



Enhancing Last Mile Connectivity

The Silicon Valley of India

August 2023



Uber

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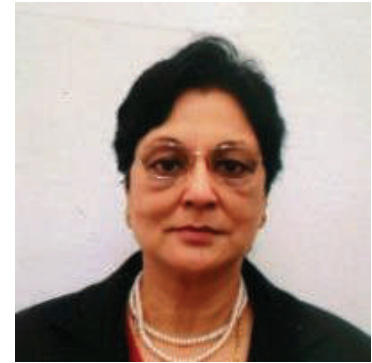
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1. Foreword

Karnataka is a top destination for investors and is on the forefront of technological innovation in the country. The state is a favoured investment destination enabling businesses to flourish.

With total investments till FY 2022-23 reaching an impressive figure of INR 4.67 trillion, Karnataka continues to grow significantly as a result of investor friendly policies and is home to more than 400 MNCs with global R&D centres present in the state. As on 2022-23, the state stands 2nd in ranking for investment in India.

As a significant partner in Karnataka's thriving technology industry, U.S. industry actively participates in key sectors, including aerospace and defence, manufacturing, financial services, information technology and IT services, R&D, consumer services, knowledge services, apparel and sourcing, clean energy and the automotive industry, among others.



Ranjana Khanna
Director General CEO
AMCHAM India

As the fastest-growing metropolitan city in the country, Bengaluru, ranked in 16th position on the Prime Global Cities Index 2023 and the 'tech city of India', is a favoured destination of U.S. companies, contributing significantly to its GDP and technological prowess. The recent initiative by the state government to enhance the city to globally benchmarked standards through its Brand Bengaluru drive is indeed welcome.

Transportation is a key enabler deciding city development index and plays a vital role in the development of modern cities. Apart from enhancing quality of life for people, the transportation and mobility sector offer immense employment opportunities. The first and last mile connectivity aggregator platforms, not only touch urban lives, but also have immense potential to contribute meaningfully to inclusive growth and have a multiplier effect on the economy.

By investing in public transport infrastructure and promoting multi-modal transit options with first and last mile connectivity, city traffic congestion challenges can be positively addressed and can also contribute to green and healthy cities.

The newly elected Government of Karnataka's move to provide free transportation to women through the Shakti Scheme has provided a much-needed stimulus to bus transport in the city. This can be further capacitated with strong first and last mile connectivity channels with innovative solutions to create an efficient and sustainable urban transportation system.

U.S. companies in India are keen to forge innovative and tested partnerships to support the vision of the Government of Karnataka for the application of the world's best and most advanced technologies in the transportation and aggregator mobility sector and contribute meaningfully to the economic development of the state.

The AMCHAM-UBER knowledge report on Enhancing Last Mile Connectivity: The Silicon Valley of India, supports the vision of the Government of Karnataka to enhance the quality of life of its citizens and efficiency of businesses operating in the state by decongesting Bengaluru. The knowledge report also conveys strategic suggestions on enhancing sustainable livelihoods.

2. Executive Summary

In the heart of India's transformative journey, Karnataka stands as a beacon of progress, drawing the attention of global investors and visionary entrepreneurs. **With a remarkable inflow of Foreign Direct Investment (FDI) exceeding INR 4.67 trillion by FY 2022-23, Karnataka has solidified its position as a favoured destination for business and innovation.** Notably, Bengaluru, the state's fastest-growing metropolis, has earned a distinguished reputation on the world stage as the "tech city of India." Its dynamic growth, coupled with investor-friendly policies and a robust ecosystem, has propelled Karnataka to the second rank in India's investment landscape.

Karnataka's ascendancy is underscored by its prowess in innovation, as evidenced by its top position on Niti Aayog's innovation index. This state, home to over 400 multinational corporations and global Research and Development centres, epitomises a synergy between technology, investment, and economic vitality. The government's unwavering commitment is evidenced by its primacy in the DPIIT Ease of Doing Business Ranking and its strategic investment in infrastructure – from international airports and national highways to an extensive rail network.

However, as Karnataka and its crown jewel, Bengaluru, evolve into centres of global prominence, new challenges arise. The rapid economic expansion that defines the region has led to the proliferation of personal vehicles, giving rise to traffic congestion, air pollution, and social fragmentation. To address these issues and ensure a sustainable trajectory, this report charts a transformative course for Bengaluru's mobility landscape, proposing innovative solutions and strategies.

Embracing pathways toward inclusive and sustainable mobility is the cornerstone of this vision. The report delineates four strategic routes that will redefine Bengaluru's urban mobility, catalysing a shift towards shared, efficient, and environmentally conscious transportation. By generating livelihoods through mobility platforms, bolstering public transportation and last mile connectivity, guiding behavioural shifts towards shared mobility, and empowering institutional capacity, the city can metamorphose into a paragon of smart, inclusive progress.

This report serves as a clarion call to Bengaluru, Karnataka, and the nation at large to harness the collective imagination, determination, and innovation that reside within their boundaries. Through concerted efforts, visionary policies, and a commitment to sustainable development, Bengaluru can emerge as a model for global cities of the future – **where economic growth, environmental stewardship, and social harmony intertwine seamlessly, lighting the path towards a better tomorrow.**



3. Introduction

Karnataka has emerged as the top destination state for attracting FDI with the total investments till FY 2022-23 reaching an impressive figure of **INR 4.67 trillion**. Karnataka continues to grow significantly as a result of investor friendly policies and is home to more than **400 MNCs with global R&D centres** presence in the State. As on 2022 -23, the State stands **2nd in ranking** for investment in India. Karnataka, today, is the ideal State for businesses to flourish.

Ranked No. 1 in Niti Aayog's innovation index, Karnataka is a leader in investment and exports. With excellent connectivity to all the major markets – **2 international airports, 47 national highways, 145 state highways, rail network of 3,818 kms., 13 minor ports and a major port in Mangalore**, the State Government is making all out efforts to boost investment opportunities and is ranked no. 1 under the DPIIT Ease of Doing Business Ranking.

As the fastest-growing metropolitan city in the country, Bengaluru, is ranked in **16th position on the Prime Global Cities Index 2023 and the 'tech city of India'**, is a favoured destination of US companies and AMCHAM membership has a major presence in this multifaceted city, contributing significantly to its GDP and technological prowess.

In view of the current and anticipated growth of the city, there is a felt need to look at decongestion strategies and innovative methods of providing last mile connectivity in a manner that provides solutions for further developing the 'Global Tech City: Bengaluru'. The report aims at bringing out strategies for faster mobility, achieving net zero goals and providing avenues for inclusive and sustainable livelihoods through mobility platforms.

Bengaluru has a unique chance to leapfrog the era of heavy reliance on automobiles by expediting the adoption of innovative Mobility-as-a-Service (MaaS) solutions and prioritising mixed-use, walkable urban development. If the city manages to enhance its mobility landscape without a surge in personal vehicle usage, it could establish a groundbreaking model for smart, inclusive progress in rapidly growing urban contexts.

Like several cities across Asia, including Bengaluru, the transport sector grapples with significant challenges driven by rapid economic expansion. This growth has led to a substantial rise in motorization over the past decades, with global projections indicating around **two billion motor vehicles expected to hit the roads by 2040**. The usage of personal motor vehicles, spanning from two-wheelers to four-wheelers, brings about substantial economic, environmental, and societal consequences. These include stifling traffic congestion, declining air quality, alarming accident rates, and fragmented communities.

Despite these challenges, personal vehicle ownership remains a sought-after aspiration for many households in developing nations, making it difficult to curtail the growth in private vehicle ownership. However, with well-crafted strategic policy incentives, policymakers can mitigate personal vehicle usage by adopting inventive and efficient shared mobility solutions.

This report provides pathways and recommendations to the government on setting the course towards making Bengaluru a **world class city**.

Pathway 1: Generating Livelihoods Through Mobility Platforms



The mobility aggregator segment has helped create hundreds of thousands of livelihood opportunities in the country. The platform is an inclusive and flexible option for individuals to have a gainful livelihood.

Karnataka, the Silicon Valley of India, as a result of its innovative industry friendly policies, is home to a huge tech-skilled manpower who have been attracted to the State due to the growth opportunities that it offers. This has led to a simultaneous growth in the associated industries like the aggregators, enhancing employment and sustainable livelihoods across the State.

Pathway 2: Improved Public Transportation & Last Mile Connectivity

Fast, seamless, healthy and safe transportation across the State of Karnataka will not only ensure the well-being of the citizens, but also significantly enhance start-ups, entrepreneurships, domestic and multinational investments. The Bengaluru model can be replicated across Karnataka for inclusive economic growth and well-designed urban cities of the future. The State has been attracting global talent, and the focus on technology has enabled large amounts of skilling opportunities and vocational training, leading to an efficient ecosystem for overall economic and inclusive growth.



Elevating public transportation and refining last mile connectivity stands as a pivotal endeavour for Bengaluru's progress. As the city experiences exponential growth, the strain on its current transportation infrastructure becomes increasingly evident, resulting in traffic snarls and environmental concerns. By placing a strong emphasis on bolstering public transit services and ensuring efficient links for the final leg of journeys, Bengaluru can usher in a multitude of positive changes.

With private vehicle ownership on the rise due to economic growth, traffic congestion has become a pressing issue. However, by investing in a comprehensive public transportation network encompassing buses, metro lines, and suburban trains, Bengaluru can offer a compelling alternative to private car travel. This not only eases congestion but also contributes to reduced carbon emissions, enhancing air quality and overall urban livability.

Pathway 3: Behavioural Nudges Towards Shared Mobility

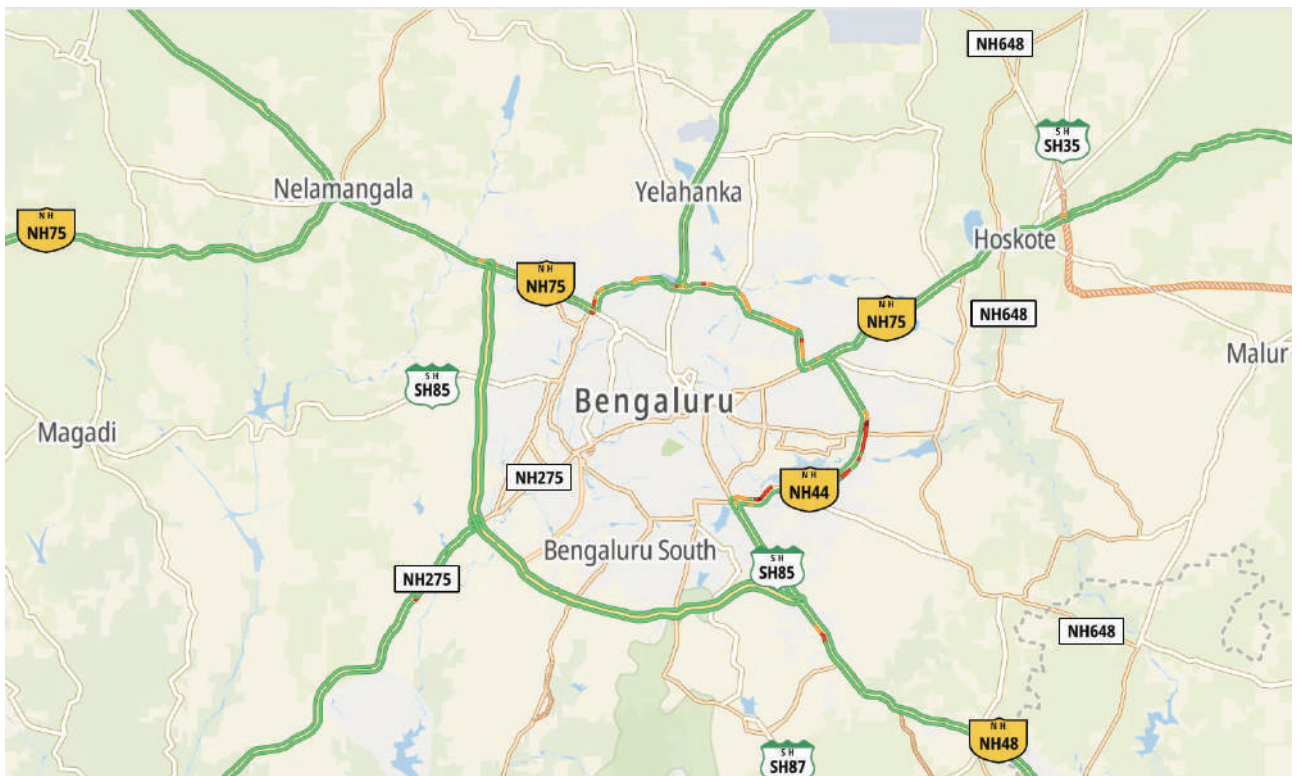
Bengaluru's rapid growth has led to an influx of private vehicles on its roads, contributing to congested streets and air pollution. However, rather than solely relying on traditional infrastructure expansion, the city can harness the power of behavioural nudges. By subtly influencing individual decisions through positive reinforcement, choice architecture, and information dissemination, Bengaluru can encourage a shift away from solitary car rides towards collective options like carpooling, ride-sharing, and public transit.

With its multicultural and tech-savvy population, Bengaluru provides an ideal testing ground for innovative behavioural interventions. Simple steps, such as offering incentives for shared rides during peak hours and providing real-time data on traffic conditions, can effectively steer people towards more sustainable commuting choices. By creating an environment where shared mobility options align seamlessly with convenience, Bengaluru can set the stage for a transformational shift in how its residents move around the city.

Pathway 4: Empowering Institutional Capacity

To establish a unified and efficient transport system in Bengaluru, the need for a coordinating body becomes paramount. In the current landscape, where public and private entities operate independently, the adoption of a multimodal nodal agency, akin to unified transport bodies found in other cities, could bridge this gap. Empowered by regulatory tools, this agency would facilitate seamless collaboration, enabling effective management of transport initiatives across diverse sectors and ensuring a coherent approach towards achieving shared objectives.

By empowering these multimodal nodal agencies with regulatory tools and decision-making authority, Bengaluru and other cities can streamline their transport initiatives effectively. This empowered body would orchestrate strategic planning, optimise resource allocation, and expedite project implementation, transcending traditional sectoral boundaries. Such a dynamic approach is vital for grappling with the complex challenges posed by urban growth, where a multifaceted transport ecosystem demands agile coordination and innovative solutions.





4. Roadmap to Transformation: Unveiling Bengaluru's Path to Congestion Relief

Bengaluru is known as the “Silicon City in India” and is a preferred destination for startups, businesses and people alike due its fantastic weather, cosmopolitan nature and business-friendly policies. However, the city requires increasing public-private collaboration to manage a growing population and their demands on the city’s infrastructure.

Bengaluru’s remarkable progress and global recognition as the “Silicon Valley of India,” has made it a preferred place to live. In order to enhance the quality of life, decongestion of the city requires thoughtful attention and proactive measures. This section aims to provide a constructive analysis of the city’s current traffic situation, incorporating data-driven insights to foster positive change. By understanding the underlying causes of congestion and their impact on productivity and public welfare, we strive to present a future where efficient mobility elevates Bengaluru's status as a leading city, promoting prosperity and well-being for its residents.

4.1. Traffic in Bengaluru today

The traffic situation in Bengaluru, as revealed by the Comprehensive Mobility Plan¹ released in 2020 by the Directorate of Urban Land Transport, presents a felt need for uplifting the city’s urban infrastructure. The major road network faces uniform congestion, with peak hour traffic at certain locations reaching 10,699 PCUs, equivalent to 11,989 vehicles. Additionally, many junctions, including prominent ones like Central Silk Board, KR Puram, and Hebbal, have surpassed their capacity, accommodating over 3 lakh vehicles per day. These figures underscore the urgent need for strategic measures to alleviate congestion and ensure efficient traffic flow.

Public transport plays a pivotal role in Bengaluru's mobility landscape as nearly 48% of the trips take place through them. Even as the growing network of the BMRCL metro has provided impetus to public transport, there is still much room for improvement with the BMTC. As mentioned in B.PAC’s Sustainable Mobility for Bengaluru report², between 2011 and 2019, Bengaluru's population witnessed a remarkable 32% increase, while the fleet strength of BMTC (Bengaluru Metropolitan Transport Corporation) showed a more modest growth of 7.89% during the same period. As of January 2020, the number of BMTC buses declined by 3% compared to the previous year, reducing the coverage from 230 to 180 kilometres per day. The BMTC’s ridership has declined from 51.3 lakh passengers in 2014-15 to 35.8 lakh in 2018-19.

Additionally, the data from the Comprehensive Mobility Plan reveals a significant reliance on private motor vehicles among Bengaluru's residents. Nearly 84% of households own motor vehicles, with approximately 20% possessing one car and around 60% owning at least one scooter or motorcycle. In total, the residents undertake a substantial 12.60 lakh peak hour trips each day, with public transport contributing almost 48% of total trips, followed by two-wheelers (23.5%) and cars/taxis (21%). Further, on average, households in Bengaluru spend approximately 7.6% of their household income. Utilisation of assets and driving affordability in transportation is critical for citizens of Bengaluru.

A welcome development has come through the newly elected Government of Karnataka’s move to provide free transportation to women through the Shakti Scheme that has provided a much needed stimulus to bus transport in the city. In July 2023, BMTC ridership hit an all-time high of 40 lakh passengers. It is now pertinent to further capacitate public transport and build strong first and last mile connectivity channels.

¹Comprehensive Mobility Plan, Directorate of Urban Land Transport

²Sustainable Mobility for Bengaluru, B.PAC

4.2. Private Vehicle Usage is burgeoning -adding to the congestion and Parking Woes



Promoting sustainable and efficient mobility solutions in Indian cities is pivotal in addressing the issue of congestion effectively. By connecting goods and services to markets and ensuring easy access to education, healthcare, and livelihood opportunities, efficient transportation becomes the driver of economic growth and societal development. The surge in vehicular ownership, driven by rising average household incomes, has contributed to congestion challenges across urban areas. **Over the past decade, vehicle registrations in Indian cities have experienced remarkable growth, with an annual average rate of about 9.8% (MoRTH, 2020).**

To achieve sustainable urban transport goals, it is crucial to prioritise the needs of economically disadvantaged communities. The lack of efficient public transport disproportionately affects these communities, leading to longer commutes and limited access to affordable transportation options. Encouraging a shift in commuter preferences from private vehicles to public transport becomes a key strategy in fostering sustainable urban mobility (Urban transportation financing, PWC).

In the context of Karnataka, the state has witnessed a notable **33%** growth in new vehicle registrations between 2015 and 2019. Bengaluru, as a significant urban centre, accounts for **41.9%** of the state's total registered vehicles (Transport Department, 2019). While this growth in vehicle ownership poses challenges, it also presents an opportunity for proactive measures and innovative solutions to create an efficient and sustainable urban transportation system. By investing in public transport infrastructure and promoting multi-modal transit options, we can positively address congestion challenges in Bengaluru. Embracing these initiatives will not only reduce traffic congestion but also contribute to a greener, more livable city for all residents.

In the realm of transportation, first and last mile connectivity plays a crucial role as it refers to the crucial end segments of a journey undertaken by public or mass transit. These segments connect the origin and destination points to stations or stops on the transit network. Providing a convenient and economical first and last mile connectivity is essential for improving ridership on public transport.

Research in sustainable transport has emphasised the importance of optimising transit infrastructure by considering the first and last mile commute as a concrete concept. Many times, transit infrastructure intervention often focuses solely on major transit hubs, with the critical first and last mile segments not receiving enough attention. This is further compounded by the felt need for non-motorized transport infrastructure, such as cycling and walking paths, which leads to a greater reliance on motorised means for the first and last mile commute.

Literature in this area demonstrates that enhancing the convenience and accessibility of first and last mile commute infrastructure for commuters has the potential to significantly boost transit ridership while reducing the city-wide dependence on automobiles. **Studies have shown that when proper attention is given to this aspect, it can result in increased transit usage (Shaheen, 2011), reduced reliance on private vehicles (WRI, 2012), and improved sustainable mobility options (Dai, 2014), (Lesh, 2013), (Fishman, 2013).**

Addressing the first and last mile connectivity as a key component of sustainable transportation planning can lead to substantial positive impacts on urban mobility, encouraging more people to opt for public transit and non-motorized transport options. By incorporating this significant theme into transit infrastructure interventions, cities can foster a seamless and environmentally-friendly commuting experience for their residents.

The emergence of new mobility service providers in Bengaluru offers an exciting opportunity to address the last-mile gap in public transport. These innovative services and intermediate paratransit providers have the potential to become key stakeholders in complementing mass transit options. To fully leverage their benefits, it is essential to reevaluate existing regulations in the state and promote shared services like shared autos, cabs, bike taxis, and carpooling. As the city prepares for the new phase of the metro and the expansion of the suburban railway network, it is crucial to proactively address the first and last mile connectivity challenge. Engaging citizens and private stakeholders through consultation meetings will enable the planning of seamless transit solutions, ensuring efficient connectivity between new mass transit stations and local communities.

4.3. Impact of Congestion on the City and its Inhabitants

What do commuters stand to **save per year** by adjusting their travel habits (for a 10 km commute in **Bengaluru**)?



One day of working from home (Fridays)

52 hours

201 kg

Three days of working from home (Fridays, Mondays, Thursdays)

157 hours

603 kg

Source: TomTom Traffic Index

The morning and afternoon rush hours in cities witness a massive influx of people commuting to school, work, and other essential activities. This surge in traffic inevitably leads to significant congestion, causing individuals to waste valuable hours stuck in their cars, arriving late for work, and starting their day with frustration. In Bogota, the capital of Colombia, reports indicate that each commuter loses an average of 191 hours annually due to gridlock, which translates to lost opportunities for productivity, relaxation, and quality time with family. This persistent issue affects the morale and productivity of city dwellers, as traffic jams ripple through the entire urban landscape, hindering the city's economic success and overall efficiency.

The predictability of travel within a city takes a hit as congestion disrupts commuters' ability to estimate travel times accurately. Unforeseen delays become a common occurrence, leaving drivers scrambling to anticipate congestion and plan their routes accordingly. Public transportation vehicles also struggle to adhere to schedules, inconveniencing numerous passengers. Moreover, the predicament poses a significant concern for emergency vehicles, as unpredictable travel times hinder their ability to respond promptly to critical situations, endangering the lives of those in need of urgent medical or police assistance.

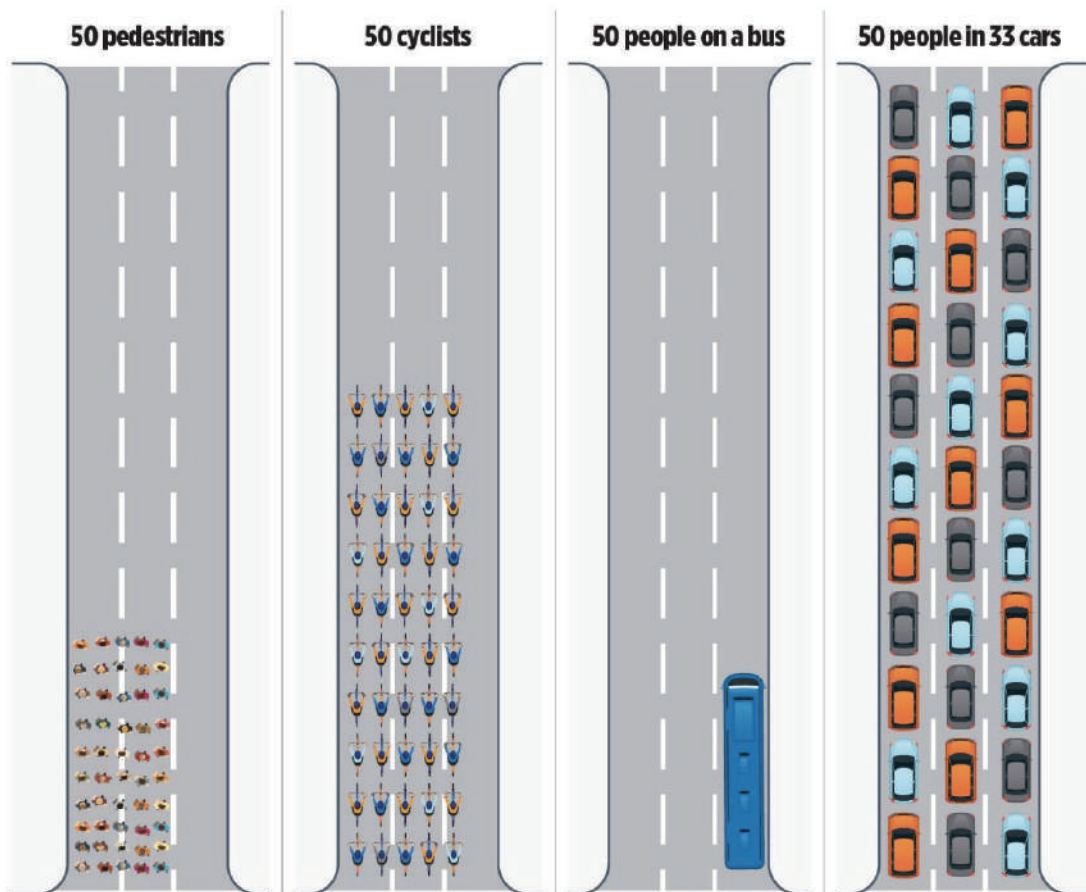
The frustrations arising from congestion can escalate into cases of road rage, leading drivers to exhibit reckless behaviours such as speeding, aggressive lane changes, and tailgating. These dangerous actions put all road users at risk, compromising overall road safety. Furthermore, the continuous stop-and-go nature of congested traffic causes drivers to become less attentive to the road, increasing the likelihood of rear-end collisions and accidents. To foster a more efficient and safe transportation system, cities must address congestion through comprehensive urban planning, prioritising sustainable transportation options and promoting alternative modes like public transit, biking, and walking.

Through the launch of the “Brand Bengaluru” initiative, the Government of Karnataka has embarked upon a tremendous initiative in its intent to upgrade the city to global standards and provide a qualitatively enhanced urban environment to the citizens.



5. Examining Pathways to Improve Transit in Cities

Urbanisation is an undeniable and natural progression in social development. It has proven to be a driving force for economic growth, the enhancement of public living standards, and the creation of new avenues for accumulating social wealth. Furthermore, it has ushered in significant changes in human lifestyles and production methods. Various countries worldwide have embraced distinct paths for urban development, tailored to their national circumstances, but this has led to similar challenges related to urban crowding and its associated consequences³.



Efficient and intelligent utilisation of infrastructure key to improving mobility experience

According to a United Nations report, **the global urban population currently stands at 55% and is projected to reach 68% by 2050**. While urbanisation has undoubtedly contributed to the advancement of society, economy, and technology, it has also presented significant hurdles for sustainable human development. In the context of India, rapid economic growth and urbanisation have led to a substantial increase in its urban population. However, this has also given rise to pressing issues, most notably urban traffic congestion, which demands urgent attention.

In today's rapidly urbanising world, cities face immense challenges in developing efficient and sustainable transportation systems. The ability to provide seamless and accessible mobility to residents, while minimising environmental impact, has become a pressing concern. To address these complex issues, cities need a clear set of guiding principles that can lead them towards bettering their transit infrastructure. By adopting strategic pathways that prioritise accessibility, equity, health and safety, responsible environmental practices, and integrated planning, cities can create transformative transportation systems that cater to the diverse needs of their communities.

³ Guo, Y., Tang, Z., & Guo, J. (2020, March 15). Could a Smart City Ameliorate Urban Traffic Congestion? A Quasi-Natural Experiment Based on a Smart City Pilot Program in China. MDPI. <https://doi.org/10.3390/su12062291>



TenderSure Project in Cunningham Road, Bengaluru
Source: Jana Urban Space

These principles can be layered on any issue to solve them but most immediately Bengaluru must address the concern of congestion. Numerous studies have highlighted the detrimental effects of urban traffic congestion on multiple fronts. Not only does it squander precious public road resources, but it also escalates the likelihood of traffic accidents. Over the long term, this congestion severely hampers the efficiency of urban production and operations, impacting the overall business environment and impeding rapid economic progress. Additionally, the escalating energy consumption and exhaust emissions associated with traffic congestion further exacerbate the strain on urban ecologies. Urban traffic congestion can be attributed to various factors based on research findings. These include the escalating demand for transportation, shifts in travel preferences, rapid population growth, unforeseen severe weather events, inadequate urban traffic planning, insufficient traffic management measures, and disparities in the supply and demand for public transportation. These elements collectively contribute to the challenges of congestion in urban areas.

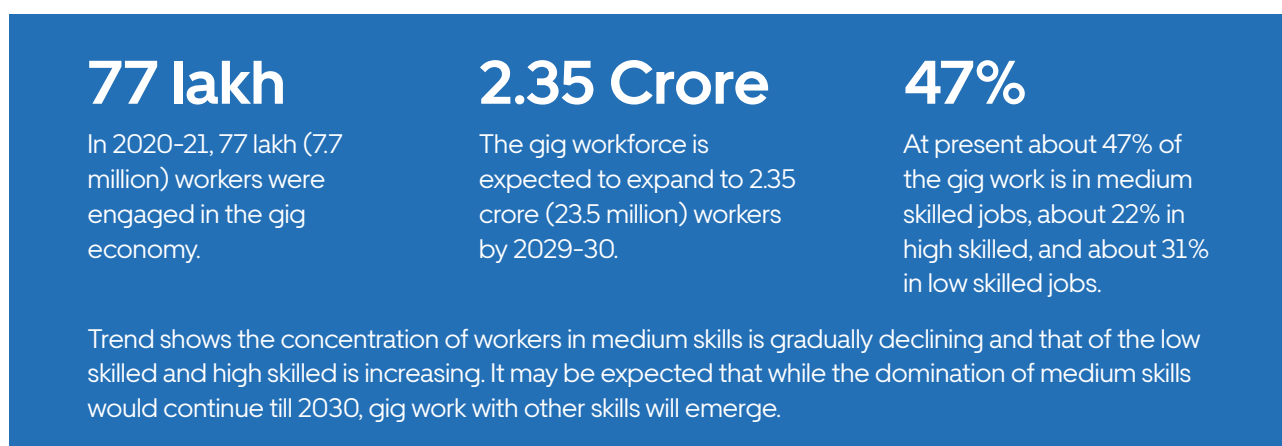
Attempting to alleviate urban congestion solely by expanding road infrastructure is an inefficient approach. This is because building new roads often leads to a phenomenon known as induced demand, where increased road capacity attracts more traffic, offsetting any initial benefits. Moreover, inadequate urban traffic planning and design, coupled with ineffective traffic management methods, can further aggravate congestion issues. To break free from this vicious cycle of urban development and traffic congestion, it is essential to adopt innovative technologies and reform governance models.

Embracing such approaches can pave the way for more effective solutions and sustainable urban development.

6. Pathway 01: Generating Livelihoods through the Digital Economy

The digital economy has seen rapid growth over the last couple of decades, particularly driven by the pace of adoption of smartphones across populations in developed and developing economies. A recent report pegged the number of smartphone users in India alone at 500 million. This rapid digitization has also changed how we work and procure services, leading to the emergence of the sharing economy and the 'gig economy.' India, with its large informal economy and workers, has always had the equivalent of gig work – and the current scenario presents an opportunity to formalise and organise it.⁴

The NITI Aayog released the following estimates for Gig Work in India⁵:



Ride Hailing is one of the most prominent and well established sectors of gig work, and the platform economy. Mobility service companies have helped create hundreds of thousands of livelihood opportunities in the country. The platform is an inclusive and flexible option for individuals to have a gainful livelihood. Over the years, platforms like those from Uber have been at the forefront of providing a range of benefits like insurance, health check-ups, microcredit and ease of access to government schemes.

Uber has half a million driver partners associated with the platform, and aims to quadruple the growth to 2 million⁶.

**Table: Livelihood Opportunities Created in Illustrative List of Cities
(Approximates, based on Uber Data,)**

Tier 1 Cities	
Delhi NCR	7,00,000
Bengaluru	4,80,000
Mumbai	3,70,000
Hyderabad	4,40,000
Kolkata	1,90,000

⁴ BCG, and Michael and Susan Dell Foundation, Unlocking the Potential of the Gig Economy in India, 2021

⁵ NITI Aayog, India's Booming Gig and Platform Economy: Perspectives and Recommendations on the Future of Work. June, 2022

⁶ Uber positively confident of quadrupling growth in India : CEO

Tier 2 Cities	
Visakhapatnam	22,700
Kochi	31,570
Guwahati	43,600
Kanpur	9,537
Surat	8,054
Agartala	1,609
Nagpur	19,046

A study by IIM-Bengaluru on Livelihood Opportunities on Gig Platforms provided insights on the earning opportunities on the Uber platform. Some of the notable findings of the study were:

- Irrespective of the years that they have been driving on the platform, respondents of the study stated better earning opportunities and flexible working hours as the main reasons for engaging with aggregator companies.
- It has been observed that earnings on such platforms are comparatively higher than in entry-level formal jobs and informal work.

AMCHAM members have always been on the forefront for contributing to sustainable livelihoods in India. There have been multiple other driver welfare initiatives such as the Uber Care program. Launched in 2018, [the program provides easy access to life insurance, family health insurance, micro-loan\(s\), etc. to thousands of drivers.](#) The top 5 cities where the maximum number of drivers were impacted are Bengaluru, Delhi, Mumbai, Hyderabad and Pune. Major Uber Care Milestones include:

<p>35.6 crore</p> <p>Micro-loans worth INR 35.6 crore</p>	<p>95 lakhs</p> <p>34,000 car servicing packages resulting in overall savings worth INR 95 lakhs</p>	<p>600</p> <p>Uber partnered with Indus Action to help more than 600 children get admission into schools till date through RTE</p>
<p>38.7 Crore</p> <p>INR 38.7 crore fuel credits with Indian Oil have been facilitated</p>	<p>92,000</p> <p>Over 92,000 drivers have signed up with DocsApp for free doctor consultations, subsidized prescription medicines, and lab tests</p>	

7. Pathway 02: Improved Public Transportation & Last Mile Connectivity



Picture courtesy: WXY Studio, Future of Cities Report

7.1. Expansion and Upgrading of Existing Infrastructure

Bengaluru's evolving public transport system is progressively adapting to the swiftly escalating transportation demand. While traditional road infrastructure measures have been a focus, the need for enhanced public transport options has become increasingly recognized. Addressing the last-mile connectivity challenge, particularly with the Green and Purple Lines of Phase I of Bengaluru Metro and BMTC buses, is now a priority.

Recent years have witnessed proactive interventions by government agencies, introducing multi-faceted strategies such as Transit-Oriented Development (TOD) and Multi-Modal Integration (MMI), along with pedestrian-friendly infrastructure and innovative shared mobility solutions. The city's efforts to implement pilot bus priority lanes, cycle lanes, and public bicycling sharing (PBS) schemes reflect a proactive approach to modernising transportation. Scaling up these initiatives for broader adoption will undoubtedly lead to a more robust and accessible urban mobility landscape.

Bengaluru's substantial investments in enhancing its public transport infrastructure and services signify a forward-looking approach. By integrating land use planning with transport planning, the city aims to unlock synergies and create shared value for the public.

The most radical innovation in expanding access to public transport has happened through the Shakti Scheme. The scheme has provided enormous impetus to utilisation of bus transport in Bengaluru and has allowed for the movement of women. The scheme will have an immensely positive impact on women's economic and social agency. Moreover, the Shakti Scheme has increased bus ridership in the city.

BMTC RIDERSHIP AFTER SHAKTI SCHEME

Date	No. of women passengers	% of women passengers	Total passengers
June 12, 2023	17.57 lakh	50.30%	34.94 lakh
Jun-13	20.56 lakh	51.19%	40.17 lakh
Jun-14	16.85 lakh	50.30%	33.44 lakh
Jun-15	17.67 lakh	53.10%	33.28 lakh
Jun-16	17.93 lakh	49.82%	36 lakh
Jun-17	18.09 lakh	51.33%	35.25 lakh
Jun-18	14.91 lakh	52.60%	28.35 lakh
Jun-19	18.41 lakh	55%	33.46 lakh
Jun-20	17.89 lakh	55%	32.49 lakh
Jun-21	18.85 lakh	56%	33.42 lakh
Jun-22	19.50 lakh	57%	34.06 lakh

Source: moneycontrol.com

7.2 Integration of Different Public Transport Modes

An important requisite to improve the ridership for transit services is to provide for a convenient, economical first and last mile connectivity which is often neglected with infrastructure intervention stopping at major transit hubs. There is ample literature which validates this idea that convenience and increased accessibility of first and last mile commute infrastructure can reduce city-wide automobile dependence while increasing ridership⁷.

In most Indian cities, including Bengaluru, infrastructure development is a work in progress with massive improvements in the last decade, and therefore the focus needs to be on ensuring first and last mile solutions connecting far off localities to public transport.

Existing regulations can be reoriented to be more supportive of shared services – shared auto, shared cabs, bike taxis, carpooling. With new expansions of metro and the suburban railway network in the works, the problem of first and last mile connectivity would escalate if not addressed. **In a recent survey conducted by B.PAC, 24% of the non-users of public transport stated a lack of good first and last mile connectivity as the reason to use private modes of transport⁸.**

It is easy to come up with a list of simple and complex potential solutions to close the first and last mile connectivity gap in Bengaluru, some of which is already underway. First among these priorities should be connecting transit stations to IT and Business Parks by mass transit which would help in reducing the usage of private vehicles for first and last mile connectivity. A frequent feeder bus system can be a boon to encouraging transit use. The last mile solutions from the transit stations needs to be designed specific to location and use cases, for example, e-auto services would be more conducive for people who are going shopping. Therefore, the last mile solutions need to be planned at a micro level taking into consideration the purpose of travel.

Walking is probably the most ignored aspect when it comes to development of transit. The operators of mass transit services should invest in improving the infrastructure for pedestrians who access their first and last mile by walk. Bengaluru's famously pleasant weather makes it more conducive to encouraging walking culture compared to hotter metros in the country.

⁷ (Shaheen, 2011) (WRI, 2012), (Dai, 2014), (Lesh, 2013), (Fishman, 2013)

⁸ (B.PAC, 2019)



Mass transit operators should consider institutionalising consultation meetings with commuters, private operators, and the local community, to understand the needs of the locality and work to introduce more viable connectivity options for first and last mile. These consultations can also help ensure accessibility and equity in provision of services. Often inadvertently certain areas end up having either one or more of public modes namely metro, bus or suburban connectivity while some far-flung areas have limited or no connectivity to public transport.

The new age mobility service providers in the city have been working on solutions to address the first and last mile gap. Today there are many low cost options available in the market which can encourage adoption of transit. To find out the right fit it might be opportune to conduct pilots in a few high traffic corridors aimed at providing the requisite physical infrastructure, connectivity services and complete information integration across different public and shared mobility modes. In the long term, multi modal integration of all public transit modes in the city would enable service providers to build solutions to close the first and last mile gap⁹.

Case Study: Leveraging Shared Mobility To Expand The Reach Of Metro In Hyderabad

In the city of Hyderabad, a natural experiment to observe riders’ travel patterns presented itself when the city gradually extended its Blue Line westward. Hyderabad’s Blue Line runs 26 kilometers east-west, north of the central business district. It was built over 7 years in 3 phases, with the newest, westernmost segment from HITEC City to Raidurg opening in November, 2019.

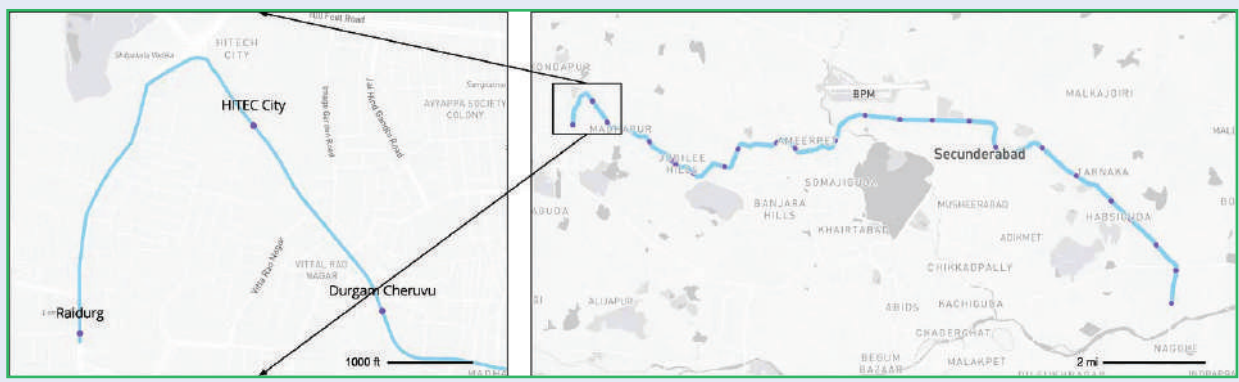
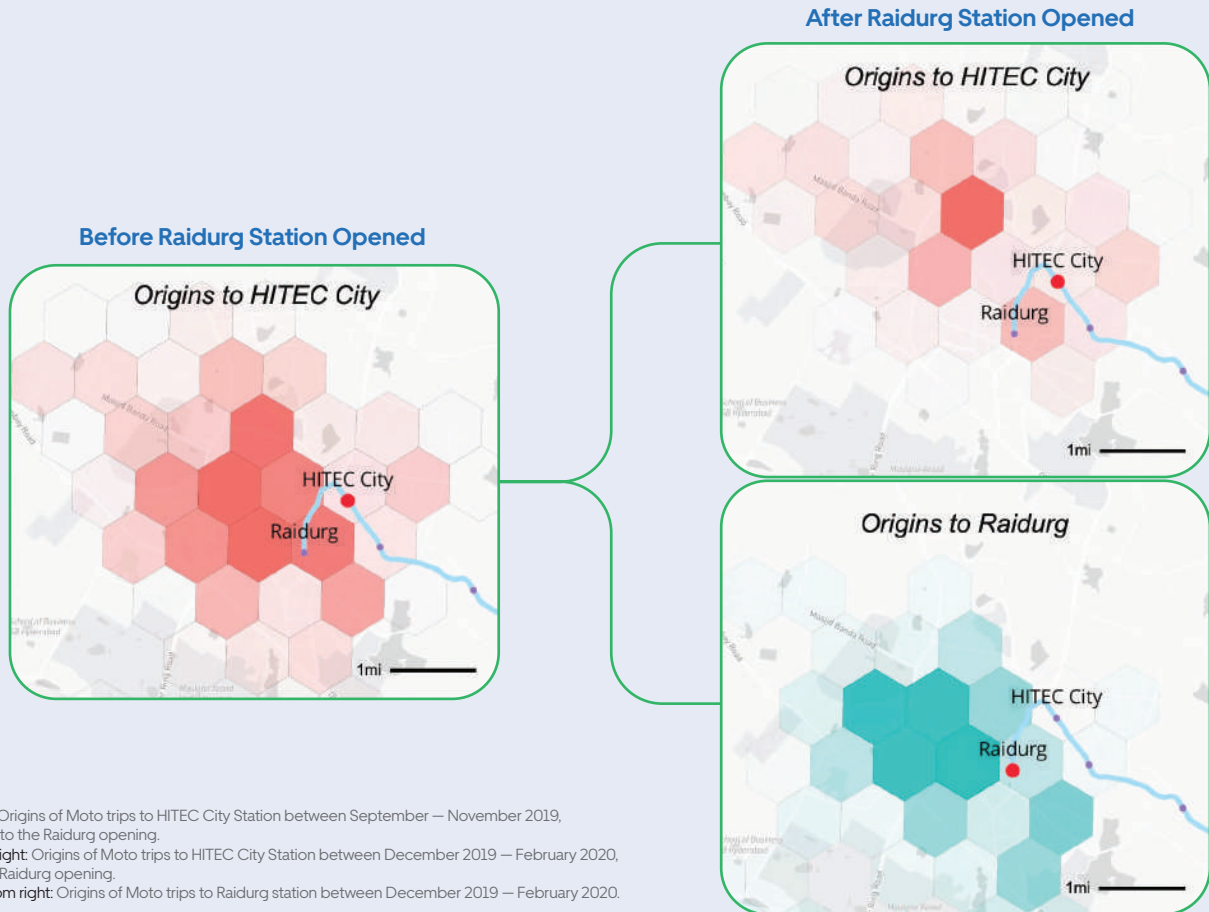


Figure 1. Map of Hyderabad Blue Line. HITEC City Station opened on March 20, 2019, becoming the western terminus. On November 29, 2019 Raidurg Station opened, becoming the new terminus. (Shapes courtesy of OSM.)

⁹ "Sustainable Mobility for Bengaluru" BPAC

The analysis from the data revealed that, prior to the opening of Raidurg Station, HITEC City Station captured demand from the north, west, and south, as it was the closest rail station to riders in all of these communities. Now, HITEC City mostly attracts riders from Kondapur to the north, for which it remains the closest, most easily accessible Blue Line station, while Raidurg draws the bulk of riders from west and south.



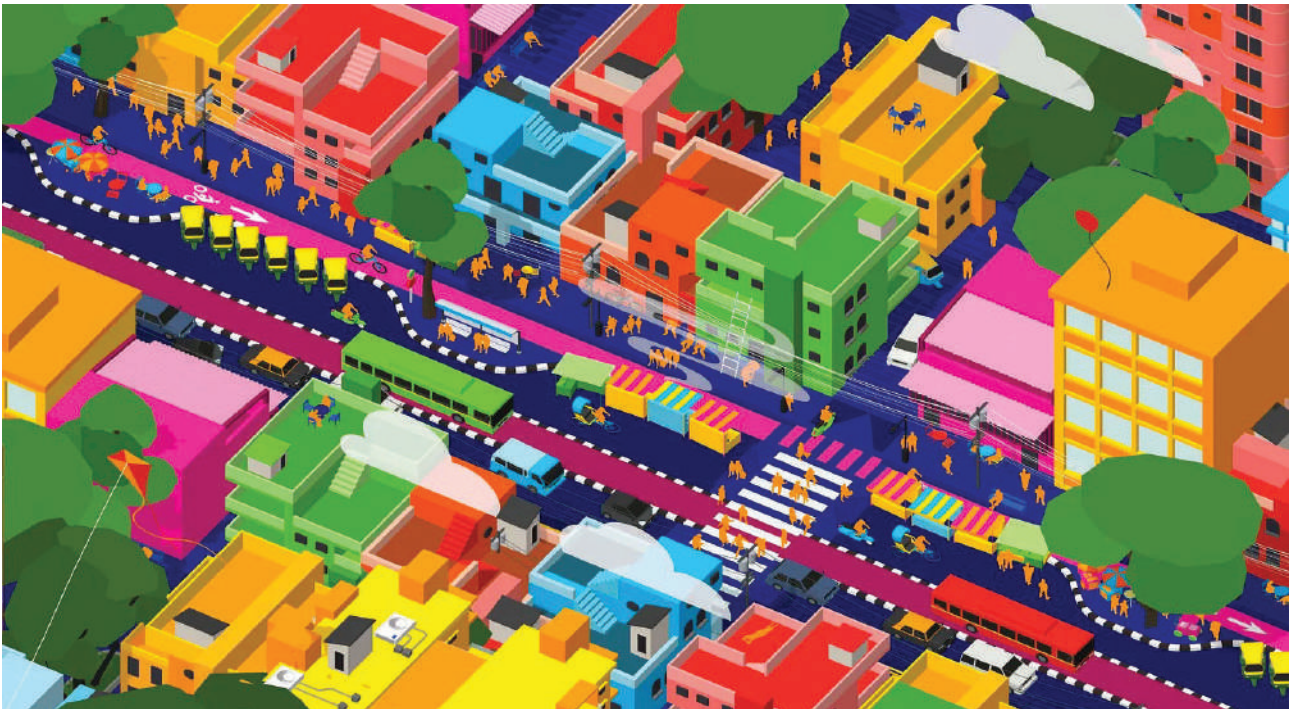
Left: Origins of Moto trips to HITEC City Station between September – November 2019, prior to the Raidurg opening.
 Top right: Origins of Moto trips to HITEC City Station between December 2019 – February 2020, after Raidurg opening.
 Bottom right: Origins of Moto trips to Raidurg station between December 2019 – February 2020.

While this study is limited to just 2 station areas in Hyderabad, its findings suggest that low cost shared mobility solutions can effectively extend the reach of the city’s public transport network by providing fast, affordable connections to transit-poor areas. More broadly, this study makes the case that it demonstrates that, particularly when used in conjunction with public transport, shared mobility services can help support longer-distance travel for those who do not or cannot own a car all the while meeting objectives around emission reduction, sustainable mobility, and wider access to jobs and other destinations.

Read more on the study:

<https://medium.com/uber-under-the-hood/making-the-connection-uber-moto-and-public-transport-in-hyderabad-india-f63fcfe13cfa>

8. Pathway 03: Behavioural Nudges Towards Shared Mobility



Picture courtesy: WXY Studio, Future of Cities Report

8.1 Parking Pricing and Management

India is home to some of the densest urban amalgamations in the world and it is natural that we prioritize our limited street space for movement. The encroachment of footpaths and pavements are a common sight in most Indian cities, therefore there is a want for proactive measures to improve parking management. Oftentimes parking capacity exceeds the street capacity leading to congestion in peak hours and conversely, improper parking practices due to the lack of adequate parking also exacerbates congestion. Thus there is a strong need for adoption of better parking management and use of levers such as pricing to manage the existing push-pull relationship between parking and congestion.



There is a great body of work in the field of parking management. Great parking management starts with a planning, from area-level parking management plans, rebalancing of streets with parallel/no parking, prioritising and segmenting footpaths and bike lanes to avoid encroachment, creating clear demarcations for parking spaces to optimise capacity and regulate enforcement, and introduction of bulb-outs to prevent parking at bus stops, junctions, and crossings¹⁰.

Increasing parking supply will not solve the issue of congestion, encroachment, or parking violations. An excessive supply of parking will only encourage people to use personal motor vehicles even when good public transport is available. We must look into limiting total parking supply, including off-street and on-street parking. These parking requirements must consider the capacity of the road network and cities must set caps on the total quantum of parking available in each zone. Developing multi-level car parks to resolve parking and congestion has not worked in India or around the world.¹

A well made plan needs effective implementation and execution and this is where enforcement can play a crucial role. First step as discussed above is to create clear signages and markings to not only facilitate enforcement but ensure clarity in compliance. To ensure enforcement actions are not seen by errant citizens as a one of chance or matter of luck, enforcement must happen regularly, and responsibility of enforcement must be clearly identified. Further, for effective management of the system, there must be investments in capacity building of enforcement officers.¹



Dynamic pricing popularised by the airline industry and ridesharing is now being adopted in other areas of transportation planning, such as highway toll roads and parking fees with advancement in technology. For example, **within the first 3 months of using dynamic pricing for its parking space, Los Angeles city recorded an overall decrease of ~11% in hourly rates, ~2% increase in revenues, ~10% less parking congestion and ~5% more occupancy of previously under-utilised space.**¹¹ Parking fees can be reinvested locally on sustainable mobility initiatives. Other monetary levers include working with Indian workplaces to offer decentralised schemes such as workplace levies or parking cashouts to employees for not taking a parking spot. This can help with equitable distribution of parking pricing. **Workplace levies in California led to 64% increase in carpooling and a 50% increase in transit ridership.**¹²

A good step for Bengaluru would be to review and execute the Parking Policy laid by the Directorate of Urban Land Transport. The discourse over urban mobility should be about moving to shared modes, transit-oriented development, where the focus would be on movement of people and not just vehicles.

¹⁰ <https://www.itdp.in/tag/parking/>

¹¹ Diakopoulos, 2015, Hall, Kendrick and Nosko, 2015 and Castillo, Knoepfl and Wey, 2017. (from Unlocking Cities by BCG)

¹² Linton, J. (2015, May 29). Donald Shoup Interview, Part 2: Pasadena, Ventura, Mexico City, A.B. 744. Streetsblog LA. Retrieved February 9, 2022, from <https://la.streetsblog.org/2015/05/29/donald-shoup-interview-part-2-pasadena-ventura-mexico-city-a-b-744/>

8.2 Incentivizing usage of Shared Mobility to Curb Congestion



Picture courtesy: WXY Studio, Future of Cities Report

Shared mobility has taken on an increasingly important role in urban transport networks within India, helping to fulfil first and last mile needs and expand the array of options available to travellers.

Four-wheeled shared mobility services have been most successful in serving high earners, tech workers and young professionals (WRI India, 2020), which are the most prominent demographic of Bengaluru. While businesses may prefer to use four-wheeled on-demand services, two- and three-wheeled services offer an affordable and accessible entry point and can avert shared mobility's high-end connotation due to their familiarity in the Indian market. Shared mobility companies can add value to what are now street-hail trips in the form of convenience, reliability and transparency.

As Bengaluru expands its metro system, and further strengthens bus routes, shared mobility companies can work in proactive partnership with transport agencies to serve travellers' first-/last-mile trips (UITP, 2019). Trips of just a few kilometres can be well served by small two- and three-wheeled vehicles and are well positioned for micro-mobility pilots with bicycle, e-bike and e-scooter share. Alternatively, companies can use their existing data to understand where trips between residences or offices and adjacent transport hubs are high and charter regular routes using vans or small buses that can aggregate several trips and lead to more spatially and environmentally efficient travel.

8.2.1 Time-based pricing

Traffic congestion in Bengaluru often leads to transportation availability being unreliable, much to the distress of millions of commuters in the city. The unreliability has also affected shared mobility aggregators, and their users. One of the primary factors that can improve unreliability is a time-based fare model for taxis or ridesharing aggregators in Karnataka.

The fare models in Karnataka currently only account for distance and model of vehicles to determine fares. However, the congestion in the city leads to long travel time, and in the absence of time-based fares, earnings of drivers take a hit. Due to a potential loss of earning, spending time in traffic, drivers do not have an incentive to provide their services in areas surrounding congested spaces.

In a number of cities in India, including Mumbai, transportation fares in taxis and auto-rickshaws are a factor of both distance and time. In order to provide incentives to drivers, ease out mobility in congested areas, and provide access to more transportation options, it is imperative to factor in time while determining fares.

8.2.2. Provision of Dynamic Pricing

The concept of dynamic pricing has been a long-standing feature in many industries, such as the airline and hospitality industries, and is a cornerstone for efficient utilisation of assets. The Indian Railways, for example, also finds merit in leveraging this principle for the optimal distribution of railway tickets where we have Tatkal fares and Suvidha fares.

Similarly, dynamic pricing is a relief valve for the rideshare marketplace. Without it, when demands for rides may exceed the number of available drivers (e.g. bad weather, rush hour, special events), riders would have to wait longer, or might not get a ride at all. Drivers would have less incentive to accept requests in busy areas and hence dynamic pricing helps restore balance to the network.

In the event of dynamic pricing, riders are presented with automated messages such as “Fares are slightly higher due to increased demand” or “Fares are a lot higher due to increased demand” so they have full information about pricing before booking a trip.

It may also be noted that the efficacy of dynamic pricing has been acknowledged and appreciated by the Ministry of Road Transport & Highways in the MV Aggregator Guidelines 2020: “**...This will enable and promote asset utilisation which has been the fundamental concept of transport aggregation and also substantiate the dynamic pricing principle, which is pertinent in ensuring asset utilisation in accordance with the market forces of demand and supply.**” (MV Aggregator Guidelines 2020)



8.2.3 Congestion Pricing

In the current mobility ecosystem only a fraction of the costs associated with car traffic, such as parking fees or fuel taxes, are levied. Congestion Pricing accounts for the economic implication of an individual's driving choices. These externalities include crashes with pedestrians, bicyclists, and other vehicles, time lost stuck in traffic, and environmental and health problems. With rising congestion, it is required to price the external costs created in the congested environment as this would allow reaching an optimal outcome or at least a step closer to that.

Congestion Pricing, as a method, involves charging road users to regulate the demand by increasing the cost of using the road. The congestion charge is quite a different concept from the vehicle taxes and tolls that are being implemented in India. Vehicle taxes are paid at the time of the purchase or annually according to the size and type of vehicle. The toll charge is collected from the road users to allow them to use an upgraded road which helps in commuting easily and fast. In a way to solve the issue of congestion in Bengaluru, it is thus required to regulate the private vehicle users by charging them, mainly for accounting their externalities. C.P, by disincentivizing the private vehicle users, with its channelised fund will redistribute the benefits to the other mode users.

Similar practices would also be relevant for parking of private vehicles. Cities are experimenting with programmes to vary parking fees based on location, vehicle type, time of day and surrounding land use. Becoming one of the pioneering cities in on-street parking management in the country, Ranchi implemented variable pricing on its busiest thoroughfare, Mahatma Gandhi Marg, with a twelve-fold increase in revenue (ITDP, 2019). According to recent information, the MPA will soon differentiate parking zones as commercial, semi-residential and residential with accompanying fee structures. The proposal is to initially start with flat, reduced pricing for residential zones to accustom people to pay instead of free parking and then slowly move towards variable parking pricing as per timings or land use. These pilots have the potential to support more progressive and equitable parking policies that account for the negative externalities associated with motorised and four-wheeled vehicle use.



8.3 Easing regulations on HCVs and pooling



The aggregation of High Capacity Vehicles (HCV), provides a doorstep solution to mobility needs while also addressing congestion concerns. Each HCV has the potential to remove more than 15 single passenger cars from the roads, and ease out the congestion on city streets. The use of HCVs, such as buses for public transportation has been the most sustainable, economical and viable method of transportation for multiple decades. However, with mobility as a service becoming a promising option, there are new frontiers to explore with the introduction of on-demand buses, or demand responsive buses.

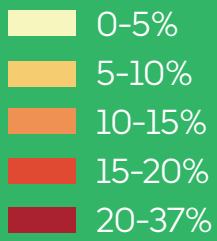
Studies have found that a Demand-Responsive Transit (DRT) service is complementary to a fixed route system that operates a vehicle along a prescribed route according to flexible schedule and timing. It is an advanced form of public transport which has many advantages over a fixed route system as providing fixed service on static routes will not solve the problem of capturing user dynamic demand. On-demand transportation leverages technology to connect an HCV in the vicinity with a passenger looking to travel in the same direction, in a demand responsive route. Convenient pick up aside, on-demand buses provide their passengers the assurance of seating for the duration of the journey, only allowing as many to board as there are empty seats. Consequently, accommodating fewer passengers on board, unlike conventional buses, also means fewer stops and a relatively quicker commute.

Providing a suitable regulatory framework for such mobility options, as has been found in the Draft Delhi Premium Aggregator Bus Scheme 2023, would give a boost to the industry.

Carpooling has been a well accepted method of sustainable transportation and a study which analysed ridesharing data brought out that Bengaluru observed far higher rates of pooling, compared to other Indian metropolitan cities. This high frequency of shared trips may be indicative of a variety of phenomena, including latent demand for public transport in the region and the presence of more tech savvy and younger demographics such as young IT professionals and students, who may be more willing to pool due to cultural norms and price sensitivity.

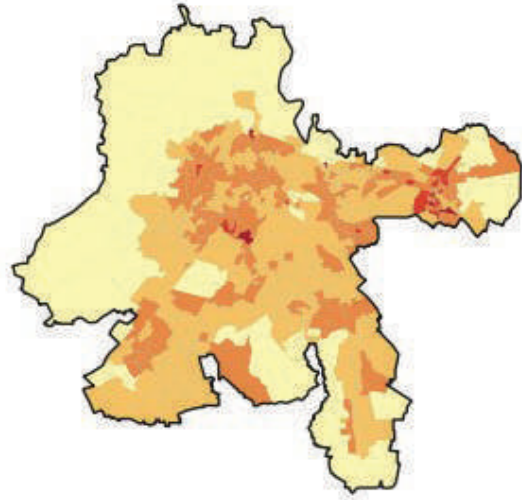
Conducive policies for carpooling have the potential of taking cars off the road. It is also worthy to note that IT firms are co-located around the outer periphery, especially the northeast quadrant, in Bengaluru. Therefore, the probability of a group of individuals having the same destination is high, which is likely to lead to pooled trips.

Percentage of Pooled 4w Rides per-COVID -19*

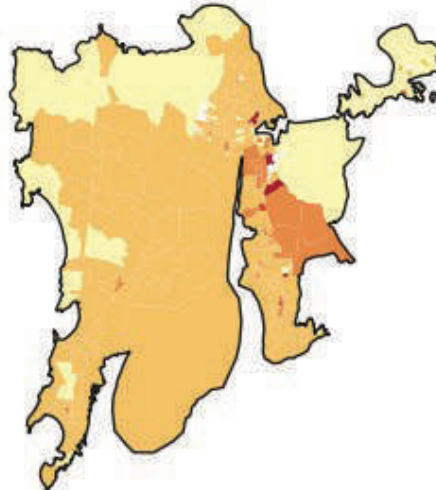


*Data aggregated by origins and destinations.

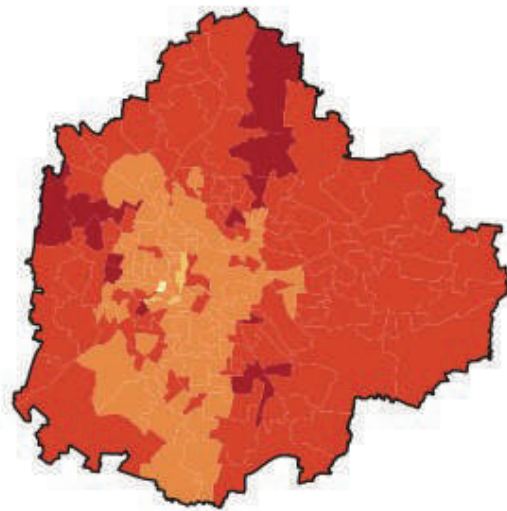
Delhi NCR



Greater Mumbai



Bengaluru





9. Pathway 04: Empowering Institutional Capacity

9.1. Establishment of BMLTA

Major global cities renowned for their successful public transport systems have achieved their success through a comprehensive and integrated approach, particularly focusing on last-mile connectivity. This aspect plays a crucial role in ensuring the widespread adoption of mass public transport modes by the general population. Cities like London, Singapore, and Hong Kong stand as prime examples, where an overarching and empowered authority takes a holistic view of all available transit options. They have implemented common ticketing systems that allow seamless access to buses, metros, light rail, and even ferries within a single trip. Additionally, they consider paratransit options, and prioritise the needs of pedestrians, including those with disabilities. Each element is meticulously designed and developed with interconnectedness in mind.

The success of this integrated approach is evident in the high modal share of public transport in these cities. For instance, in London, active, efficient, and sustainable modes like walking, cycling, and public transport accounted for an impressive 62.7 percent of the average daily share in 2017. In Singapore, the peak hour modal share of public transport stands at 67 percent. In contrast, India's fragmented approach to public transport, has resulted in a comparatively low modal share for public transport. According to Census 2011 data, only 18 percent of people used public transport for their daily work trips. More recent studies have projected a decline in the overall modal share of public transport to 44.7 percent in 2030-31 from 75.5 percent in 2000-01, primarily due to the impact of COVID-19 prompting a shift towards private vehicles. As cities expand, increasing the need for daily commutes over longer distances, the absence of an integrated approach to public transport will exacerbate this imbalance.

Bengaluru's transportation landscape presents an opportunity for a positive institutional transformation. The city can embrace a Unified Metropolitan Transport Authority (UMTA) to strategically plan, coordinate, and invest in sustainable transportation projects. Building on the efforts of the Bengaluru Metropolitan Land Transport Authority (BMLTA) initiated in 2007, a strengthened UMTA can overcome past challenges by empowering it with financial, legislative, and professional autonomy.

Empowering the UMTA with decision-making authority will allow it to chart the most suitable transport investments for the city's growth. **Encouragingly, the Karnataka government has taken proactive steps to set up the BMLTA's and establish its statutory footing, signalling a positive shift in urban transport planning and implementation.**

The current array of entities involved in transportation planning, including the Transport Department, Bengaluru Metropolitan Region Development Authority, BDA, BMTC, BMRCL, BBMP, and traffic police, can come together cohesively under the UMTA's umbrella. A united approach ensures synchronised efforts, optimising planning and implementation, and fortifying the city's traffic and transportation services.

The BMLTA can be empowered to issue licences to shared mobility players in Bengaluru, sandbox pilots of intelligent transport systems and provide permissions to innovative solutions that may improve the mobility ecosystem of the city.

10. Conclusion

In the true spirit of participatory democracy, the Government of Karnataka launched the “Brand Bengaluru” campaign to seek suggestions from citizens. As collated and synthesised by the Indian Institute of Science, the recommendations to the government are well-aligned to suit a city that is well on its way to becoming a global brand.

From this whitepaper, we outline the following policy recommendations:

1

Encouraging Private Participation in High Capacity Vehicles

The government should actively encourage private participation in providing high capacity vehicles, such as buses and shuttles, to augment the existing public transport infrastructure. This can be achieved by creating a favourable regulatory environment and offering incentives for private operators to invest in and operate these vehicles. By partnering with private sector entities, the government can increase the frequency and coverage of public transport services, addressing the demand for efficient and comfortable mass transit options.

2

Expanding First and Last Mile Connectivity with Shared Mobility

Promote the expansion of first and last mile connectivity options for commuters through shared mobility services. Collaborate with ride-sharing and micro-mobility platforms to offer convenient and accessible options for travellers to complete their journeys from home to transit hubs and vice versa. By integrating shared bicycles, motorcycles, and ride-sharing services into the public transportation ecosystem, the government can reduce dependency on private vehicles, enhance accessibility, and create a more seamless travel experience.

3

Introduce time-based pricing for shared mobility in the city

The fare models in Karnataka currently only account for distance and model of vehicles to determine fares. However, the congestion in the city leads to long travel time, and in the absence of time-based fares, earnings of drivers take a hit. Due to a potential loss of earning, spending time in traffic, drivers do not have an incentive to provide their services in areas surrounding congested spaces.

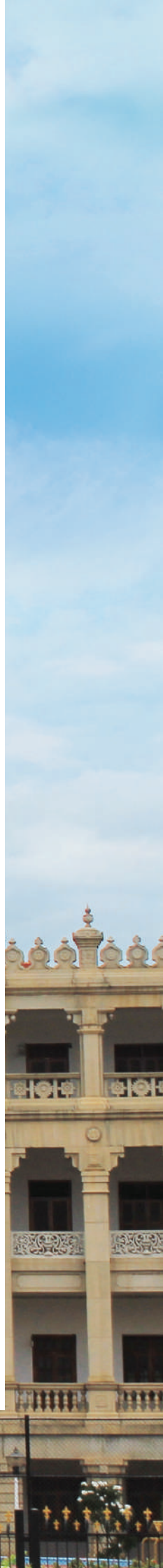
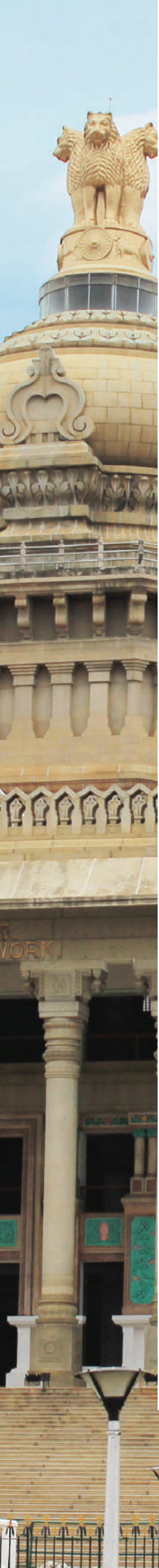
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4

Establishment of the Bengaluru Metropolitan Land Transport Authority (BMLTA)

Expedite the establishment of the Bengaluru Metropolitan Land Transport Authority (BMLTA) as an empowered coordinating agency responsible for streamlining transportation policies and decisions across different civic agencies. The BMLTA should have the authority to develop and implement integrated transport plans, resolve conflicts, and ensure cohesive execution of mobility projects. By consolidating decision-making authority and fostering collaboration among stakeholders like BMTC, BMRCL, BBMP, K-RIDE, and DULT, the BMLTA will play a pivotal role in achieving a sustainable, efficient, and well-connected transportation network for Bengaluru.





Uber