alighting. Respondents also recommended additional luggage storage space, wider entrances, and design features that better accommodate elderly passengers, women travelling with children, and passengers carrying belongings. A few users suggested incorporating features such as GPS tracking, and a vehicle design that resembles city buses to improve usability and visibility.

Figure 10. User suggestions for vehicle design improvements prioritise extra leg space, luggage space, and ease of movement within the microbus



Source: Authors' analysis

Drivers and conductors perspective

We infer from the driver and conductor feedback, captured via two FGDs and six IDIs that the vehicles' interiors are not, as currently built, suited to stage-carriage operations. Designed as contract carriages for seated, point-to-point travel, they obstruct the rapid, high-turnover boarding this

service demands. The aisle is too narrow for passengers to move or stand in numbers. The floor is noted to be too high causing discomfort especially to women's in saree and elders, also challenge in quick boarding and alighting at frequent stops. The single, narrow doorway

forces passengers on and off in single file and the seat directly in front blocks the flow. The absence of hanging handles leaves standing passengers unsupported. Together these lengthen dwell time and cap the load the vehicle can turn over at a busy stop.

The vehicle also lacks a distinct public-transport identity—without the livery and recognisability of a city bus, passengers do not read it as scheduled service.

We infer that these are not incidental shortcomings but a mismatch between the available vehicle and the duty assigned to it. The interior must be redesigned around intra-city, stop-to-stop operation before the microbus is deployed at scale. For a city authority, the implication is that vehicle size is suitable; the current specification is, but it must be corrected through a purpose-built design and ergonomics.

Figure 11. Drivers and conductors' suggestions for design improvements prioritise decreasing floor height, increasing door width, and widening aisle width for ease of movement within the microbus

Increase aisle width for in-vehicle movement

Increase width of the door

Entry exit can be from different door

Vehicle colour should resemble city bus

Floor height needs to be reduced

Remove seat in-front of entrance

Add handles at top of aisle

Source: Authors' analysis

Traffic police perspectives

We infer from in-depth interviews with road- and site-level traffic constables and inspectors, and discussions with senior traffic-police officers, that the microbus was perceived to be neutral to traffic stress. They did not seem to add to road congestion along the pilot corridors. Officers viewed it favourably for a secondary effect—its lower, scheduled fare

drew ridership away from the auto-rickshaws, which, unable to match the cheaper service, operated and parked their vehicles more responsibly and redirected to other routes and stretches. For the traffic police, the microbus therefore eased, rather than added to, the enforcement burden on these corridors.

CTU and State transport department perspectives

We infer from discussions with the CTU and the state transport department that the microbus is broadly regarded as a vehicle needed for urban public transport. The officers described it as a service that bridges the gap that is now filled by the auto-rickshaw. In Raipur, large numbers of auto- and e-rickshaws occupy disproportionate road space, a passenger-friendly microbus running scheduled, fixed point-to-point services is seen to strengthen formal public

transport while serving the same travel needs more efficiently.

The department further considers the model readily replicable and scalable—adaptable to other cities and, notably, to smaller towns. There, the department expects reliable timings to draw commuters off the two- and three-wheelers they now depend on, easing road congestion as deployment grows.

3.3. Proposition 3: User acceptance and affordability

Do users accept the microbus service and can mostly afford it?

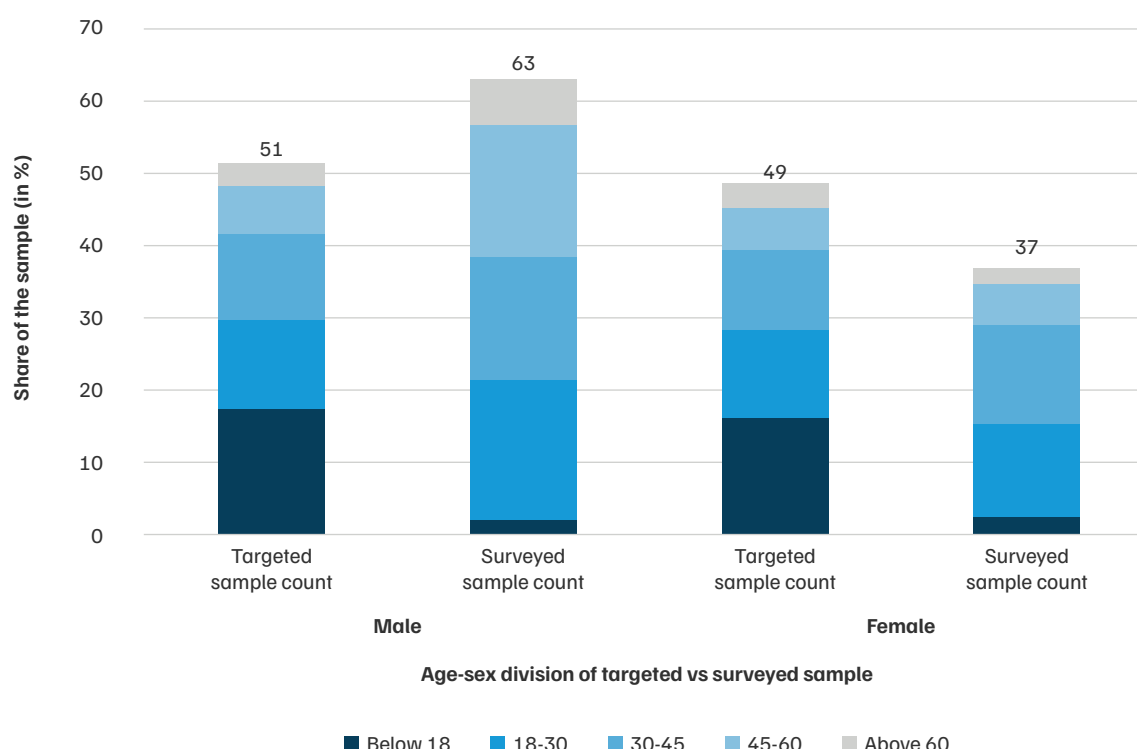
This section draws on 486 usable responses from passengers surveyed on board and 110 from non-users at stops, and it reports who were the users, what they shifted from, what the journey cost them against their previous mode and how they rated the service.

The survey's sample varied from the Census-based sample target. The sample was skewed towards respondents aged 18 and above, indicating lower uptake among students, potentially due to limited student travel during the pilot period. Male respondents in the 18–30 and 45–60 age groups were 40–50 per cent higher than the target. The female age distribution too was broadly comparable with the target across age-groups, except for respondents below 18.

Since the survey covered passengers on-board, while the Census covers the entire resident population, the difference reflects whom the service reached, rather than a sampling error. This was verified by re-weighting the responses to the Census age–sex structure. This resulted in variation of less than one percentage in all the key findings, so the composition of the sample does not impact the outcome.

However, as the gender-wise boarding counts were not recorded, the analysis cannot distinguish between the gender of actual riders and those who chose to respond. This limitation applies to all gender-wise findings.

Figure 12. The sample was skewed towards respondents aged 18 and above and dominated by male



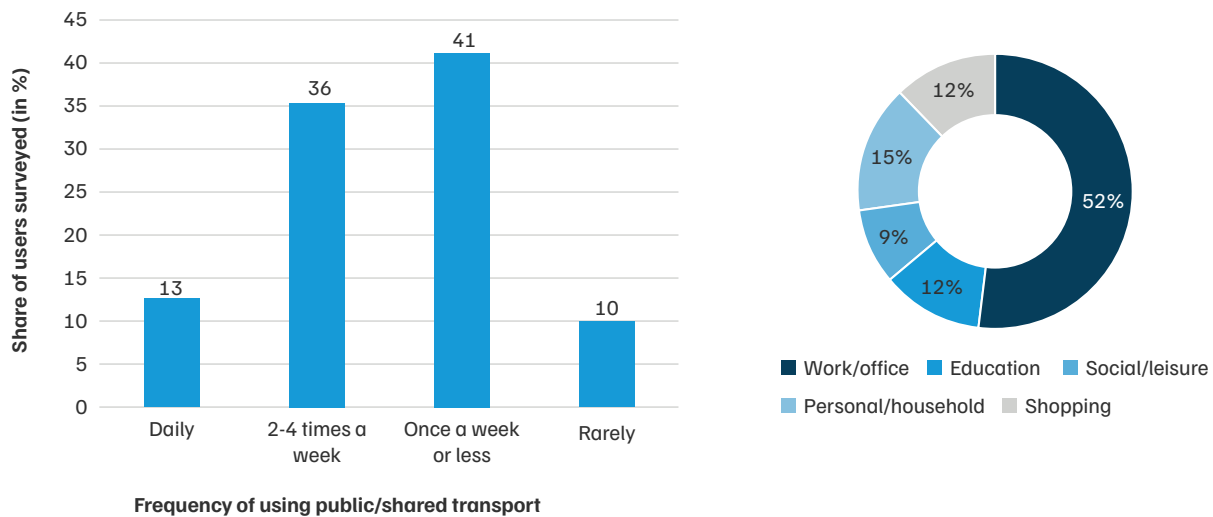
Source: Authors' analysis

Who were the microbus users?

Around 72 per cent of microbus users belonged to households with a monthly income below INR 40,000, with most households having at least one motorised two-wheeler and one in six having a car. This shows that the service drew transport-poor mainly from lower-middle-income households that owned a motorised alternative at home but chose the microbus for their trip. Nearly 50 per cent of respondents were frequent public transport users, making more than two to four trips per week. However, the share of commuters on the identified corridors was lower than anticipated, partly reflecting seasonal off-peak demand and lack of awareness about the service. Work trips accounted for around 52 per cent of observed trips, followed by education trips at 12 per cent; the latter is likely to be higher during the college operational period on Route 2.

Among frequent public transport users, around 70 per cent reported first- and last-mile distances of less than one kilometre, predominantly covered by walking (65 per cent), followed by auto-rickshaws (12 per cent). Around 20 per cent, reported first- and last-mile distances of up to four kilometres, which are mainly covered by auto-rickshaw or city bus that connects to Naya Raipur. This indicates that the microbus primarily served short first- and last-mile connections, while also enabling longer multi-modal trips. Four in five riders used the microbus for trips of more than four kilometres. 35 per cent of the total trip were between four to eight kilometres, 45 per cent more than eight kilometres. Only 20 per cent used it for trips below four kilometres, a distance band that the literature shows is served mainly by intermediate public transport. A likely reason for the lower share of less than four kilometres trips is the higher fare—INR 13 on the microbus for this band, against INR 10 in a shared auto-rickshaw.

Figure 13. Half the microbus users were frequent commuters, with work trips accounting for the largest share of observed trips



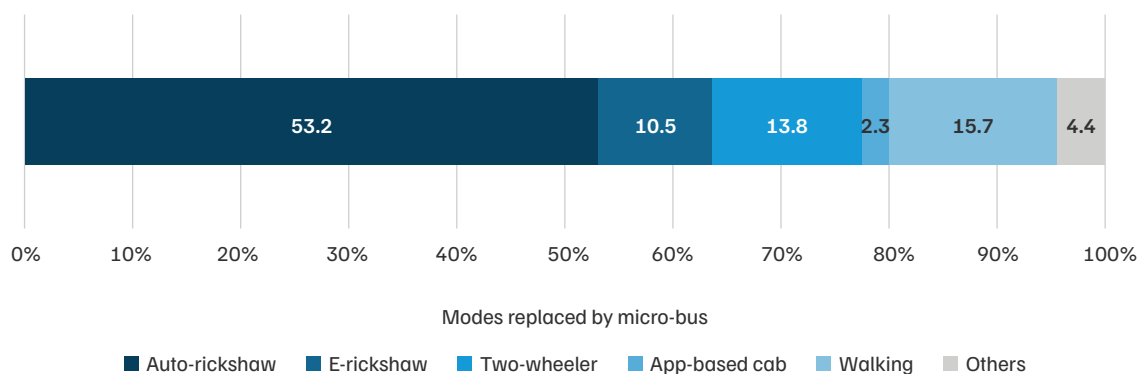
Source: Authors' analysis

Where did they come from and why?

Microbus passengers shifted mainly from auto-rickshaws and e-rickshaws, which together accounted for 63.7 per cent of stated prior modes, followed by private two-wheelers at 13.8 per cent and app-based cabs at 2.3 per cent, with the remaining 20.1 per cent

having previously walked or travelled by city bus or used other modes. The service therefore drew riders from both intermediate public transport and private modes.

Figure 14. Two-thirds of microbus passengers shifted from IPT modes

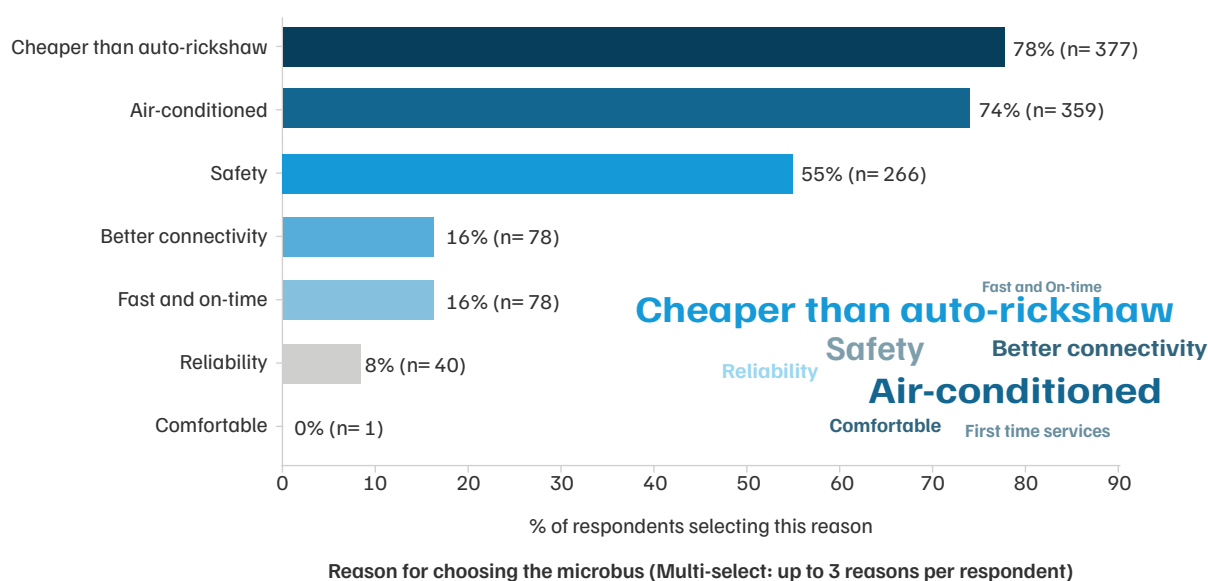


Source: Authors' analysis

Figure 15 shows why they switched. Respondents could select up to three reasons and selected 2.5 on average: 78 per cent chose the microbus because it

was cheaper than an auto-rickshaw, 74 per cent for air conditioning and the comfort that came with it, and 55 per cent for safety.

Figure 15. Lower fares relative to auto-rickshaws, air-conditioning, and perceived safety were the key reasons for choosing the microbus



Source: Authors' analysis

Was the service affordable?

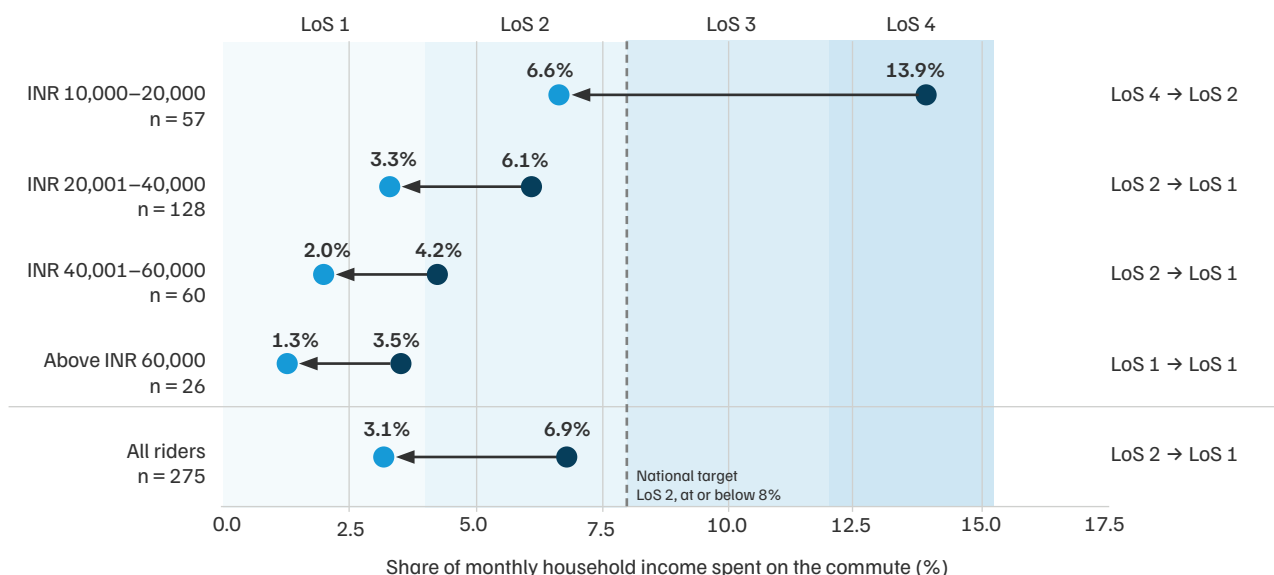
The microbus service riders who reported both income and fare (usable responses “n” = 275), individually spent less than eight per cent of their monthly household income on commute by microbus. Average individual transport expenditure on commuting declined from 6.9 per cent to 3.1 per cent of the total household income, after switching from previous modes.

The affordability gain was most pronounced among lower-income households earning INR 10,000–20,000 per month, for whom the share of income spent on commuting declined from 13.9 per cent to 6.6 per cent, moving from LoS 4 to LoS 2 (MoUD 2013). Similarly, households earning INR 20,001–40,000 and INR 40,001–60,000 moved from LoS 2 to LoS 1, while higher-income households remained within LoS 1. The proportional reduction in commuting expenditure was substantial across all income bands, ranging from 46 to 63 per cent. This demonstrates the affordability of the microbus service.

Will they use the service if it continues?

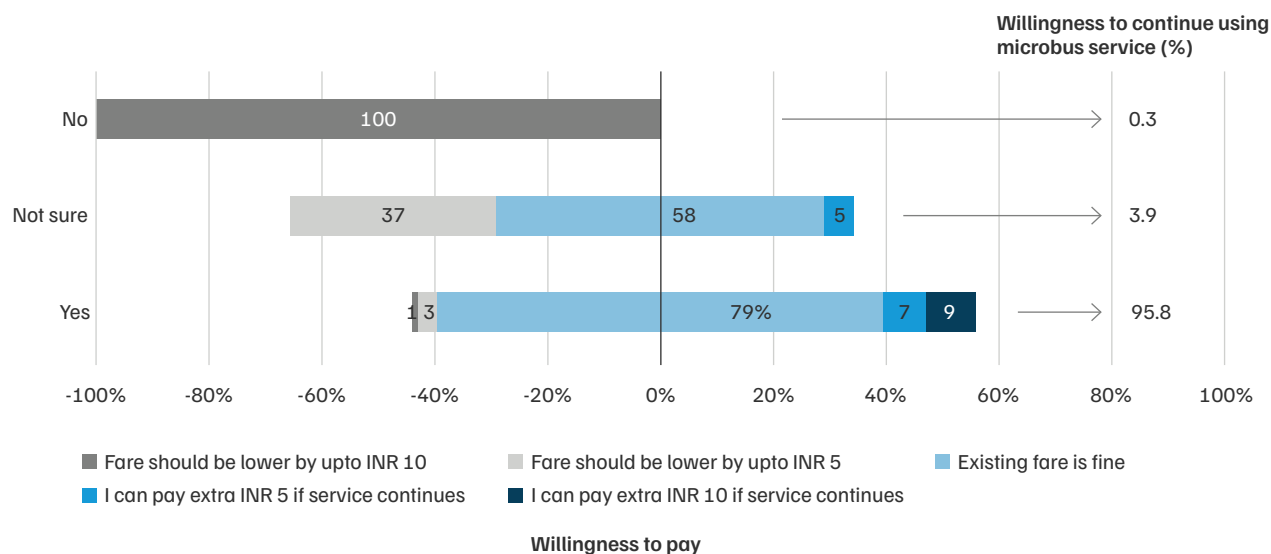
The survey found high acceptance of the microbus service among existing users. Overall, 95.8 per cent of respondents were willing to continue using the service. Of these, 79 per cent found the existing fare suitable, while another 16 per cent were willing to pay an additional INR 5–10 per trip if the service continued. Only 4.2 per cent of total respondents were unwilling or uncertain about continuing. Among those uncertain, 58 per cent considered the current fare appropriate, while remaining mentioned the fare should be reduced. The findings indicate that the existing fare was broadly acceptable to users and was not a significant constraint to continued use.

Figure 16. Microbus reduced the individual share of household income spent on commuting by 3.8 percentage points



Source: Authors' analysis

Figure 17. Almost 95.8% of respondents are willing to continue using the service

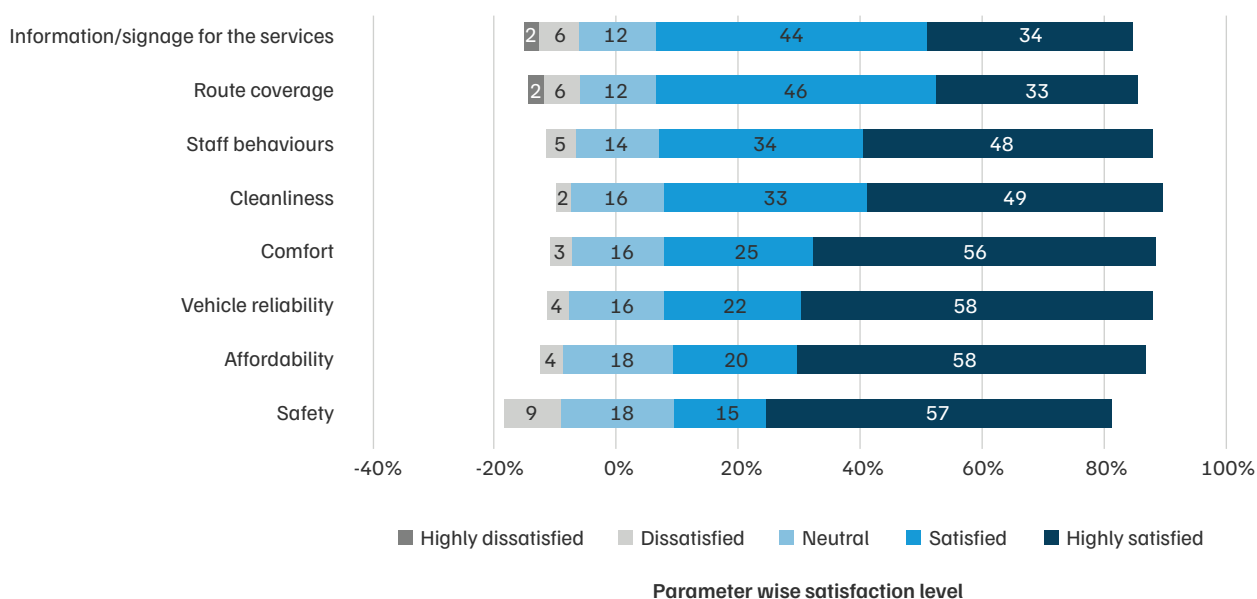


Source: Authors' analysis

Overall satisfaction with the microbus service was high and uniform across key service attributes (figure 18). Cleanliness, staff behaviour, comfort, vehicle reliability, and affordability received the highest satisfaction ratings. Safety, route coverage, and service

information were also rated positively, although these had a larger share of neutral responses. This points to scope for improving passenger information and route planning as the service is expanded.

Figure 18. Rated on safety, reliability, cleanliness, staff behaviour, and other parameters, 80% of riders were satisfied or very satisfied and around 15% stayed neutral



Source: Authors' analysis

4. Recommendations and way forward

The 45-day pilot established that a 17 to 22 seat microbus can hold a scheduled, affordable, stage-carriage service on a corridor, the standard city bus

could not sustain. Table 3 presents the summary of our pilot analysis for the three propositions.

Table 3. The current findings and interim analysis answers the three propositions

Proposition	Takeaway	Basis
Is the microbus operationally viable for a scheduled stage-carriage service, especially on medium-demand urban corridors?	Yes	The 17-22 seater vehicles broadly matched the demand, with loading mostly within the 30–80% range, except for peak on Route 1 with 100% plus standings. However, the deployed vehicles were contract-carriage models used in stage carriage operations, they faced five of 14 maintenance events linked to mechanical and self-start faults.
Are currently available microbus models suitable as per varied stakeholders, and especially on narrow roads?	Partially	The microbus held a scheduled stage-carriage service on Route 1—where no city bus could ply—with no route deviation and no width-attributable incident. Route 2, wider, yet medium-dispersed demand showed why smaller buses are better now, than planned 9 metres buses. The permitted route carried 2 sections with 3.5-5 metres undivided road, congested, and street-parking. Manoeuvrability in genuinely narrow conditions is both designed and tested value. Users and crew flagged gaps in vehicle design and ergonomics, while city and state authorities appreciated it. Thus, the vehicle size and class appears suitable, but existing models need adaptation for stage-carriage operations. Findings are limited to select two models (six body-types) from one manufacturer.
Do users accept the microbus service and can mostly afford it?	Yes	95.8% of users are willing to continue using the service, and 16% willing to pay INR 5–10 more. Satisfaction was high due to comfort, cleanliness, reliability and affordability. 63.7% shifted from auto- and e-rickshaws, primarily due to lower fares, AC comfort, and safety. Average commute spending fell from 6.9% to 3.1% of household income, shifting from LoS 2 to LoS 1.

Source: Authors' analysis

Estimated co-benefits

The pilot demonstrated that microbuses can deliver benefits beyond passenger movement. The service shifted a share of auto-rickshaw and private vehicle trips towards microbus, reducing transport-related emissions, formalising and creating new direct jobs.

- **On road vehicles replaced by microbuses, relieving congestion:** Our pilot delivered a measurable shift from shared vehicles and private two-wheelers. One microbus replaced approximately 3.5 auto-rickshaw/e-rickshaw trips and 1.5 two-wheeler trips per trip operated, estimated based on the reported modal shifts and average occupancy of modes. Our pilot, with eight microbuses, replaced around 11,200

auto-rickshaw/e-rickshaw trips and around 4,800 two-wheeler trips during the pilot, calculated for the 3,200 trips performed.

- **GHG, PM_{2.5} and NO_x reduction:** The shift in trips also resulted in net emission savings during the pilot. For the assessment, we used emission factors from Automotive Research Association of India (ARAI), and the India GHG Programme, along with annual utilisation assumptions established through CEEW's Transport Fuel Forecast Model (TFFM). Over 39 operating days, the eight microbuses caused the net reduction of 2.23 kg of PM_{2.5}, 20.3 kg of NO_x, and 7,249 kg of CO₂e.

Table 4. Microbuses abated about 7.24 tonnes of CO₂e during the pilot period alone

Pollutant	Emitted by eight microbuses (kg)	Avoided through mode shift (kg)	Net reduction (kg)
PM _{2.5}	0.72	2.95	2.23
NO _x	61.95	82.25	20.3
Greenhouse gases (CO ₂ e)	7,662	14,911	7249

Source: Authors' analysis

- **Transition to formal jobs and new jobs created:** We estimate that operating a microbus, as a formal public transport service, in stage carriage city transit operations requires approximately four direct staff per vehicle, like buses (around 1.7 drivers, 1.2 conductors, 0.5 administrative/workshop and maintenance staff, and 0.6 station staff) (Jha et al. 2025). Each microbus trip operated, displaces 3.5 auto-rickshaw/e-rickshaw trips and can potentially be attracted towards formal bus and microbus operations. The higher staffing requirement of microbus operations therefore helps offset the potential loss of jobs in the informal mobility sector, while creating additional 0.5 jobs per microbus as formal employment.

This section translates the key findings into action at three levels— for Raipur city, scale up at state and central government nudge to build the market to enable the 4,000 small and medium cities.

4.1. City level recommendations on operations and service design

- **Size of the vehicle must be adapted to corridor demand and carriageway width:** We observe that at same level of passenger demand, observed in the pilot, a 17-seat vehicle would operate at 80 per cent seat occupancy, compared with just 42 per cent for a nine-metre bus, making the smaller vehicle more efficient for such corridors. Raipur should map demand and road width across arterial, sub-arterial, and collector roads, and assign vehicle sizes accordingly.
- **Adjust the schedule as per the observed demand, not a standard commuter template:** We find that the busiest hours are late morning, and the two corridors differ in the evening. Additional microbus

deployment at Route 1 during morning peak would enhance the Level of Services (LoS) and cater demand comfortably.

- **Plan explicitly for the higher operating cost on width-constrained corridors:** The pilot proved manoeuvrability in practice, but at a measurable penalty—fuel efficiency was around 20 per cent lower than on the unconstrained-width segments of Route. Average speed was also observed to be lower by an average of five kilometres per hour. Raipur must estimate the time and cost penalty, ahead of planned operations, proactively.
- **Develop permanent, sign-posted intermediate stops along the route:** Study finds that Boarding was heavily first-bus stop-anchored, but alighting was distributed along the route. Several stops on Route 1 were only landmark locations with temporary signage. Permanent, well-marked stops with basic passenger infrastructure at the high-turnover nodes would cut dwell-time variability, and make the service legible to potential riders.
- **Service redesigned to attract more student riders:** The service intensity can be aligned with the college timings specially on the Raipur Junction–Tatibandh route.
- **Hold fares to preserve the affordability gain:** The pilot clearly proved that service is highly acceptable and also affordable, with microbus commute spending dropping from 6.9 to 3.1 per cent ratio of stated individual travel expense to monthly household income. 10 per cent of the deployed vehicle trips could be earmarked for premium service with sit-only, and limited stops with up to 20 per cent higher fare.
- **Bring auto- and e-rickshaw operators into the service:** Auto-drivers made the biggest push back to the service, as their usual customers were the biggest source of the microbus ridership. The pilot engaged auto-union leaders as conductors and site supervisors to build trust and reduce conflict. We recommend prioritising existing auto-rickshaw drivers for microbus driver or conductor jobs, while shorter trips can continue to be served by shared autos.

- **Vehicle suitability is limited and require purpose-built models:** Study finds that the current limited M2 category models are only partially suitable for stage-carriage city operations with challenges in ingress-egress, movement in aisle, and holding difficulty for standees. Raipur city must account for time and efforts in developing contract specifications for purpose-built vehicle body and ergonomics.

4.2. Scaling at state level

- **Potential pilots and scalability of minibuses to PM-eBus Sewa scheme cities in state:** The pilot model can be extended to other cities in Chhattisgarh on the basis of corridor-level demand and road conditions. Four cities—Raipur, Durg-Bhilai, Bilaspur, and Korba—are set to receive buses under the *PM-eBus Sewa* scheme. Two of these are allocated mini buses, thus acknowledging that demand is typically below the standard-bus thresholds. Within these cities, lower, dispersed demand corridors can be assessed for microbus deployment, as a complementary service.
- **Adopt long-term operating contract with microbus operators:** Post successful trials, the State can consider long-term multi-city contracts to attract competitive bids for minibuses. This could uncover a significantly lower per-kilometre cost, than a nine-metre e-bus after scheme subsidy. This can potentially avoid deploying larger buses on corridors where they may be underutilised, and operate at low service levels.
- **Potential testing and deployments in sixteen small and medium cities in Chhattisgarh:** These have a population between 50,000 to 300,000, as per Census 2011, and falls outside the scheme's eligibility. Microbus can be tested and deployed as formal public transport. The size and type of vehicle must be selected based on corridor demand. Table 5 lists cities of Chhattisgarh where the microbus deployment can be considered for scaling.

Table 5. 16 cities of Chhattisgarh, with populations between 50,000 and 3,00,000, can be considered for microbus deployment

	City	Population (Census 2011)
1	Katghora	2,04,552
2	Raigarh	1,63,121
3	Rajnandgaon	1,63,114
4	Jagdalpur	1,25,463
5	Ambikapur	1,21,071
6	Patan	1,13,166
7	Dhamtari	1,08,277
8	Baikunthpur	72,507
9	Khadganva	69,307
10	Dhamdha	65,499
11	Manendragarh	63,485
12	Mahasamund	61,807
13	Dondi	58,565
14	Bhatapara	57,537
15	Champa	52,472
16	Kawardha	51,516

Source: Census 2011

4.3. Central Government nudge to build the market

- **Fund a multi-model, multi-fuel trial initiative to close the evidence gaps:** The pilot's reach was bound by what the market offered (only two diesel microbus models from one manufacturer). No electric variant exists in the 10–22 seat band, and manoeuvrability in genuinely narrow conditions of small cities must be extensively tested. The pilot showed that microbuses need to be designed specifically for intra-city stage-carriage operations, with suitable doors, standee standing space, storage, and seating layouts.

Thus we recommend a set of microbus trials, under national initiative/programme across several vehicle models and fuels, including electric, on width-constrained corridors, to establish evidence on vehicle suitability, emissions, and total costs, before public funds are committed to large-scale procurement. Vehicle standards and homologation specifications development should also be aligned with potential intra-city stage-carriage operations.

- **Pilots must help develop national microbus governance-and-contracting template:** Microbuses are novel and nascent mode in stage carriage operations in India. They lack experience, data and thus SOPs, and cities need contracting models that keep fares affordable while ensuring operator viability for operating stage-carriage microbuses. Developing a model contracting template, drawing on the set of pilots like Raipur and *PM-eBus Sewa* payment-security mechanism can nudge cities to adopt microbuses.

4.4. Next step to analyse the other parameters of pilot performance

This sub-section suggests what needs to be further examined from GPS, ETM, CCTV data and other data collected during the pilot to strengthen the analysis. Few planned analysis are listed below -

- Analysis of seat-kilometres/passenger-kilometers using ETM data for peak hour and off peak hour variations for boardings, alightings, and occupancy.
- Analysis of GPS data of eight vehicles for second half of the pilot duration for estimating speed variation in peak and off peak, narrow stretches, variation by vehicle model, schedule adherence, reliable service versus delayed services, congestion analysis for routes, dwell times by stops.
- Analysis of vehicle performance by age, type and models.



The CEEW team with Shri S. Prakash, Transport Secretary, Government of Chhattisgarh, during a site visit as part of the Raipur pilot, July 2026.

- Analysis of CCTV data for detailed analysis to develop insights on gender, age and in-vehicle use and issues
 - Drawing insights in relation with microbus operations benchmarks from Global South, adding reference to Raipur city bus services and Association of State Road Transport Undertakings (ASRTU) benchmarks for city-buses
 - Comparing the route riderships, users with baseline demand and modal-split on routes
 - Comparing the affordability against the metrics and data from the Household Consumption Expenditure Survey (HCES) for 2023–24
 - Document challenges faced during new service planning, potential solutions that worked in pilot and outreach plans and their implementation
- This report presents only an overview of the microbus pilot performance across the three key propositions of operational viability, vehicle suitability and user acceptance. The detailed analysis requires further efforts and deep-dive using the collected datasets as discussed above and shall be published later.

Acronyms

ARAI	Automotive Research Association of India
ASRTU	Association of State Road Transport Undertakings
CCTV	closed-circuit television
CO ₂ e	carbon dioxide equivalent
CTU	City Transport Undertaking
ETM	electronic ticketing machine
FGD	focus group discussion
GPS	global positioning system
INR	Indian Rupee
ISBT	Inter-State Bus Terminus
MoHUA	Ministry of Housing and Urban Affairs
MoUD	Ministry of Urban Development (MoHUA's name before 2017)
NO _x	oxides of nitrogen
OEM	original equipment manufacturer
PM _{2.5}	particulate matter of 2.5 microns or less in diameter
RNNTL	Raipur Nagar Nigam Transport Limited
TFFM	Transport Fuel Forecast Model
UDDR	Urban Design Dynamics Raipur

References

ASRTU (Association of State Road Transport Undertakings). 2023. *Maharashtra State Road Transport Corporation's Electrifying Transformation E-Bus Project and Beyond*. <https://www.itdp.in/wp-content/uploads/2023/11/MSRTCs-Electrifying-Transformation-Final-Report-by-ASRTU-ITDP-India.pdf>.

Census, India. 2011. *Census of India 2011: Primary Census Abstract*. Census Report. New Delhi: Government of India. <https://www.data.gov.in/catalog/primary-census-abstract-2011-india-and-states-0>.

Force Motors. 2021. <https://www.forcemotors.com/vehicles/traveller-3700wb/>

Jain, Himani, Saoni Sanyal, and Krishna Khanna. 2026. *Microbus Mega Demand: Estimating market of 4000 towns of India*. New Delhi: Council on Energy, Environment and Water (forthcoming)

Jha, Anannya, Divyanshu Yadav, Aditya Swarankar, Saoni Sanyal, Krishna Khanna, and Himani Jain. 2025. *India's E-bus Initiatives: Job Creation, Adoption Challenges, and Policy Pathways*. New Delhi: CEEW. <https://www.ceew.in/publications/how-can-india-boost-electric-bus-market-jobs-and-sustainable-public-transport-initiatives>

Kumar, Anita, Srikara Prasad, and Kartik Akileswaran. 2026. *Shaping Urban India: By Design, Not by Default: A City-Systems Approach to Growth and Liveability*. Janaagraha. <https://www.janaagraha.org/resources/shaping-urban-india-by-design-not-by-default/>.

Ministry of Housing and Urban Affairs (MoHUA). 2026. 7 May. <https://www.mohua.gov.in/static/uploads/2026/05/b7e2d2eb677682b54527c15a399fe9a8.pdf>

MoUD. 2013. *Service Level Benchmark in Urban Transport for Indian Cities*. Ahmedabad: CEPT University.

PIB. 2023. "PM-eBus Sewa: 10,000 e-Buses to Be Deployed in 169 Cities." Press Information Bureau, Government of India, August 24, 2023. <https://static.pib.gov.in/WriteReadData/specificdocs/documents/2023/aug/doc2023824243601.pdf>.

Tiwari, Geetam, and Deepty Jain. 2023. *A Framework for Selecting an Appropriate Urban Public Transport System in Indian Cities*. The Infravision Foundation and Transportation Research and Injury Prevention Centre (TRIPC). <https://tripc.iitd.ac.in/assets/publication/Urban-Transport-Project-White-Paper.pdf>.

UN DESA (United Nations Department of Economic and Social Affairs). 2025. *World Urbanization Prospects 2025: Summary of Results*. UN DESA/POP/2025/TR/No. 12. United Nations. <https://desapublications.un.org/publications/world-urbanization-prospects-2025-summary-results>.

Khandekar, Aditya, Deepak Rajagopal, Nikit Abhyankar, Shruti Deorah, and Amol Phadke. 2018. *The Case for All New City Buses in India to Be Electric*. Berkeley, CA: Lawrence Berkeley National Laboratory. https://eta-publications.lbl.gov/sites/default/files/the_case_for_all_new_city_buses_in_india_to_be_electric.pdf.



The authors



Anannya Jha

Programme Associate
anannya.jha@ceew.in

Anannya Jha is a Programme Associate with the Sustainable mobility team at The Council. Her work focuses on driving advocacy to support green transitions in the transport sector. Her areas of interest include planning for shared mobility, promoting public transport, spatial transport infrastructure planning, and developing cases for emerging technologies like micro-mobility solutions, battery-swapping etc.



Himani Jain

Fellow
himani.jain@ceew.in

Dr Himani Jain is the Fellow and Team Lead of the Sustainable Mobility team. At The Council, her research is geared towards building connections between emerging technologies, travel behavior patterns and land use. This includes the analysis of risks constraining mobility of both passengers and freight, particularly in transport-poor demographic segments and the development of suitable interventions aimed at equitable transport.



Council on Energy, Environment and Water (CEEW)

ISID Campus, 4 Vasant Kunj Institutional Area

New Delhi - 110070, India

T: +91 11 4073 3300

info@ceew.in | ceew.in |  @CEEWIndia |  ceewIndia



Scan to read the full study