

Ease of Moving Index



Bengaluru City Profile



November 2024



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FOREWORD BY TRUSTEES



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Bengaluru exemplifies India's emergence as a global innovation powerhouse, seamlessly merging its rich cultural heritage with modernity to drive progress across economic, cultural, and social dimensions. Widely regarded as the technology capital of India, Bengaluru consistently ranks among the top global cities for innovation and entrepreneurship. Its immense contributions to the nation's GDP, alongside its well-earned reputation as the "Silicon Valley of India," highlight its critical role in shaping the country's economic trajectory.

Bengaluru also takes pride in its status as the start-up capital of India, hosting 40 of the country's 100 unicorns. Due to its concentration of industries and robust infrastructure, the city leads in both the secondary and tertiary sectors contributing to 35.6% of Karnataka's economy (GSDP at current prices). Bengaluru demonstrates its commitment to sustainable and inclusive growth through significant education, healthcare, and infrastructure investments.

The city's dedication to transforming urban mobility is equally remarkable. As one of the first Indian cities to embrace an Electric Vehicle (EV) policy, Bengaluru is driving the transition towards clean mobility with initiatives that prioritise environmental sustainability. The electrification of public transport, particularly BMTC's fleet of electric buses, demonstrates the city's leadership in adopting eco-friendly practices. The implementation of well-connected metro networks and last-mile connectivity solutions further highlight Bengaluru's progressive vision for a seamless and efficient transportation system.

The 'Ease of Moving Index - Bengaluru City Profile', developed by OMI Foundation, offers a detailed evaluation of the city's mobility framework, identifying areas for improvement and highlighting successful initiatives. This report can be an invaluable resource for policymakers, industry stakeholders, and civil society, providing data-driven insights for enhancing urban mobility. It addresses various stakeholder needs.

- For city authorities, It offers several insights on travel behaviour from time taken to expenditure incurred aiding concerned authorities to assess priorities on improving infrastructure, safety and mobility related investments.
- For distribution utilities and electric vehicle manufacturers the study offers measures to enhance EV adoption, improve air quality, and thereby contribute to mitigating tailpipe emission.
- For public transport operators and traffic management agencies, it recommends improvements in specific areas of services, connectivity, and safety, etc. to elevate commuter experience.
- For industry stakeholders, the report outlines vehicle market dynamics and consumer preferences, crucial for OEMs, urban logistics, aggregators, FinTech, and transport service providers.

Bengaluru's innovative strides in mobility include the development of green corridors and pedestrian-friendly zones, which encourage active mobility and healthier lifestyles. By prioritising sustainable and resilient transportation networks, the city exemplifies a forward-thinking approach to urban mobility challenges.

The 'Ease of Moving Index – Bengaluru City Profile' is a significant step in empowering stakeholders to navigate the path toward sustainable urban mobility. It underscores the importance of data-driven policymaking and collaboration in creating future-ready cities.

We congratulate the dedicated team at OMI Foundation for their meticulous work on the Bengaluru City Profile, a significant contribution towards realising a sustainable, mobility-ready future.



OMI Foundation Trust is a policy research and social innovation think tank operating at the intersection of mobility innovation, governance, and public good. Mobility is a cornerstone of inclusive growth providing the necessary medium and opportunities for every citizen to unlock their true potential. OMI Foundation endeavours to play a small but impactful role in ushering meaningful change as cities move towards sustainable, resilient, and equitable mobility systems that meet the needs of not just today or tomorrow, but the day after. OMI Foundation houses three interconnected centres which conduct cutting-edge evidence-based policy research on all things mobility.

Centre for Future Mobility

OMI Foundation's Centre for Future Mobility envisions a future which meets the aspirations of all in a diverse world, anchored in the paradigms of active, shared, connected, clean, and AI-powered mobility.

Centre for Clean Mobility

OMI Foundation's Centre for Clean Mobility explores the diversity of near- and long-term pathways to clean mobility. It focuses on the use of electric, future fuels, and renewable energy alike within the mobility ecosystem.

Centre for Inclusive Mobility

OMI Foundation's Centre for Inclusive Mobility ensures the existing and emerging mobility paradigms are Safe, Accessible, Reliable, and Affordable for every user of mobility infra and services, including persons with disabilities, women, trans/ non-binary, LGBTQIA+, children, and the elderly. It further paves the road for the future of work and platform economy to fulfil the modern promise of labour.

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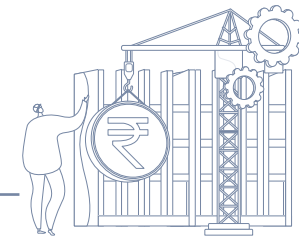
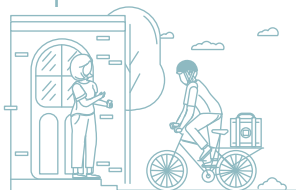
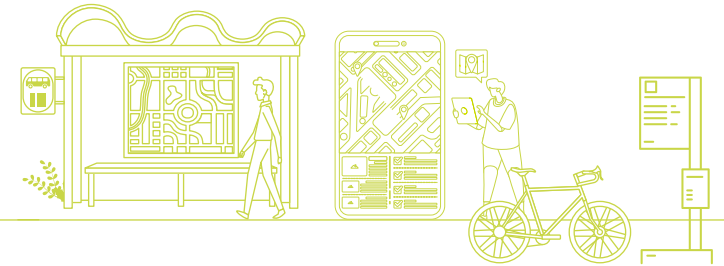
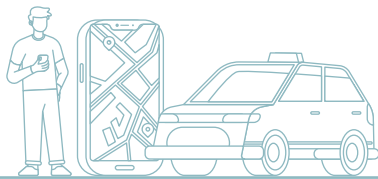
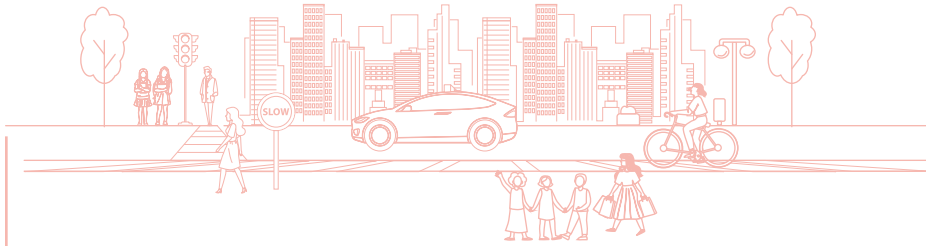
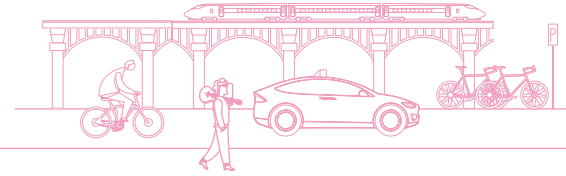
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INTRODUCTION

Bengaluru, formerly known as Bangalore, is the IT capital of the country. It has undergone a comprehensive evaluation of its mobility paradigm through the 'Ease of Moving Index - India Report 2022 (EoMI 2022)' – a study conducted by the OMI Foundation. EoMI 2022 is a framework enabling cities to evaluate their mobility paradigm across nine parameters. It enables cities to benchmark against their peers and assess opportunities for improving specific mobility aspects in the city.

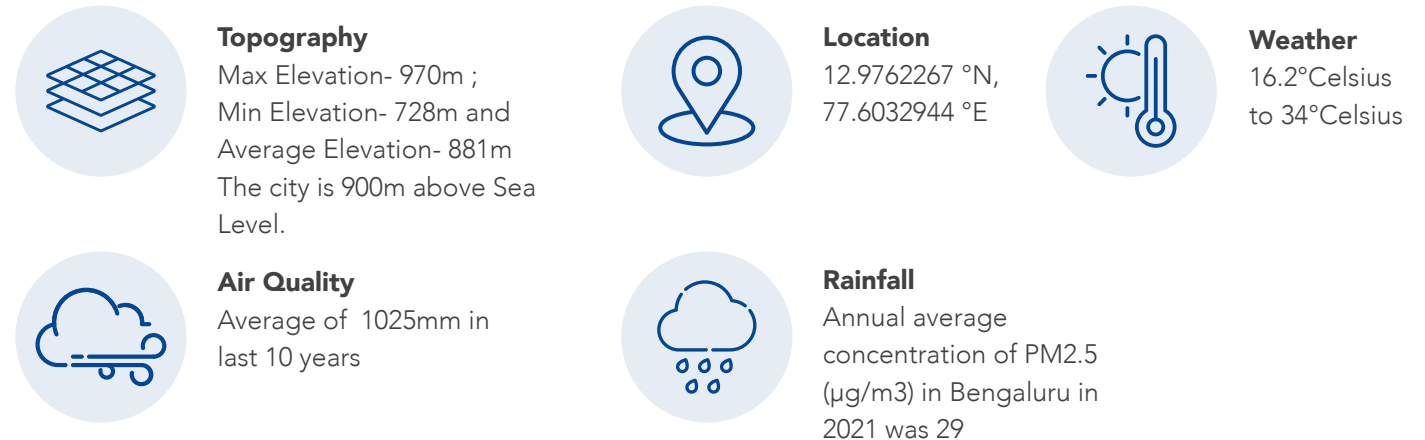
This city profile presents the key findings of EoMI 2022, focusing on Bengaluru's mobility system. It provides a detailed analysis of the city's performance across the nine parameters (listed later in the document) of the Index, shedding light on the strengths and areas requiring attention in Bengaluru's mobility network. For a holistic understanding, readers are encouraged to explore this city profile in conjunction with the 'Ease of Moving Index - India Report 2022,'² available on the OMI Foundation's website. The comprehensive report provides a broader context and deeper insights into the overall mobility scenario in India

CITY OVERVIEW

Contextual Characteristics

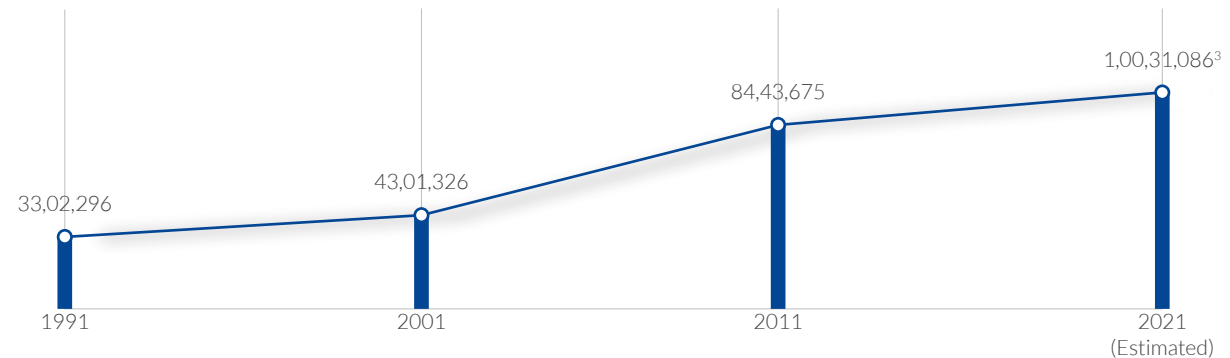
Bengaluru, the capital of Karnataka, is located on the Deccan plateau at the southern edge of the state, bordering Tamil Nadu. Figure 1 presents the key physical attributes of the city, while Figure 2 presents the population growth.

Figure 1: Physical attributes of Bengaluru



Source: (Bengaluru Topographic Map, Elevation, Terrain, n.d.) (IQ Air, n.d.) (meteoblue, n.d.) (Meteostat, n.d.)

Figure 2: Growth of population in Bengaluru



Source: (Office of the Registrar General & Census Commissioner, India; Ministry of Home Affairs, Government of India, 2023)

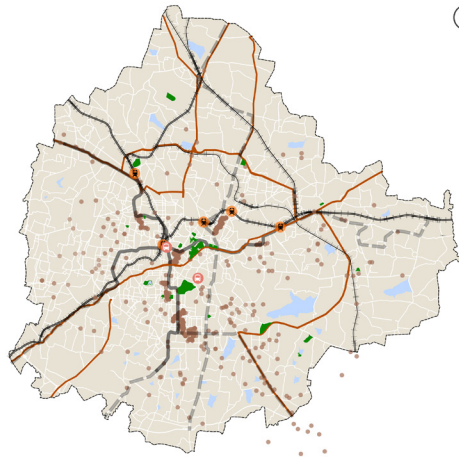
¹The 'Ease of Moving' by OMI Foundation is based on globally recognised concepts of 'sustainable development' and the 'Ease of Living' as propounded by the United Nations and the Ministry of Housing and Urban Affairs, Government of India respectively.

²The report can be accessed here: <https://olawebcdn.com/ola-institute/easeofmoving-2022.pdf>

³The projections are based on growth rates indicated by the Ministry of Statistics and Program Implementation (MOSPI) for 2016 and 2021. The projected population for 2021 of Bengaluru has been derived from the projected growth rate as suggested by MOSPI. Based on the growth rate the population of the city is estimated at 1,00,31,086 at 44.8% in the last three decades.

Bengaluru

- KSRTC terminals
- Railway Stations
- Parks and garden
- National/ State Highway
- Metro Phase 2 (Proposed)
- Metro Phase 1
- Survey Locations
- waterbodies
- BBMP



CITY ADMINISTRATION

Public Transport Authority



Bengaluru Metropolitan Transport Corporation

6,767 Buses



Bangalore Metro Rail Corporation Limited

69.66 Km is operational, 105.89Km is under construction. Presently, 2 corridors are operational while 5 corridors are being built.



Bengaluru Traffic Police

4 divisions, 8 subdivisions and 44 police stations.



Bengaluru Suburban Rail Project- Rail Infrastructure Development Company Limited (Karnataka)

148.17 Km long project across 4 corridors and 57 stations was approved.



Regional Transport Office in Bengaluru
Karnataka Motor Vehicle Department

Regional Transport Office

15 RTOs- Bengaluru East, Bengaluru West, Bengaluru North, Bengaluru South, Bengaluru Central, Marathahalli, Jnanabharathi, Yelahanka, Electronic City, KR Puram, Banashankari, RT Nagar, Bengaluru STU & AR, Nelamangala, Chandapura

Scope of Administration



Bruhat Bengaluru Mahanagar Palike (BBMP)

741 Sq.Km



Bengaluru Metropolitan Development Authority

8,005 Sq.Km



Bengaluru Development Authority (BDA) aka Bangalore Urban District

2,196 Sq.Km



Bengaluru Metropolitan Land Transport Authority

Bengaluru Metropolitan Area

EASE OF MOVING INDEX 2022 DATA COLLECTION AND RESPONDENT PROFILE

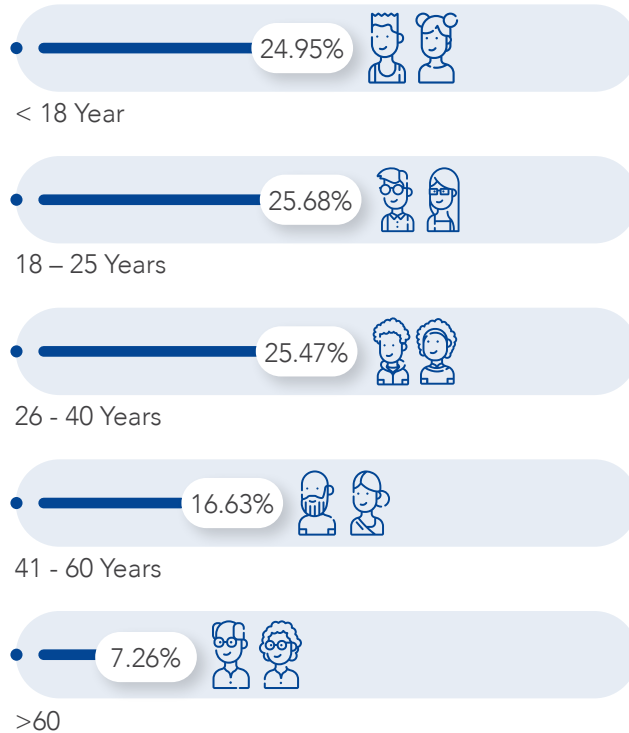
The Ease of Moving Index - India Report 2022 was developed based on findings from primary surveys, FGDs, and secondary data analysis. To ensure comparability, the 40 cities were divided into four clusters based on their estimated 2021 population. Bengaluru falls within the 'Mega cities cluster,' consisting of nine cities⁴, each with a population exceeding 4 million.

Sample size for No. of respondents/participants

Survey: **3,800** respondents

FGD: **12** women participants

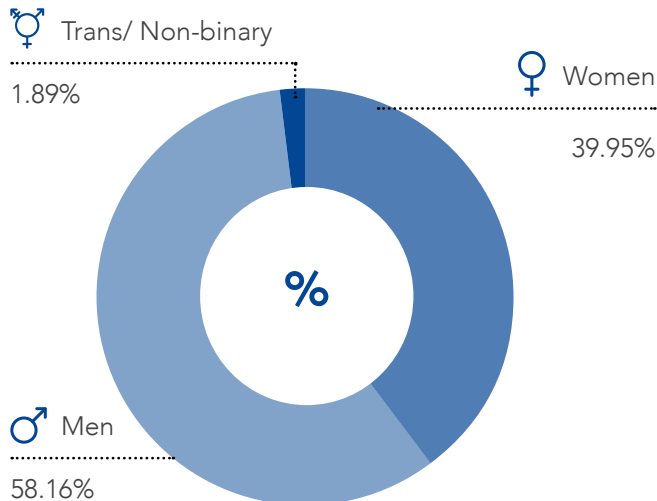
Age Distribution



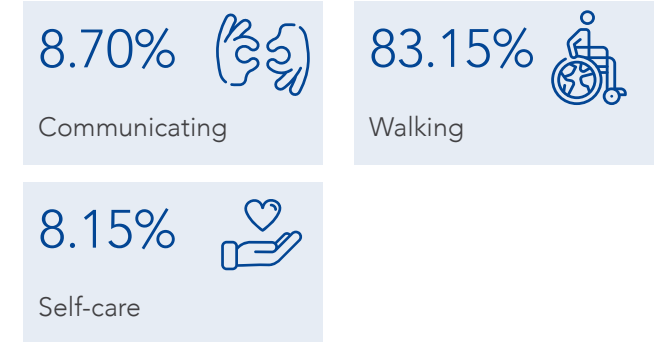
Survey sample and FGD participants

The primary survey was based on a randomly selected and statistically significant sample, stratified by gender, disability, and household income. The sample size was determined with a 95 percent confidence level and a 5 percent margin of error, based on the estimated population for 2021. Additionally, a focus group discussion (FGD) was conducted with a group of 12 regular women commuters, centering on women's safety in public transport.

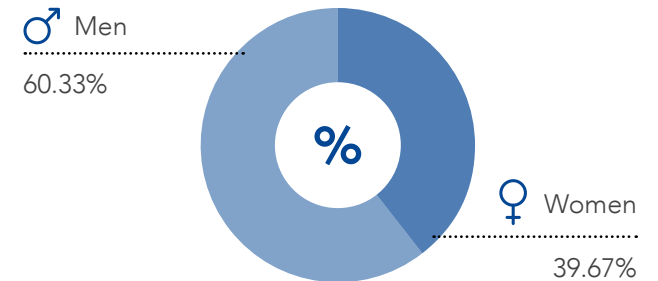
Gender Distribution



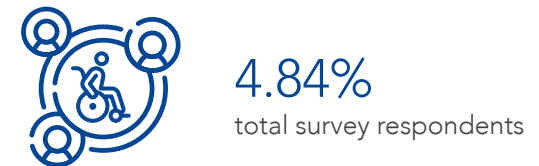
Distribution of disabilities/functional difficulties⁵



Gender distribution of persons with disabilities



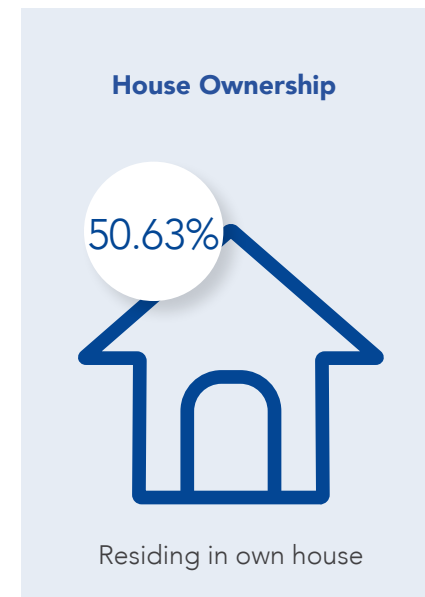
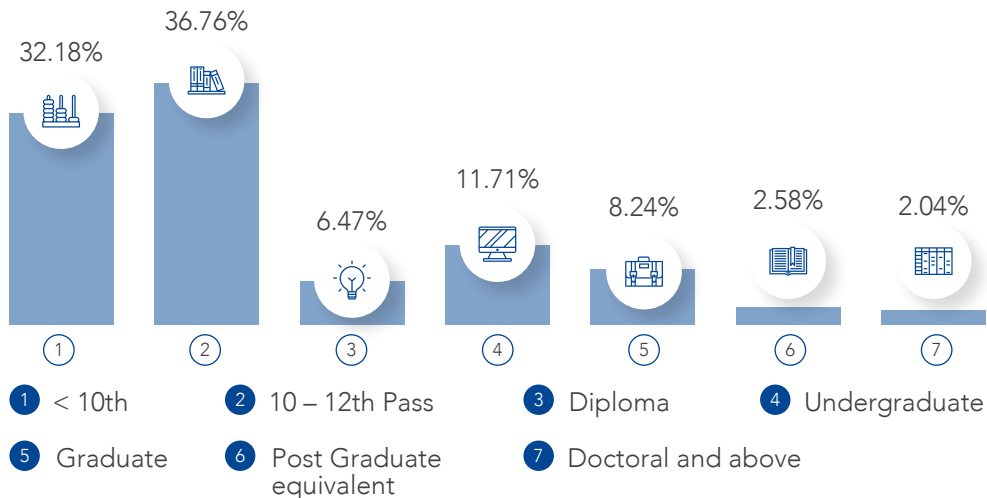
Persons with Disabilities



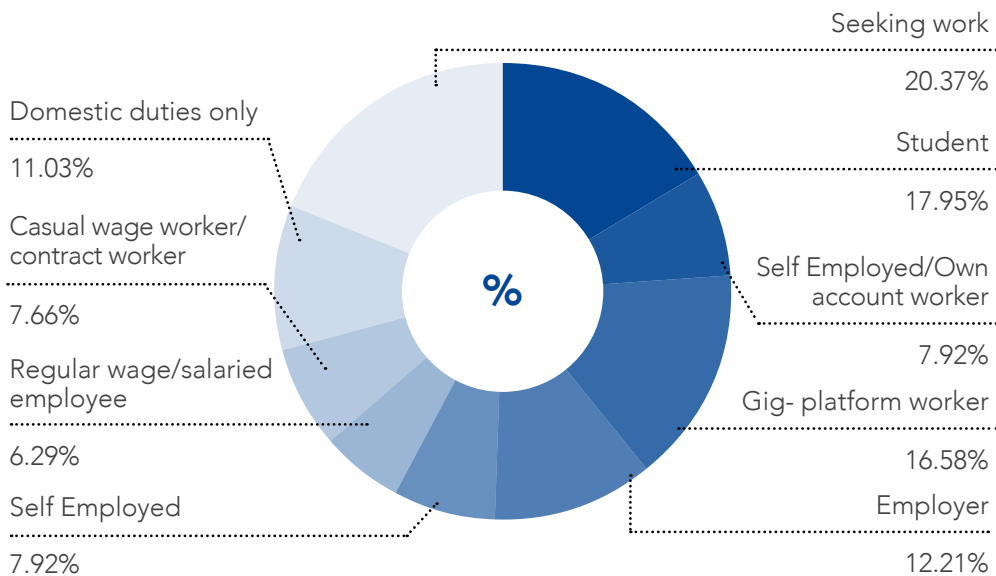
⁴The Mega Cities cluster includes the cities of Ahmedabad, Bengaluru, Chennai, Hyderabad, Kolkata, Mumbai, New Delhi, Pune-Pimpri Chinchwad and Surat.

⁵Total will exceed 100% as a survey respondent may have multiple disabilities/ functional difficulties

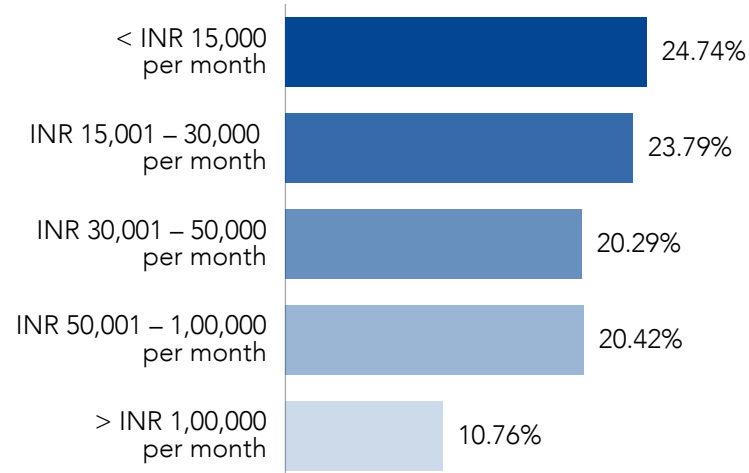
Highest Educational Qualification



Occupation



Household Income



INSIGHTS FROM THE EASE OF MOVING INDEX 2022

IMPETUS FOR ACTIVE AND SHARED MOBILITY

A robust urban infrastructure supporting active and shared mobility plays a pivotal role in creating a cleaner and more sustainable environment. By promoting physical activity and reducing traffic congestion, it enhances public health while offering affordable and inclusive transportation choices. This, in turn, improves accessibility and fosters social equity within the community, making it crucial to give impetus to active and shared mobility in cities. Here's how Bengaluru fairs on this parameter.



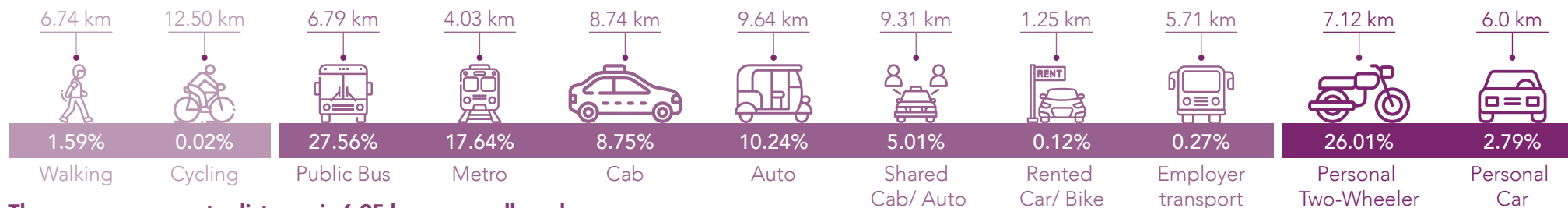
Mode share and public transport adoption

- In Bengaluru, public transport comprises **45.2%** of the mode share, placing it behind Chennai, Kolkata, Mumbai, and Hyderabad. At the same time, the combined mode share of active and shared mobility in Bengaluru reaches **71.2%**, marginally trailing Chennai, Kolkata, Mumbai, and Delhi.
- In Bengaluru **66.49%** of respondents regularly use the public transport system which is below the mega city cluster average of **76.85%**. Though the city has a substantial availability of 67.1 buses per lakh population, surpassing the cluster average of 38.34 buses per lakh, the patronage is low, owing to post-COVID mode shift and the rise of work-from-home. ("Bengaluru More Than Halves AC Bus Fleet, Cites Fuel Costs and Work From Home in IT Sector," 2022) In the recent past the state government of Karnataka announced free public transport travel for women under the 'Shakti Scheme'. The scheme has already increased women ridership in buses from **39%** to **57%** (Philip, 2023). This may increase ridership in the city's public bus transport systems. (Government of Karnataka, 2023)
- In terms of mass transit infrastructure, Bengaluru leads the cluster with 3.23 km

per lakh population (including both built and under construction projects). The suburban train is also being developed which will increase the total length of the mass transit.

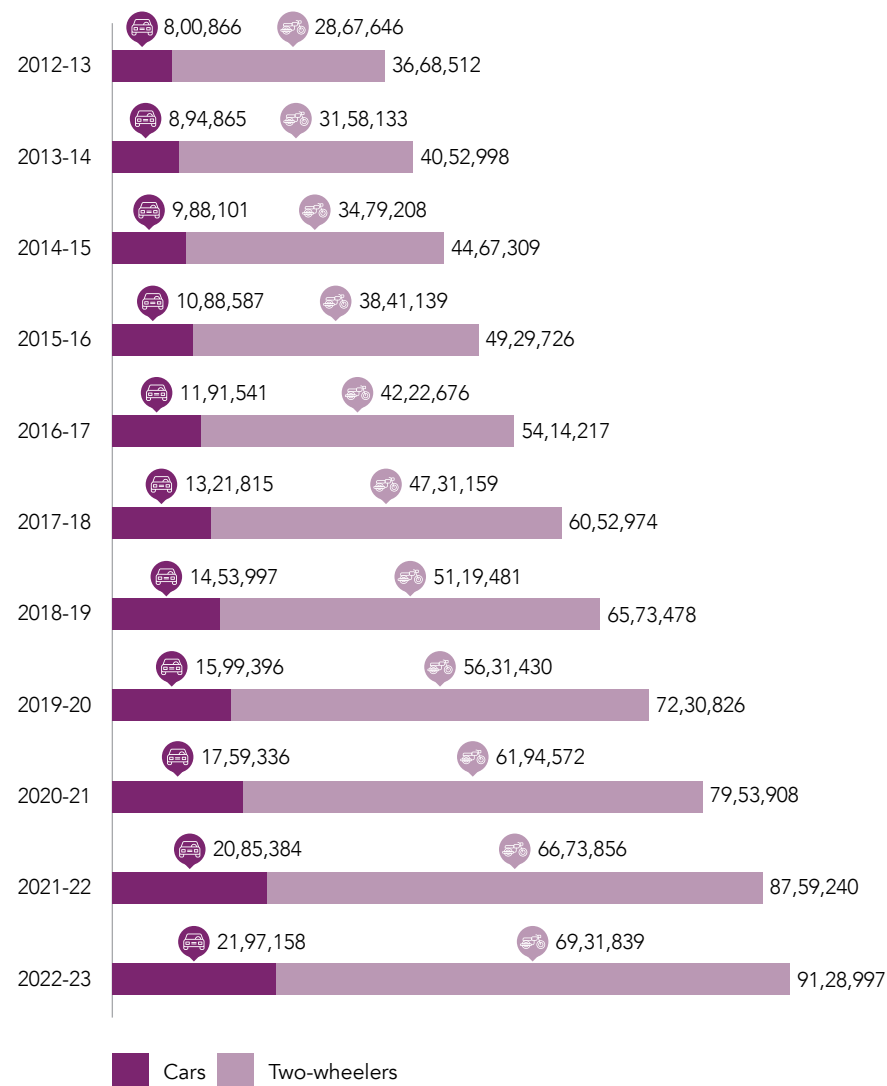
- Among regular public transport users, **73.15%** also own some form of motor vehicle (two-wheeler/car/three-wheeler), indicating the presence of choice users. Interestingly, **38.17%** of these vehicle owners choose not to use their vehicles due to the reliability of public transport and the availability of alternatives such as autos and cabs. Additionally, **37.87%** cited the high cost of vehicle ownership as their reason for relying on public transport. Yet another **7.10%** said rash driving and unsafe roads as a reason to not use their own vehicle.
- 38.88%** of the survey respondents reported good accessibility to public transportation throughout Bengaluru. While this is above the cluster average (**35.91%**), it is significantly lower than Pune-Pimpri Chinchwad (**49.15%**). Only **13.24%** of regular users expressed their reluctance to use public transport at night. This reluctance stems from the unavailability and unreliability of transportation services in their areas, highlighting an unequal distribution of the public transport network.

Mode share and average trip length, as reported by EoMI survey respondents



The average commute distance is **6.95 km** across all modes.

Cumulative number of vehicles registered in Bengaluru between 2012-13 to 2022-23



Source: (State Transport Authority, Karnataka, 2022) (State Transport Department, Karnataka, 2023) (Ministry of Road Transport and Highways, n.d.)

Vehicle growth and ownership patterns

- Since 2012-13, Bengaluru has witnessed a significant growth in registered non transport vehicles at **9.55%** CAGR. The number of registered Two-wheelers increased at a CAGR of **9.23%**, while the number of registered cars grew at a CAGR of **10.62%** over the same period.
- Among the mega cities, Bengaluru is notably burdened with an alarming count of 659 registered two-wheelers per thousand. This figure stands significantly above the cluster average of 500 two-wheelers, and far exceeds that of Kolkata, which records 94 two-wheelers per thousand population.
- In terms of car ownership, Bengaluru has a staggering 206 cars per thousand population, second highest after Delhi among mega cities. This figure significantly exceeds the cluster average of 152 cars and far surpasses the count in Mumbai, which has 75 cars per thousand population.
- The EoMI survey finds that in Bengaluru, **84.92%** of respondents own at least one two-wheeler, **33.11%** own at least one car. Around **36.66%** own a bicycle, slightly below the cluster average of **36.43%**; about **6.32%** of respondents did not own any vehicle.

Availability of public transport

Respondent perception regarding ease of availability of Public transport between any two points in the city (n=3232)

Per thousand ownership	Disagree	Neutral	Agree
Bus	41.37%	19.12%	39.51%
Metro	42.39%	19.37%	38.24%
Average	41.88%	19.25%	38.88%

- In Bengaluru, **38.88%** of public transport users reported finding public bus transport easily accessible between any two points in the city, above the cluster average of **35.91%**. Surat leads the cluster in this aspect with an impressive **49.15%** respondents reporting satisfaction on public bus transport accessibility.

SEAMLESS MOBILITY

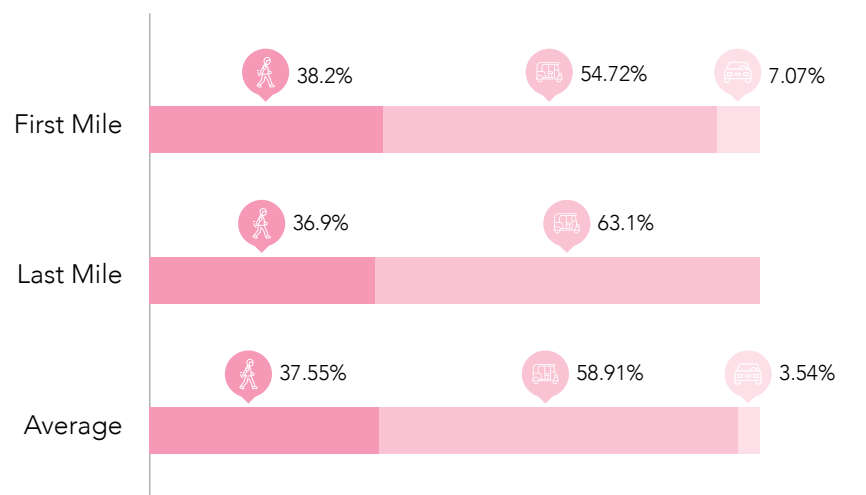
The integration of various transportation modes through seamless multimodal connectivity plays a vital role in promoting active and shared mobility and significantly affects individual mode choices. Bengaluru has the second longest operational metro network in the country and is in process of developing better mass transit connectivity across the city. It is also building a Suburban rail project while also maintaining a well-established network of buses, however, share feeder services are limited.



First- and last-mile connectivity to public transport

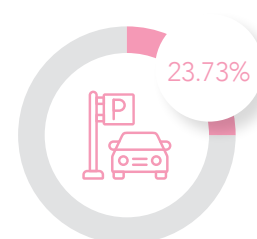
- In Bengaluru, **37.55%** of regular public transport users walk to the nearest transit stop, a little more than the cluster average of **34.8%** but significantly lower than **43.16%** as observed in Pune-Pimpri Chinchwad.
- Approximately **58.91%** of respondents rely on IPT modes for first-mile and last-mile connectivity to public transport, which is lower than the cluster average of **62.02%**.

Modes used for first and last mile connectivity by regular public transport users (n=2,149)

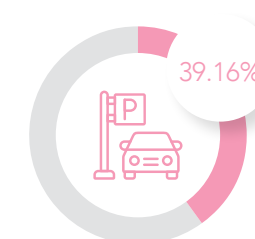


Parking facilities

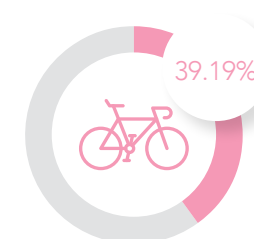
- The survey revealed that **23.73%** of regular public transport users in Bengaluru find the dedicated parking facilities at major transit hubs to be satisfactory. This is lower than the cluster average of **25.46%** and much lower than Surat, which leads the cluster with **39.16%** of respondents expressing satisfaction with the parking availability at transit hubs. The survey also suggests that **39.19%** respondents using bicycles found there is adequate parking for bicycles at transit hubs.



Parking at Transit hubs
Bengaluru

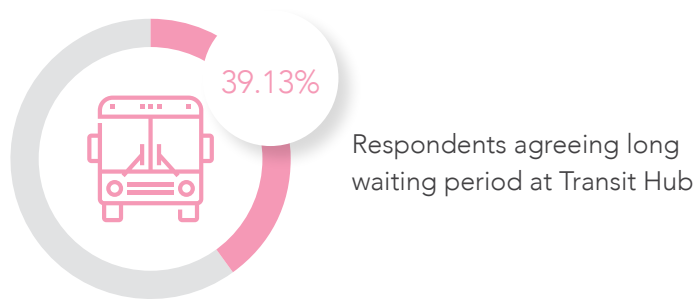


Parking at Transit hubs
Surat



Bicycle parking at Transit hubs
Bengaluru

Access and wait time for public transport



- Regular public transport users in Bengaluru reported an average time of 8 minutes and 11 seconds to reach the nearest transit stop. This duration is the third shortest, following Mumbai and Chennai, in terms of access time to transit stops.
- The average wait time for public transport in Bengaluru is 9 minutes and 18 seconds, which is lower than the cluster average of 9 minutes and 22 seconds. However, there is still room for improvement compared to Mumbai, which has the shortest wait time among mega cities at 9 minutes. This is reinforced by the dissatisfaction expressed by **39.13%** of respondents in Bengaluru regarding the waiting period for boarding public transport.

Unified Metropolitan Transport Authority (UMTA)

- Bengaluru's pursuit of a seamless mobility system has finally been recognised with the passing of Bengaluru Metropolitan Land and Transport Authority (BMLTA) Act in December 2022. Though it was established in 2007 through an executive order, it now has statutory power with the passing of the BMLTA bill in 2022 by the legislative assembly. The Directorate of Urban Land and Transport continues to function as the authority.



Time to access nearest transit hub

Bengaluru

8 minutes and
11 seconds



Average wait time for public transport

Bengaluru

9 minutes and
18 seconds

Cluster Average

9 minutes and
22 seconds

TOWARDS VISION ZERO

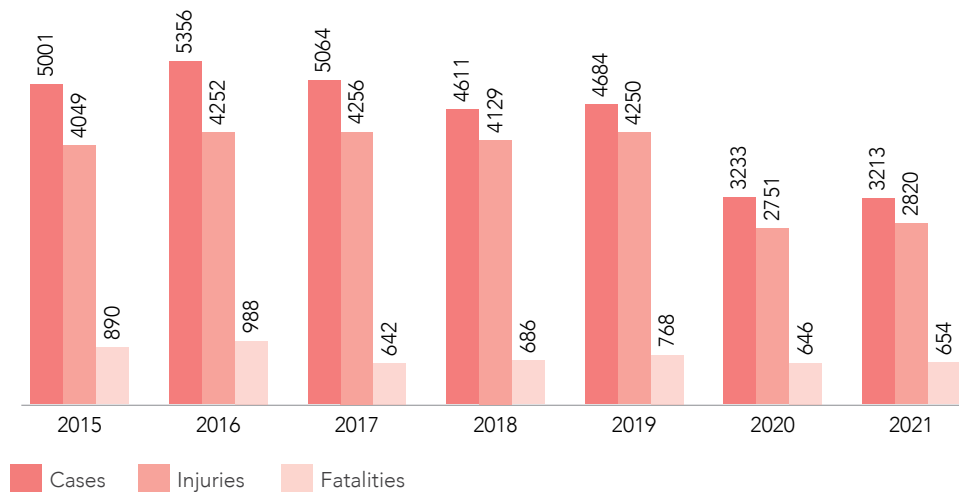
Reducing road accidents is crucial for improving public safety and promoting sustainable mobility, making it a top priority for urban planners and policymakers alike. Here's a look at Bengaluru's records on this front.



Road Safety and Fatalities

- Bengaluru has achieved a **33.80%** reduction in road fatalities in 2021 from its peak of 988 in 2016.
- Despite a reduction in road fatalities and accidents since 2016, Bengaluru records the third highest absolute numbers of fatalities in 2021, after Delhi and Chennai.
- The city has the third highest absolute number of fatalities, at 6.45 fatalities per lakh population, far more than Hyderabad (3.82)⁶.
- Vulnerable road users, including pedestrians, cyclists, and two-wheeler riders, accounted for nearly **74.46%** of the total fatalities in Bengaluru in 2021.

Road Accident details from 2015 to 2021



Source: National Crimes Record Bureau (2015, 2016, 2017, 2018, 2019, 2020, 2021)

Pedestrian and cycling infrastructure

- In Bengaluru **39.5%** of respondents considered the footpaths in the city to be wide and in good condition. This is notably higher than the cluster average of **31.05%**, but lower than Hyderabad and Mumbai, where approximately **40.64%** and **40.56%** of respondents, respectively, expressed satisfaction with the condition of footpaths.
- In Bengaluru, **42.61%** of respondents believe that major junctions in the city have sufficient grade separators like Foot Over Bridges (FOBs) and Subways. This is second only to Pune Pimpri Chinchwad, where **43.6%** of respondents feel similarly, among mega cities cluster.
- The Non Motorised Transport Improvement Plan proposed in the Comprehensive Mobility Plan for Bengaluru, 2019, suggests building 600 km of cycle tracks. However, Bengaluru has only 15 km of disjointed cycle tracks. (Kumari, 2023) Absence of safe cycling infrastructure is apparent as only **39.49%** of respondents in Bengaluru, believe there are sufficient cycle tracks and lanes available throughout the city.
- Presently, Bengaluru does not have a public bicycle sharing system, but almost **41%** respondents agree that availability of such a system would encourage them to cycle for short distances.

Illumination on roads and footpaths

- The EoMI survey reveals that **28.13%** of respondents in Bengaluru believe that the roads in the city are adequately illuminated, and around **40.53%** stated that the footpaths are also well lit. While the percentage of respondents satisfied with the illumination on the road is slightly lower than the cluster average of **28.42%**, the percentage of respondents satisfied with the footpath illumination is above the cluster average of **31.39%**.

⁶Mumbai has a fatality rate of 3.26 per lakh population, but it has over 10 people dying due to rail accidents everyday, which is not accounted as road fatality.

MOBILITY FOR ALL

Inclusive urban mobility ensures that everyone, regardless of their age, gender, ability, income level, or background, has equal access to transportation options. It reduces transportation-related inequalities and enables individuals to participate in the economic, social, and cultural activities within the city.



Persons with Disabilities and public transport accessibility

- According to the survey results, **67.1%** of respondents in Bengaluru who have disabilities or difficulties in walking, communication and self-care use public transport regularly.
- Respondents with disabilities in Bengaluru rated the public bus and metro system higher than the cluster average of **29.18%** and **32.03%** respectively. However, in Mumbai, **43.32%** respondents with disabilities agreed that public bus transport is accessible and in Delhi, **63.86%** participants find the metro accessible.

Respondent perception regarding accessibility of public transport for persons with disabilities (n=184)

Modes of Commuter	Disagree	Neutral	Agree
Bus	43.48%	17.93%	38.59%
Metro	41.30%	23.37%	35.33%
Average	42.39%	20.65%	36.96%

Safety from gender related crime events such as eve teasing and molestation in public transport (n=1343)

Bus	Metro	Average
41.47%	40.58%	41.03%

- In examining the safety of public transportation from a gender perspective, distinct insights emerge from two of India’s mega cities. In Bengaluru, a significant **41.47%** of women and trans/non-binary individuals perceive the public bus system as safe from gender-related crimes, showcasing the city’s leadership in this area. Conversely, when it comes to satisfaction with the metro system, Pune-Pimpri Chinchwad stands out with a notable **69.08%** of women and trans/non-binary respondents affirming its safety, the highest recorded satisfaction among the mega cities.
- On an average **41.03%** women and Trans/non binary respondents in Bengaluru consider the public transport system safe from gender related crimes while Pune-Pimpri Chinchwad leads the mega cities cluster with **47.54%**. respondents across public transport systems considered it safe from gender-related crimes.
- In Bengaluru, over **62.92%** women and trans/non-binary respondents use public transport regularly, much lower than the mega cities cluster average of **74.44%**. However, this is likely to improve as more women are using the public bus transport system after the Shakti scheme. (Philip, 2023)

Safety from pickpockets and other petty crimes in public transport (n=3,232)

Bus	Metro	Average
39.05%	39.54%	39.29%

- Among respondents using public transport regularly, about **39.29%** agreed that the public transport system in Bengaluru is safe from pickpocketing and other petty crimes. It is better than the cluster average of **31.29%**. However, it lags behind Ahmedabad in public bus safety and Pune-Pimpri Chinchwad in metro safety as **42.33%** and **49.06%** respondents in the respective cities think it is safe from petty crimes.

AFFORDABLE MOBILITY

Affordable mobility allows individuals to access essential services like education, healthcare and job opportunities, regardless of their financial situation. Affordable transport systems allow low-income households to allocate their budget on other important services like education, housing, and healthcare, thereby contributing to a more equitable distribution of resources.



Public transport affordability

- In Bengaluru, **39.96%** of respondents find public transport affordable, surpassing the cluster average of **35.37%**, yet it is notably lower than Pune-Pimpri Chinchwad, the cluster leader, with an average of **57.67%** respondents across all income groups think public transport is affordable between any two points in the city.
- Among the mega cities, Bengaluru had the highest percentage of respondents agreeing that buses were affordable with **40.01%**. Whereas Pune-Pimpri Chinchwad had the highest percentage of **68.31%** respondents agreeing that metro is affordable between any two points in the city.
- Among the respondents with monthly household income below INR 30,000, **39.14%** respondents considered public transport affordable, exceeding the cluster average of **35.34%** but much less than Pune-Pimpri Chinchwad with an average of **57.68%** respondents think public transport is affordable between any two points in the city.
- Among the respondents with monthly household income below INR 30,000, the highest percentage of respondents in Surat with **41.88%** found the bus to be affordable between any two points in the city. While Pune-Pimpri Chinchwad lead in metro as **69.02%** respondents stated it is affordable between any two points in the city.

Affordability of public transport in Bengaluru

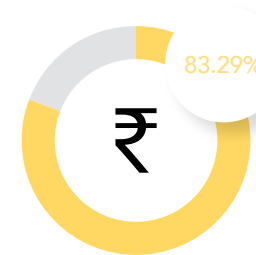
Public Transport Mode	Perception of affordability (income agnostic) (n=3,232)	Perception of affordability (monthly household income less than 30,000) (n=1,524)
Bus	40.01%	39.50%
Metro	39.91%	38.78%
Average	39.96%	39.14%

Unaffordable mobility as a roadblock

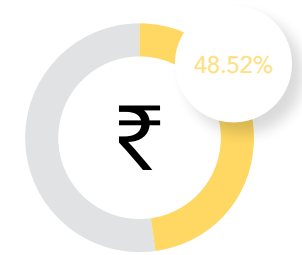
- EoMI finds that **5.82%** respondents in Bengaluru said no to an opportunity due to difficulty in commuting, compared to the cluster average of **5.18%**, and no one in Ahmedabad, Hyderabad, and Surat.
- 96.28%** of the respondents who said no to an opportunity in Bengaluru, attributed their loss of opportunity to the high cost of travel which is far greater than the cluster average of **38.62%**. No one in Ahmedabad, Hyderabad, Mumbai, and Surat have said no to an opportunity due to the high cost of travel.

Monthly expenditure on travel

- The monthly travel expenditure in Bengaluru is low, with over **83.29%** of respondents reporting spending less than INR 3,000 per month on mobility. Approximately **48.52%** (1,844 respondents) have a monthly household income below INR 30,000, and **81.99%** of them spend less than INR 3,000 on transportation. The respondents with household income less than INR 30,000 reported spending **15.18%** of their income on transport, compared to the cluster average of **11.98%**, and cluster minimum of **9.65%** in Hyderabad.



Transport Expenditure less than INR 3000 (Income agnostic)



Transport Expenditure less than INR 3000 (Respondents earning less than INR 30000)



EFFICIENT AND RELIABLE MOBILITY

Efficient and reliable mobility is a key aspect of any well-functioning transportation system. In this regard, access to timely and accurate information on fare and timetables, and efficient public transport is crucial for making informed travel decisions. Availability, accessibility and time taken for trips is yet another pertinent yardstick for measuring efficiency of public transport. This section presents how the city of Bengaluru fairs on this parameter.



Availability of information

Respondent perception regarding easy availability of information on timetable, fare etc. of public transport modes (n=3232)

Modes of Commute	Disagree	Neutral	Agree
 Bus	40.28%	19.77%	39.94%
 Metro	39.98%	18.81%	41.21%
Average	40.13%	19.29%	40.58%

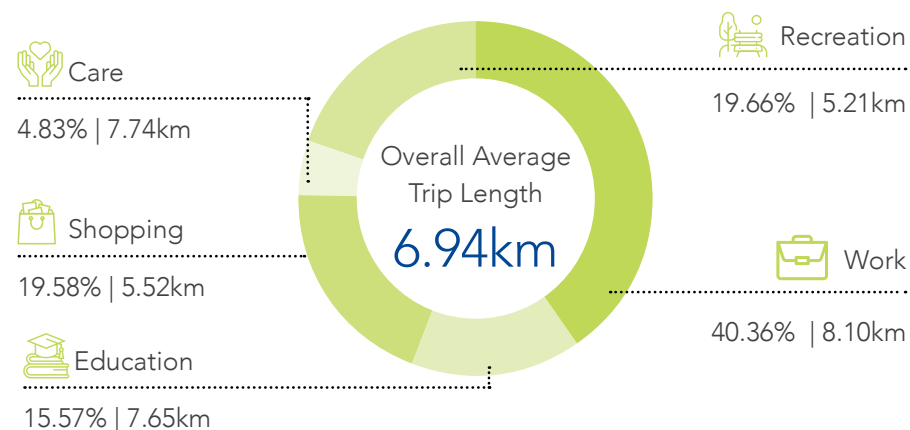
- On average, **40.58%** of Bengaluru respondents indicated easy access to information regarding public transport fares and timetables, compared to the cluster average of **46.54%**.
- While **39.94%** respondents in Bengaluru expressed satisfaction in accessing information about buses, which is higher than the cluster average of **38.81%**, in Surat **65.22%** respondents have easy access to such information.
- In Bengaluru, **41.21%** respondents have easy access to information regarding fares and timetables regarding metro, lower than the cluster average of **45.01%**. However, in Ahmedabad, **65.37%** respondents agreed that they have easy access to information regarding metro fares, and timetables.
- In Bengaluru, **40.16%** respondents accessed this information through digital means, while the majority obtained it at transit stops or through word of mouth. Meanwhile, **60.06%** of the respondents have access to some information and none is being accessed using digital medium in Bengaluru.

Public Transport vs Private Vehicle

- In Bengaluru, **42.08%** respondents stated that using their own vehicle significantly speeds up reaching their frequented destination compared to public transport. This is less than the cluster average of **46.01%**. In Ahmedabad and Surat, no respondent disagreed that reaching their frequently visited destination is faster by personal vehicle than by public transport.

Average commute duration

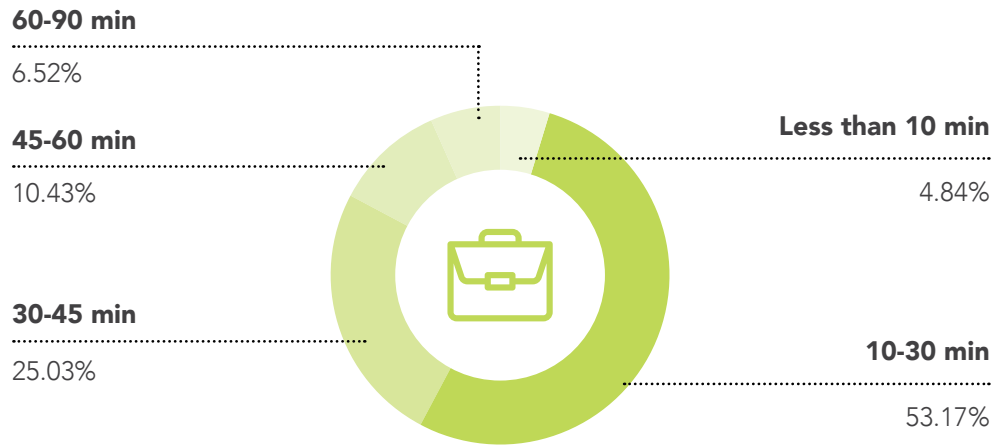
Trip distribution and average trip length based on trip types



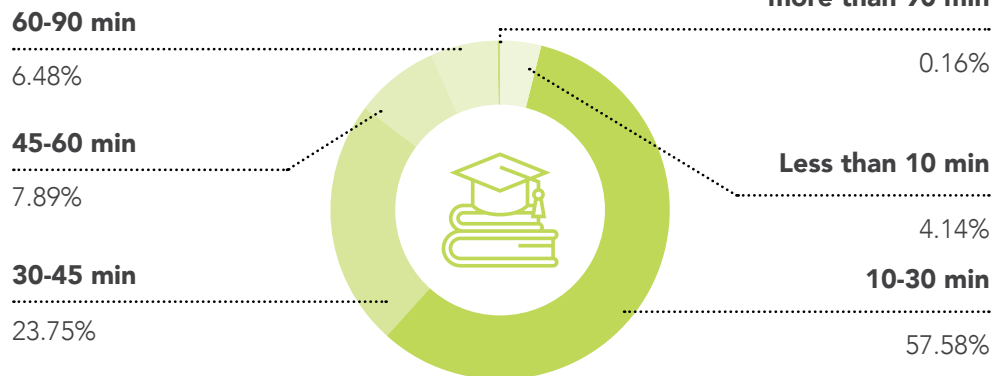
- Over **40%** of the trips, as stated by respondents, were for work, while **15.57%** of the trips were made for education.
- On average, the respondents in Bengaluru reported commuting for a duration of 31 minutes and 2 seconds which is around the cluster average, and marginally higher than Ahmedabad, which has the lowest commute duration of 29 minutes 53 seconds.

Distribution of work and education trips across different time intervals

Trip purpose: Work



Trip purpose: Education



- In Bengaluru, **58.01%** of work trips and **61.72%** of education trips were completed within 30 minutes. Across the cluster, an average of **58.37%** of work trips and **62.94%** of education trips were completed within 30 minutes. Ahmedabad had the highest percentage of both work (**62.7%**) and education (**74.10%**) trips among the mega cities.

Time spent on First Mile/ Last Mile connectivity

- In Bengaluru, **29.87%** respondents take less than 10 minutes to walk or cycle to the nearest transit stop for first and last mile connectivity. Among the mega cities, the average is **25.89%**. However, in Pune-Pimpri Chinchwad, **34.68%** respondents can access transit stops within 10 minutes by walk.
- On average, **45.72%** respondents in Bengaluru take less than 10 minutes to reach the nearest transit stop by shared mobility modes. This is lower than the cluster average of **46.98%**. Notably, Ahmedabad had the highest percentage (**52.43%**) of respondents achieving this quick connectivity.

Congestion and crowding

Respondent perception regarding state of overcrowding in Public Transport (n=3232)

Modes of Commute	Disagree	Neutral	Agree
Bus	39.23%	20.45%	40.32%
Metro	39.98%	19.99%	40.04%
Average	39.60%	20.22%	40.18%

- In Bengaluru, an average of **40.18%** of public transport users felt it is overcrowded and it is difficult to find a space to sit or even stand. This is more than the cluster average of **35.75%**, and Delhi's **24.76%**.
- Regarding the comfort and capacity of public transport, certain cities exhibit notably lower levels of overcrowding. In the context of public bus transport, Delhi leads with the lowest percentage of respondents (**24.31%**) reporting overcrowding, followed closely by Chennai (**25.17%**) and Hyderabad (**25.32%**).
- Similarly, for metro services, Ahmedabad, which has a limited network, reports minimal overcrowding. Among more extensive metro systems, Delhi stands out with only **25.2%** of respondents experiencing overcrowding, followed by Chennai (**25.28%**), Hyderabad (**25.72%**), and Kolkata (**26.36%**).
- Although Bengaluru was considered the second most congested city in the world as per the TomTom's Traffic Index-2022 (Tom Tom, 2022), **45.68%** of the respondents believed that the roads are not congested, which is near the cluster average of **45.44%**.

CLEAN MOBILITY

Clean and sustainable mobility is a key focus area in modern urban planning, aiming to reduce carbon emissions, improve air quality, and create a healthier environment. Moreover, emphasising hygienic mobility practices, including cleanliness measures in public transport, enhances the safety and well-being of commuters. Here's how Bengaluru fares in terms of clean mobility:














Deaths due to PM2.5 pollution

- In 2019, Bengaluru recorded 73.12 deaths per lakh population⁷ attributed to PM2.5 pollution, the lowest in the mega cities cluster. (Health in Cities, n.d.) However, the rising vehicular traffic and emission along with reduction in green cover due to construction has impacted the weather severely. The cost of haphazard development and the pollen season has an impact on the air quality often leading to chronic health issues.

Electric Vehicle (EV) adoption

- Bengaluru is a hub for several Electric vehicle OEMs and is gradually gaining traction among respondents. Approximately **2.18%** of the total two-wheelers owned by the respondents were electric vehicles. In the case of bicycles, **2.0%** were either pedal-assisted or electric cycles.



Top three reasons for unwillingness to buy electric vehicles (n=333)

Reasons for unwillingness to buy Electric Vehicle	Bengaluru
 Electric vehicle are more expensive than ICE vehicles	5.96%
 Limited finance options	19.59%
 High cost of finance	2.43%
 Safety concerns	85.97%
 Not enough EV options in the market to choose from	40.24%
 Inadequate charging infrastructure	77.72%
 No clarity on resale/ resale value of EVs	3.65%
 Concerned about technology and reliability of existing EVs	51.44%
 Lack of service centres/ skilled mechanics	7.03%
 I'm not aware of the EV technology	2.76%
 I own a car /recently purchased personal vehicle so not planning to buy one in the next few years	3.20%

- About **28.53%** of respondents in Bengaluru expressed their willingness to purchase electric vehicles in the near future, which is lower than the cluster average of **34.5%**. However, safety concerns, inadequate public charging infrastructure, and doubts about the reliability of existing technology are major deterrents.

Cleanliness and hygiene perception in public transport

Respondent Perception on cleanliness, hygiene and maintenance/upkeep of Public transport (n=3232)

	Disagree	Neutral	Agree
 Bus	39.14%	20.85%	40.01%
 Metro	40.66%	19.77%	39.57%
Average	39.90%	20.31%	39.79%

- Among the respondents who regularly use public transport in Bengaluru, **40.01%** find buses to be clean and hygienic, better than the cluster average of **39.63%**. Among the mega cities, Mumbai stands out with **40.24%** respondents reporting that buses are clean and hygienic.
- However, **39.57%** of respondents find the Metro to be clean and hygienic, lower than the cluster average of **39.79%**. Among the mega cities, Pune-Pimpri Chinchwad stands out with **68.92%** respondents reporting that the metro is clean and hygienic.

Shift to Electric bus

- Bengaluru Metropolitan Transport Corporation (BMTc) augmented 390 buses under Faster Adoption and Manufacturing of Hybrid and Electric Vehicles in India (FAME -2) scheme (Devaiah BP, 2023). In addition, it tendered another 921 electric buses under Gross Cost Contract (GCC) facilitated under the grand challenge by Convergence Energy Service Limited (CESL) (Devaiah BP, 2023). Hence, a total of 1311 electric buses are being procured, about **19%** of its current fleet, with plans to electrify the entire fleet in near future.

⁷The figure has been calculated by dividing the number of deaths due to PM 2.5 pollution in 2019, by the projected population in Bengaluru in 2021

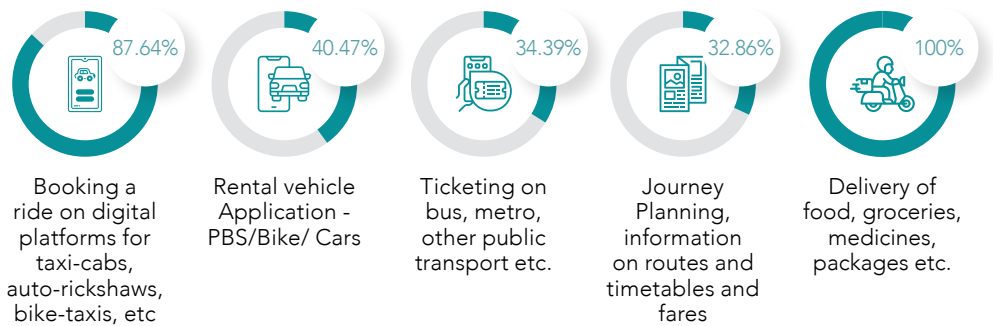
FUTURE MOBILITY

The ubiquity of smartphone applications has brought about a transformative shift in how people make mobility decisions and facilitate payments. This has led to greater flexibility and convenience in choosing the most appropriate transportation mode, whether it's for commuting or package delivery. Additionally, integrated payment systems within these apps have significantly enhanced the efficiency and security of transactions, eliminating the need for traditional cash-based payments. This section explores the extent to which citizens embrace technology-enabled mobility and payment solutions in Bengaluru.



Mobility and package delivery

Percentage of respondents having number of applications for different services

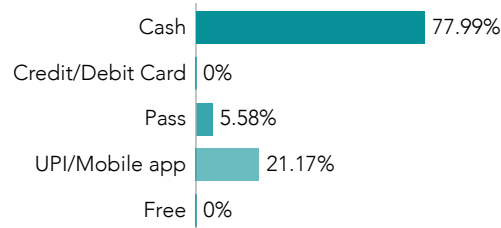


- Over **98.18%** of respondents use a smartphone. Of these, **87.26%** have at least one app to book a ride on digital platforms, and all smartphone users have at least one app for food and package delivery. However, the percentage of respondents having at least one app for rental vehicle applications, ticketing for public transport and journey planning, etc are significantly lower. This pattern is observed across the cities in the cluster.

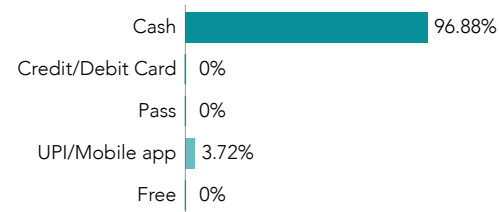
Payment for mobility, and parking

Distribution of payments made for different mobility services - parking (n=2,983), public transport, and IPT (n=2,149).

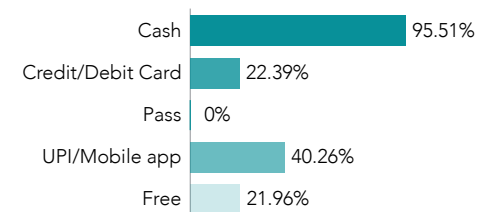
Public Transport



Intermediate Public Transport



Parking



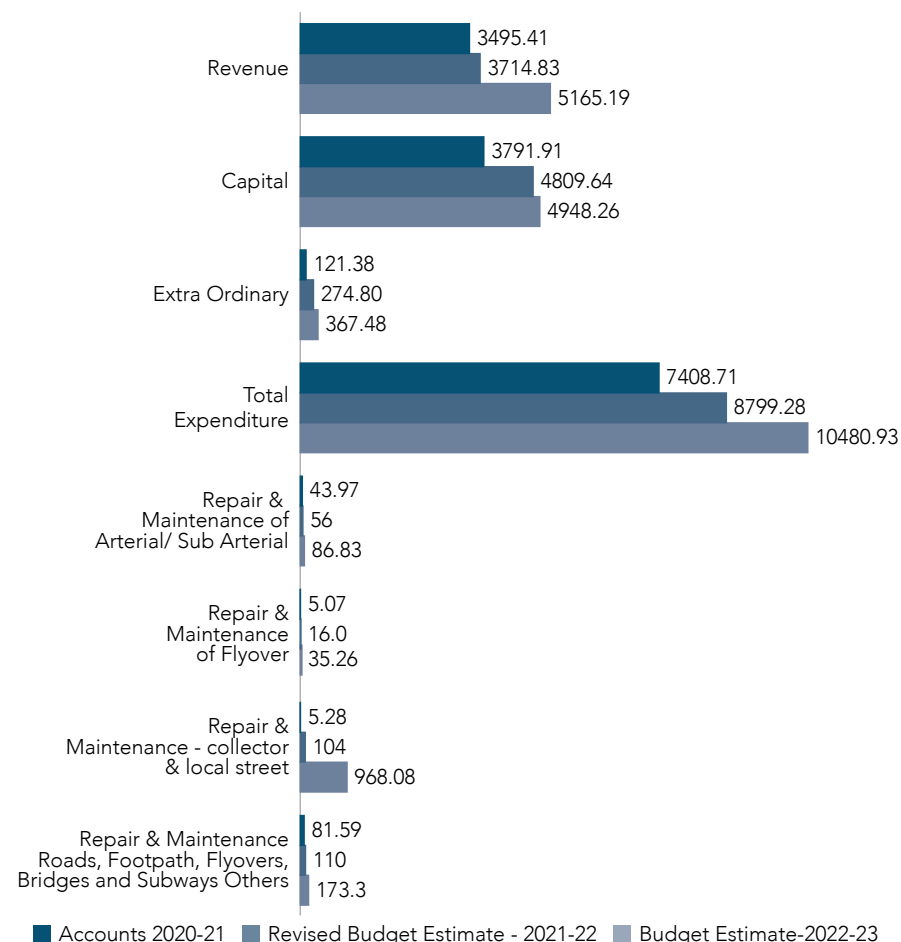
- UPI/ Mobile applications are the most popular and acceptable mode for cashless payment. While **40.26%** of respondents using parking facilities pay by UPI/ Mobile applications, its usage for payment in public transport is only about half.
- Cash remains the dominant mode of payment for all the three purposes in Bengaluru, a pattern also observed in other cities in the cluster.
- Bengaluru has the highest percentage of cashless payments for parking in the cluster.
- Passes are being used by only **5.58%** regular public transport users in Bengaluru. While this is marginally lower than the cluster average of **6.1%**, it is lower than Surat (**8.37%**) and substantially behind Mysore (**23.03%**). UPI and mobile apps as a mode of payment for public transport are being used by **21.17%** respondents, substantially higher than the cluster average of **14.21%**, and just behind Hyderabad (**24.66%**). The survey was conducted prior to the launch of 'Shakti Scheme' and hence there was no free travel using public transport.
- Only **3.72%** of respondents in Bengaluru use UPI and mobile apps for paying for IPT modes, lower than the cluster average of **8.66%**, and significantly lower than Hyderabad (**34.13%**), which leads the cluster.

INVESTMENT IN CITY

Financial resources play a vital role in development and maintenance of a sustainable, seamless, efficient and inclusive mobility system. Below are the updated budgets for Bengaluru city, focusing on mobility expenditures:



Bruhat Bengaluru Mahanagar Palike (BBMP) Budget 2022-23 details



Source: (BBMP, n.d.)

- The BBMP's estimated budget for 2022-23 has increased by over **19%**, or INR 1,681.62 Crores from the revised budget of 2021-22. The revenue account's estimated budget has significantly increased by **39.04%**, or (INR 1,450.36 Crore).
- The Mahanagar Palike plans to spend INR 1,263.47 Crores, about **12%** of its budget, towards repair and maintenance of the road assets. BBMP has spent an estimated INR 6.13 Crore on pot hole filling, and INR 17 Crore has been allocated for asphaltting of major road networks.(BBMP, n.d.).
- Additionally, if BBMP meets its revenue generation targets, the Urban Development Department will allocate an extra 377.5 Crore. (Times of India, 2022).
- The revenue and capital expenditure for the BBMP in 2020-21 amounted to INR 7408.71 Crore, resulting in a per capita budget of INR 7,311. The per capita expenditure is expected to increase to INR 10,343 as per estimated budget of 2022-23.
- Besides BBMP, BMTCL in 2019-20 spent INR 2669.30 Crore in operation, maintenance and investment in 6690 buses. (BMTCL, 2021) BMRCL also spent INR 821.94 Crore in FY 2021-22 towards operation, maintenance and other expenses. (BMRCL, 2022).
- The Directorate of Urban Land and Transport, Bengaluru Traffic police and BMRDA also spend substantial amounts of funds to improve transportation in the city.

THE ROAD AHEAD

There are multiple factors affecting mobility, as it should be for something as encompassing. If infrastructure sets the pace, technological advancements and behavioural changes ensure that the journey to sustainable and efficient mobility systems is seamless. The inferences encapsulated in the study aim to highlight the opportunities ahead, and assist policy makers towards a data-driven decision-making process. The key responsibility areas and their respective improvement areas have been furnished below.

We urge all stakeholders to join us on this journey of improved and enhanced mobility across the country through various engagement channels.

Key responsibility and improvement areas, along with the agencies responsible for intervention.



Encourage Shared Mobility

Improvement Areas

- In Bengaluru, as discussed in the section Vehicle growth and ownership patterns, there could be a link between the increasing personal vehicle ownership and the rising congestion in the city. Inadequate shared mobility options such as share autos, share taxis etc. coupled with a diminishing preference for active mobility choices could be influencing the mode choices of the residents. Addressing this trend would require policy interventions. Encouraging alternatives like walking, cycling, public transport, along with electric and shared mobility, could play a significant role in mitigating the growth in vehicle ownership.
- Therefore, potential solutions such as carpooling, shared auto systems, and the proliferation of electric bike taxis could be critical in promoting sustainable transportation methods in the city.

Responsible Agency

State Transport Authority/ RTO



Improving first and last mile connectivity and seamless multi-modal integration

Improvement Areas

- Institutional, physical, information and fare integration are pillars of seamless multi-modal integration. These are also building blocks for strengthening first and last mile connectivity and improving efficiency of all mobility means. Improving these would help make the public transport in Bengaluru more seamless and efficient (refer section - Seamless Mobility, Availability of information and Payment for mobility, and parking))
- Access to public transit can be improved by encouraging use of active and shared mobility modes for first and last mile connectivity. (refer section First- and last-mile connectivity to public transport and Time spent on First Mile/ Last Mile connectivity)

Responsible Agency

Directorate of Urban Land and Transport / Bengaluru Metropolitan Land and Transport Authority



Road safety infrastructure

Improvement Areas

- Investment in public bicycle sharing systems and safe cycling infrastructure, especially on major roads, will encourage more people to use bicycles and facilitate safety for cyclists. This will also reduce congestion and emission. (refer section Towards Vision Zero)
- Well-lit and well-designed roads and footpaths will encourage walking and keep both motorists and pedestrians safe. (refer Section Illumination on roads and footpaths)

Responsible Agency

BBMP



Budgetary spending

Improvement Areas

- There is a need to increase budgetary allocations towards mobility in the city. Though the budget estimates of 2022-23 has increased by over INR 3000 Crores from actuals 2020-21, the per capita will be lesser than the cluster average and much lesser than Mumbai, Pune-Pimpri Chinchwad. (refer section Investment in City)

Responsible Agency

BBMP



Decarbonisation

Improvement Areas

- Augmenting electric buses in Bengaluru will not only encourage patronage for public bus transport but also improve air quality standards. (refer Section Clean Mobility)

Responsible Agency

Bengaluru Metropolitan Transport Corporation



Improving Public Bus Transport services

Improvement Areas

- Increase patronage as the regular PT users are fewer than the cluster average even though it has the second highest bus fleet and the highest number of buses per lakh population. (refer section Mode share and public transport adoption) Though the bus availability is better than cluster average, it can be improved further by augmentation of more buses and operational efficiency. (refer Section Availability of public transport)
- The patronage among women commuters using public bus transport may have changed after the implementation of Shakti Scheme. (refer Section Safety from gender-based crimes)
- Encouraging use of cashless payments in public transport to increase efficiency and reduce leakage. (refer section Payment for mobility, and parking)
- Open data on schedule could enable opportunities for service providers to improve first and last mile efficiency and reduce access and wait time. (refer Section Access and wait time for public transport)

Responsible Agency

Bengaluru Metropolitan Transport Corporation



Adopt cashless payment system

Improvement Areas

- Adoption of cashless payment for Intermediate public transport in Bengaluru is below cluster average (refer Section Payment for mobility, and parking) indicating room for improvement.

Responsible Agency

IPT service provider.



Improving Namma Metro connectivity

Improvement Areas

- Open data on schedule and historic ridership at different stations will enable opportunities for service providers to improve first and last mile efficiency. Open APIs and integration of public transit systems with other mobility modes will also enable commuters to plan their journey better. (refer Section Availability of information)

Responsible Agency

Bengaluru Metro Rail Corporation Limited


The strategic interventions mentioned above need to be prioritised to improve the mobility scenario in the city. OMI Foundation will be keen to support the civic administration in creating pathways for implementation, demonstration of pilot and collaboration to improve Bengaluru's mobility scenario.

REFERENCES

1. Bangalore Metro Rail Corporation Limited. (n.d.). Retrieved 10 18, 2022, from <https://english.bmrc.co.in/#/>
2. Bangalore Traffic Police. (n.d.). Bengaluru Traffic Police. Bengaluru Traffic Police. Retrieved October 20, 2022, from <https://btp.gov.in/tmc.aspx>
3. Bangalore Traffic Police. (n.d.). Bengaluru Traffic Police. Bengaluru Traffic Police. Retrieved September 27, 2023, from <https://btp.gov.in/Aboutuskannada.aspx>
4. BBMP. (n.d.). Budget Estimates for 2022-23. BBMP. Retrieved October 20, 2022, from https://testudp.bbmpgov.in/ucc_file/2022-23-BBMP-BUDGET.pdf
5. BBMP. (2022, January 17). Budget Estimate for 2021-22. Retrieved October 19, 2022, from <https://openbudgetsindia.org/dataset/d476f525-0297-4e7b-ae72-11762c0960f6/resource/2eea20af-9c27-49b6-a212-3f6e2262483c/download/bangalore-municipal-budget-2021-22.pdf>
6. Bengaluru topographic map, elevation, terrain. (n.d.). Topographic maps. Retrieved October 20, 2022, from <https://en-gb.topographic-map.com/map-f88gp/Bengaluru/>
7. BMRCL. (n.d.). Home. Retrieved September 23, 2022, from <https://english.bmrc.co.in/#/metro-network>
8. BMRCL. (2022, September 26). 16th Annual Report 2021-22. Retrieved October 18, 2022, from [https://english.bmrc.co.in/uploads/finance/english/FileUploads/30e01f74-63f0-408e-9793-1764a5d46d71\\$@!!@\\$BMRCL%20Annual%20Report%20for%20the%20year%202021-22.pdf](https://english.bmrc.co.in/uploads/finance/english/FileUploads/30e01f74-63f0-408e-9793-1764a5d46d71$@!!@$BMRCL%20Annual%20Report%20for%20the%20year%202021-22.pdf)
9. BMTCL. (n.d.). BMTCL Glance - Bengaluru Metropolitan Transport Corporation. ಬೆಂಗಳೂರು ಮಹಾನಗರ ಸಾರಿಗೆ ಸಂಸ್ಥೆ Retrieved September 23, 2022, from <https://mybmtc.karnataka.gov.in/info-1/BMTCL+Glance/en>
10. BMTCL. (2021, 3 30). Annual Administration Report 2019-20. <https://mybmtc.karnataka.gov.in/storage/pdf-files/ENGLISH%20AAR%20BMTCL%202019-20.pdf>. Retrieved 10 18, 2022, from <https://mybmtc.karnataka.gov.in/storage/pdf-files/ENGLISH%20AAR%20BMTCL%202019-20.pdf>
11. Bruhat Bengaluru Mahanagara Palike. (n.d.). Potholes. <http://webapps.bbmpgov.in/potholesdashboard/index.html>. Retrieved October 18, 2022, from <http://webapps.bbmpgov.in/potholesdashboard/index.html>
12. Devaiah BP, D. (2023, June 2). BMTCL to procure 120 electric minibuses. The Hindu. <https://www.thehindu.com/news/cities/bangalore/bmtc-to-procure-120-electric-mini-buses/article66921107.ece>
13. Devaiah BP, D. (2023, July 18). BMTCL to induct 921 non-AC electric buses soon; all four RTCs to add 3,888 new buses to their fleet. The Hindu. <https://www.thehindu.com/news/cities/bangalore/bmtc-to-induct-921-non-ac-electric-buses-soon-all-four-rtcs-to-add-3888-new-buses-to-its-fleet/article67093574.ece>
14. Directorate of Urban Land and Transport. (2021, September 14). PBS and SMSS notification September 2021 ನಗರ ಭೂ ಸಾರಿಗೆ ನಿರ್ದೇಶನಾಲಯ Retrieved September 23, 2022, from https://dult.karnataka.gov.in/uploads/media_to_upload1647256762.pdf
15. Government of Karnataka. (n.d.). Budget Speech 2021-22. Untitled. Retrieved October 20, 2022, from <https://finance.karnataka.gov.in/storage/pdf-files/02-Budget%20Highlights%202021-22.pdf>
16. Government of Karnataka. (2023, June 15). Karnataka Shakti Scheme. Govt Schemes India. Retrieved September 28, 2023, from <https://govtschemes.in/karnataka-shakti-scheme#gsc.tab=0>
17. Karnataka State Transport Department. (2022, March 31). Annual Report 2021-22 Sl. No. SUBJECT PAGE NUMBERS 1. INTRODUCTION 01 2. ADMINISTRATIVE SET UP 02-07 3. COMPUTERIZATION OF TRANS. Retrieved September 23, 2022, from <https://transport.karnataka.gov.in/storage/pdf-files/annual%20report%202022-202-397.pdf>
18. Kumari, B. (2023, April 25). 'We want 2,000 km cycle lane, we barely have 15 km'.

- Deccan Herald. <https://www.deccanherald.com/india/karnataka/bengaluru/we-want-2000-km-cycle-lane-we-barely-have-15-km-1212968.html>
19. meteoblue. (n.d.). Climate change Bengaluru. Retrieved July 4, 2023, from https://www.meteoblue.com/en/weather/historyclimate/change/bengaluru_india_1277333
20. Meteostat. (n.d.). Retrieved July 4, 2023, from <https://meteostat.net/en/station/43295?t=2023-06-20/2023-06-27>
21. Office of the Registrar General & Census Commissioner, India; Ministry of Home Affairs, Government of India. (2023, August 21). India - Primary Census Abstract - Urban Agglomeration India - 2011. Census of India. Retrieved October 3, 2023, from <https://censusindia.gov.in/nada/index.php/catalog/45261>
22. National Crimes Record Bureau. (2015). Accidental Deaths & Suicides in India - 2015 | National Crime Records Bureau. राष्ट्रीय अपराध रिकॉर्ड ब्यूरो. Retrieved September 20, 2023, from <https://ncrb.gov.in/en/accidental-deaths-suicides-india-2015-1>
23. National Crimes Record Bureau. (2016). Accidental Deaths & Suicides in India - 2016 | National Crime Records Bureau. राष्ट्रीय अपराध रिकॉर्ड ब्यूरो. Retrieved September 20, 2023, from <https://ncrb.gov.in/en/accidental-deaths-suicides-india-2016>
24. National Crimes Record Bureau. (2017). Accidental Deaths & Suicides in India - 2017 | National Crime Records Bureau. राष्ट्रीय अपराध रिकॉर्ड ब्यूरो. Retrieved September 20, 2023, from <https://ncrb.gov.in/en/accidental-deaths-suicides-india-2017>
25. National Crimes Record Bureau. (2018). Accidental Deaths & Suicides in India - 2018 | National Crime Records Bureau. राष्ट्रीय अपराध रिकॉर्ड ब्यूरो. Retrieved September 20, 2023, from <https://ncrb.gov.in/en/accidental-deaths-suicides-india-2018-0>
26. National Crimes Record Bureau. (2019). Accidental Deaths & Suicides in India - 2019 | National Crime Records Bureau. राष्ट्रीय अपराध रिकॉर्ड ब्यूरो. Retrieved September 20, 2023, from <https://ncrb.gov.in/en/accidental-deaths-suicides-india-2019>
27. National Crimes Record Bureau. (2020). ADSI - 2020 | National Crime Records Bureau. राष्ट्रीय अपराध रिकॉर्ड ब्यूरो. Retrieved September 20, 2023, from <https://ncrb.gov.in/en/ADSI-2020>
28. National Crimes Record Bureau. (2021). ADSI-2021 | National Crime Records Bureau. राष्ट्रीय अपराध रिकॉर्ड ब्यूरो. Retrieved September 20, 2023, from <https://ncrb.gov.in/en/ADSI-2021>
29. Rail Infrastructure Development Company (Karnataka)Limited. (July 2021). Bengaluru Sub-urban Rail Project - Design Basis Report. Ministry of Railways, Government of India. <https://kride.in/wp-content/uploads/2021/09/Design-Basis-Report.pdf>
30. State of Global Air. (n.d.). Health in Cities. State of Global Air. Retrieved October 20, 2022, from <https://www.stateofglobalair.org/data-cities/#/health/plot>
31. State Transport Authority, Karnataka. (2022, March 31). Annual Report 2021-22. Annual Report 2021-22 Sl. No. SUBJECT PAGE NUMBERS 1. INTRODUCTION 01 2. ADMINISTRATIVE SET UP 02-07 3. COMPUTERIZATION OF TRANS. Retrieved August 30, 2023, from <https://transport.karnataka.gov.in/storage/pdf-files/annual%20report%202022-202-397.pdf>
32. State Transport Department, Karnataka. (2023, February 23). Annual report 2014-2022. Annual Report - Transport Department. Retrieved August 30, 2023, from <https://transport.karnataka.gov.in/info-4/Reports/Annual+Report/en>
33. Times of India. (2022, May 9). BBMP budget approved with addl outlay of 377.5 Crore. <https://timesofindia.indiatimes.com/city/bengaluru/bbmp-budget-approved-with-addl-outlay-of-377-5-crore/articleshow/91425636.cms>
34. Tom Tom. (2022). Traffic Index ranking. TomTom. Retrieved September 29, 2023, from <https://www.tomtom.com/traffic-index/ranking/>



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