



A POLICY BRIEF

shared mobility

a solution for Bengaluru's first-mile and last-mile problems

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executive summary

Bengaluru has earned the infamous tag of the most traffic-congested city in the world¹. A huge reason is the over-reliance on private vehicles, which has surged by a whopping 280% between 2007–2020², due to inaccessible and under-developed public transport (PT) infrastructure. This is reflected in the low modal share of PT at 48% (Mumbai and Kolkata are at 80%)². A major reason for non-usage of PT is the lack of first-mile and last-mile (FMLM) connectivity, as stated by 24% non-users of public transport in the city³. Studies show that better FMLM leads to an increase in PT ridership and reduces city-wide automobile dependence².

In this policy brief, we focus on strengthening shared-mobility solutions since it is the top choice for the first mile (51%) and last-mile (68%) connectivity³ in Bengaluru. Also, sharing of automobiles leads to higher utilization (on average 2x higher) of vehicles already on the road leading to better efficiency and decongestion⁴. Among shared-mobility solutions we are focusing on:

Section I

Ride-sourcing for two-wheelers A staggering 80% of Bengaluru's vehicles are 2-wheelers. Their better utilization can result in a robust FMLM solution and can lead to decongestion.

Section II

Encouraging micro-transit to complement mass-transit Out of the 48,899 buses registered in Bengaluru, only 6,600 are owned by Bengaluru Metropolitan Transport Corporation (BMTCC)⁵. This depicts the scope for enhancing the micro-transit system in the city.

key recommendations

Two-wheelers sourcing

- Owner-operator model: Owner of vehicle can be operator/driver
- Police verification: Mandatory background checks by police
- Street-hailing bikes: Association with ride aggregators not mandatory; individual can get a permit
- Ease of obtaining permits: Not mandating private bike taxis to be converted to commercial vehicles
- Improved linkages with mass-transit system: Dedicated pick-up and drop points at mass-transit stations

Micro-transit

- Adopt central government guidelines: State government to consider central government policy on permitting private bus-aggregation services
- Optimize BMTCC routes: To provide FMLM connectivity between IT parks and metro stations
- Maximize use of bus lanes: Allow private on-demand/feeder bus services to use bus lanes

what is shared mobility?

It is imperative to understand the types of shared mobility options in the Indian landscape and relate them to some real-life examples in Bengaluru. The following infographic provides an overview of some of these options⁶:

SHARED MOBILITY IN BENGALURU



MASS TRANSIT

High capacity modes such as buses, metros and trains that are typically operated by public or private agencies.



RIDE SOURCING

On-demand services that link riders to for-hire drivers who are using their own vehicles for commercial use, using online platforms for the linkage and facilitating payments



RIDE SPLITTING

Drivers enter into a contract for service with a passenger. Typically, the contract is amended to include additional riders along a route, filling empty seats in the vehicle.



RIDE SHARING

Ridesharing is similar to ride sourcing, in which trips are shared by travellers, but with the exception that the drivers are not considered 'for-hire', though they can receive some forms of compensation to recover their costs.



VEHICLE RENTAL

Companies providing access to vehicles for public use, usually bikes or cycles in docked, dockless or peer-to-peer forms, on need basis for hourly, daily or monthly rentals.



MICRO-TRANSIT

Micro-Transit refers to private companies operating shared vans, where drivers and riders are linked via IT-enabled applications.



Compiled from the classification done in NITI Aayog's 2018 report on Shared Mobility

benefits of shared mobility

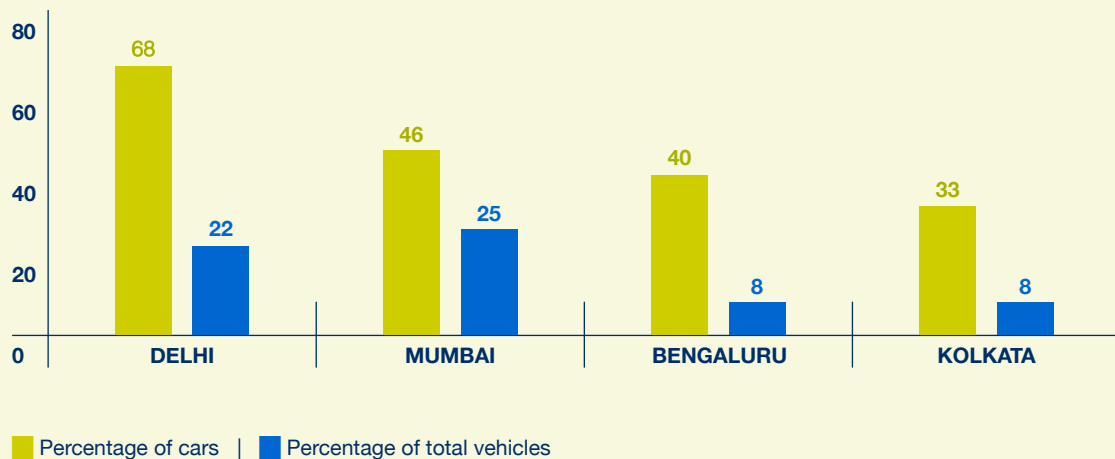
Providing alternatives to car ownership⁷

In a 2018 BCG study, 89% of commuters from Bengaluru and Kolkata indicated plans to purchase a car in the next 5 years. The same respondents (52% highly willing, Kolkata) showed the highest likelihood to forgo the purchase if ridesharing could meet their transport requirements on price, timeliness and availability. Shared mobility may not just result in lesser vehicle purchase in the future, but it also leads to fewer vehicles on the road due to higher utilization per vehicle (on average 2x higher) leading to better efficiency and decongestion.

The following exhibits illustrate the percentage reduction in private and total vehicles that can result due to ridesharing and the related reduction in avoidable social costs⁸ due to congestion (in \$ billion).

CHART 1

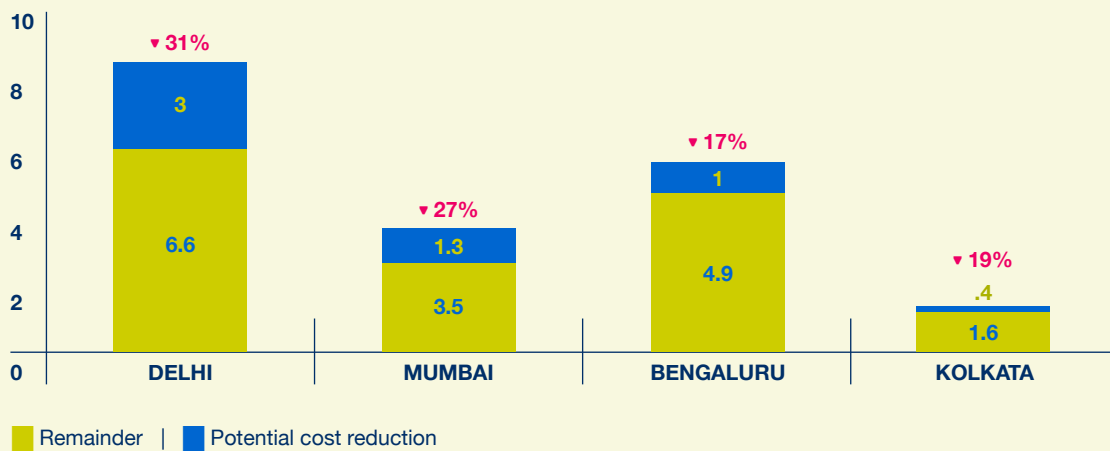
Percentage of private + total vehicles reduced with rideshare



Assumptions: (1) With rideshare scenario under which ridesharing replaces private cars as the #2 or #3 mode of transport and pool constitutes 50% of rides. (2) The total number of vehicles includes private cars, motorcycles, buses, taxi and rideshare cars. (3) Total number of cars include private and ridesharing cars.

CHART 2

Estimated reduction in avoidable social cost (in \$ bn) of congestion due to rideshare adoption



Accelerating public transport adoption⁹

Shared-mobility solutions can increase PT adoption by extending its catchment area. They can play a pivotal role in covering the gaps in the existing transportation network. While PT is often constrained by fixed routes, capacity and scheduling, shared mobility's on-demand access provides the flexibility needed to hop-on and hop-off from a bus/metro network. In a survey conducted across India, 80%¹⁰ people believe that improvement in first- and last-mile connectivity will translate into better adoption of public transport in the country.

Environmental benefits

Another benefit that shared mobility can provide is in terms of reduced cost spent on imported fossil fuels and the resulting environmental benefits. The transport sector at 17% was the third largest energy consumer in 2017.¹¹ India imported 84%¹² of its oil at a cost of Rs. 7.7 lakh crore in FY19.¹³ This massive energy consumption of fossil fuels also results in a lot of air pollution: in Bengaluru, it is estimated 85% of volatile organic compounds (VOC), more than 70% of carbon monoxide (CO), 42% of nitrous oxide (N₂O), and 40% of PM2.5 in 2015 came from vehicular exhaust.¹⁴

Supplementing incomes¹⁵

The goal behind shared mobility is to provide on-demand mobility tailored to the needs of the user. Since individuals will now rely on others to drive them to their destinations, it has the

potential to create a large workforce of vehicle owners and drivers. Flexibility in terms of work-hours can serve to supplement income for drivers and generate the opportunity of self-employment. A study indicates a high willingness of car drivers in Bengaluru and Kolkata to drive for a ride-sharing platform in order to increase their incomes.¹⁴ As shared mobility grows the resulting reduction in congestion could lead to increased earning potential for drivers. It could also create employment opportunities for citizens who previously lacked access to such avenues. For example, Koala Kabs, Sakha Cabs and Priyadarshini cabs are premium taxi services offered by women drivers for women, children and senior citizens in Delhi NCR and Mumbai.

SECTION I

ride-sourcing for two-wheelers

India is the world's largest two-wheeler market, with two-wheelers constituting 81%¹⁶ of the automobiles sold in the country. With the advent of app-based services, two-wheelers are also emerging as the primary mode for last-mile connectivity, both for delivery of goods and movement of passengers.

The two-wheeler assets in cities can be used in different modes, as rental vehicles, ride-pooling and as bike-taxis. The current policy landscape allows for the use of two-wheelers as rental vehicles, but their use as bike-taxis on contract carriage basis still remains a grey area.

Evolution of policies governing bike-taxi services¹⁷

November 2004

Central Government allows motorcycles to be categorized as a transport vehicle under the Motor Vehicle Act, 1988 (MV Act).

December 2016

Committee constituted by the Ministry of Road Transport and Highways (MoRTH):

- Proposes taxi policy guidelines to promote urban mobility
- Recommends State Transport Department to allow two-wheeler taxi permits as a last-mile solution
- Further recommends usage of private bikes for these purposes, and an online option to allow private bikes to convert to taxis

December 2018

The MoRTH tells Lok Sabha "...the States may issue permits for taxi under Section 72 and 73 [of the MV Act, 1988]. Therefore, it is legal for the States to issue taxi permits for all kinds of vehicles including two-wheelers.

August 2019

The Motor Vehicles (Amendment) Act, 2019 brings app-based mobility solutions to service providers, such as Ola and Uber, under the ambit of the MV Act.

Adoption of bike-taxis in Karnataka

Despite the two-wheelers having a vehicular modal share of 24%¹⁸ in the city, Bengaluru and generally, the state of Karnataka does not benefit from the widespread adoption of bike-taxis for the following reasons:

1. Lack of clarity on what licenses and permits bike taxis need to operate due to the lack of regulations¹⁹.
2. Transport department currently working on a policy with relevant stakeholders; draft yet to be made available for public consultation.
3. Perception of lack of safety for women and minor passengers and lack of adherence to traffic safety rules.
4. Might lead to traffic-congestion due to increased vehicles on road.

Empirical evidence of the benefits of bike-taxis

Evidence from the operations of bike-taxis in the cities of Gurugram and Jaipur, with the cab-aggregator Ola, suggest that bike-taxis are a popular and effective mode of transport for short-distances¹⁵.

1. 70-85% of the trips via bike-taxis are for a distance of 7 kms or shorter, both in metro cities and in the hinterland.
2. In Gurugram, which has a metro network, one in three bike-taxis are to and from a metro station. This shows its potential to be used as a feeder service.
3. A survey by the Ola Mobility Institute (OMI) titled, 'Ease of Moving Index Report 2018' indicated that improvements in first & last mile connectivity will improve adoption of public transport.²⁰
4. As per the same report, bike-taxis were 50% faster than car rides for trips less than 6 kilometers and generated more than 10,000 jobs in Punjab, Haryana and Telangana in the year 2018.

Comparison of bike-taxi policies in the other states

	PUNJAB ²¹	RAJASTHAN ²²	WEST-BENGAL ²³
Policy/scheme	Motor Bike Taxi Policy, 2017	Rajasthan Bike Taxi Policy, 2017	N.A.
Permit requirement	Contract Carriage Permit	Contract Carriage Permit	Contract Carriage Permit, along with a Letter of Intent (LOI) issued by the local Regional Transport Authority (RTA) for each vehicle
Vehicle ownership	The policy does not specify the distinction between the driver and the owner of the vehicle	The service provider can be an individual, firm/company or a legal entity The driver shall be appointed by the service provider The service provider must own a minimum of one motorcycle	The service provider must own a minimum of 15 motorcycles, The driver shall be appointed by the service provider
Background checks	Police verification at the residence of the driver	The onus of driver's background check on the service provider	The onus of driver's background check on the service provider
Safety	The vehicle shall carry a first-aid box The owner shall be responsible for the safety of women and children passengers	The vehicle shall carry a first-aid box Carriage of minors shall not be allowed	Provision of GPS tracking and emergency panic button Carriage of minors shall not be allowed
OPERATING HOURS	N.A.	N.A.	8 A.M. TO 8 P.M.

As recommended by the MoRTH,²⁴ the existing private bikes should be allowed to operate as bike taxis for optimal utilization of idle assets. The state government may consider an online option to allow private bikes to convert to taxis.

Policy recommendations

1. Owner-operator model

The owner of the vehicle can be the operator/driver. This eliminates the entry barrier of owning a number of vehicles, hiring drivers and conducting background checks. This unlocks livelihood opportunities providing self-employment opportunities for the masses.

2. Police verification

Background checks by police should be conducted during the process of getting a permit.

3. Street-hailing bikes

The driver/operator does not need to be associated with any ride aggregator and should be allowed to operate as a street hailing taxi similar to autos or kaali-peeli taxis. An individual should be able to apply for a permit.²⁵

4. Ease of obtaining permits

Doing away with regulatory requirements for private bike taxis to be converted to commercial vehicles would result in better utilization of idle private assets.¹⁶

5. Improved linkages with mass-transit system

Dedicated pick-up and drop-off points should be provided at mass-transit stations. This will improve linkages with the areas traditionally underserved by public transport.

6. Eliminating entry barriers and creating a level playing field

The average selling price of bikes in India is ₹40,000 to ₹60,000, which is nearly half the cost of an auto-rickshaw. Removing entry barriers by facilitating access to institutional credit will create livelihood opportunities for people from diverse backgrounds.¹⁵

7. Creating livelihood opportunities

Along with operating bike-taxis, the drivers can also partner in food-delivery and courier services during the non-peak hours which will provide them with a stable source of revenue without making them dependent on a single source of income. Part-time avenues are also attractive livelihood opportunities for women and college students.

SECTION II

encouraging micro-transit to complement mass-transit

Shaheen and Chan (2016) state that shared mobility services enable commuters to gain short-term access to transit services on an as-needed basis.²⁶ They highlight how services such as bike-sharing and micro-transit, due to their on-demand nature, have changed the way urban dwellers access public transportation and make connections to other modes. By integrating with mass-transit and offering reliable options of first- and last-mile connectivity, bike-sharing and micro-transit strengthen the access of mobility as a service, reducing the need for vehicle ownership and promoting greater reliance on shared and public transit modes. There is extensive research to suggest that a lack of good connectivity between mass-transit stations and the endpoints of commutes may dissuade commuters from using public transit and impact its ridership.²⁷

Decreasing usage of BMTC services

BMTC's current model of a mass-transit system hasn't been able to reap many rewards for the commuters in Bengaluru. As seen in the graphic, the ridership of BMTC has decreased from 50.7 lakh in 2013–14 to 35.8 lakh in 2019–20, even though the population has increased from 93.8 lakhs to 1.2 crores.²⁸ The growth in BMTC bus fleet is not proportional to the population growth in Bengaluru over the past years as seen from the images below.

BMTC operation

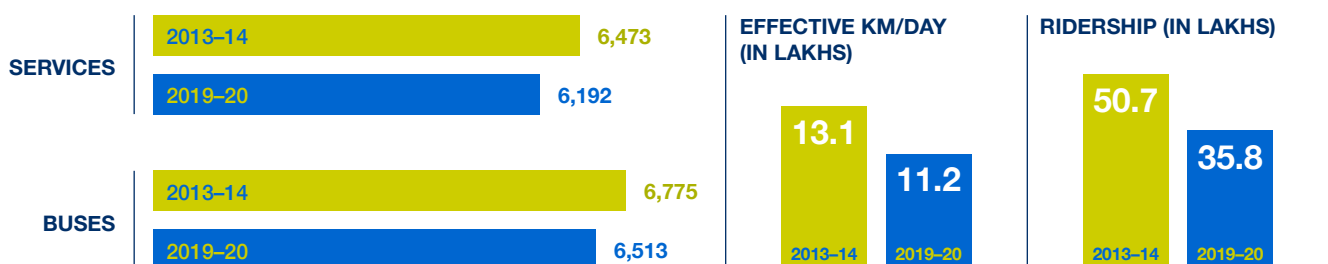
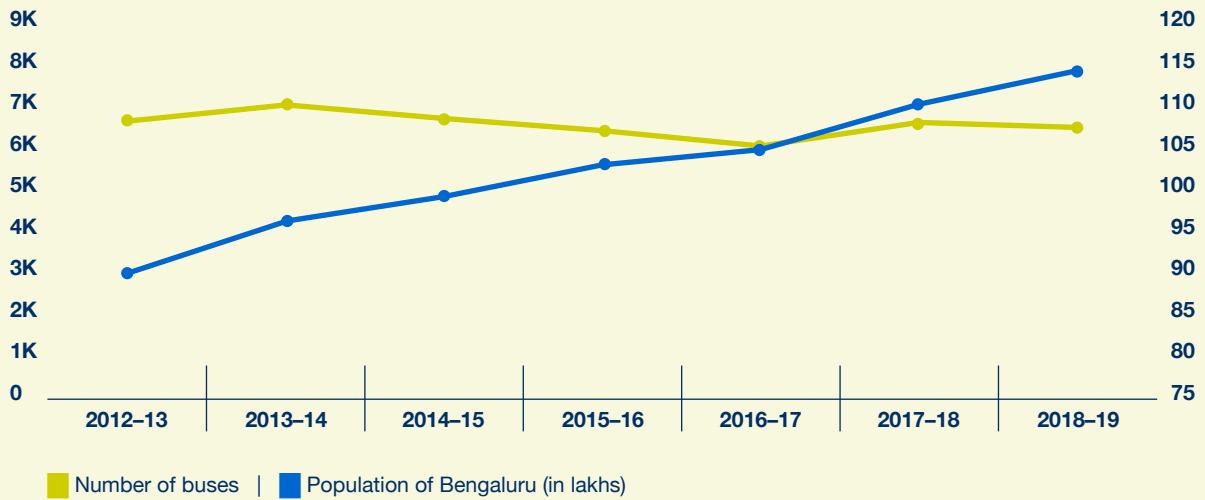


CHART 3

Growth of BMTC buses vs. population in Bengaluru

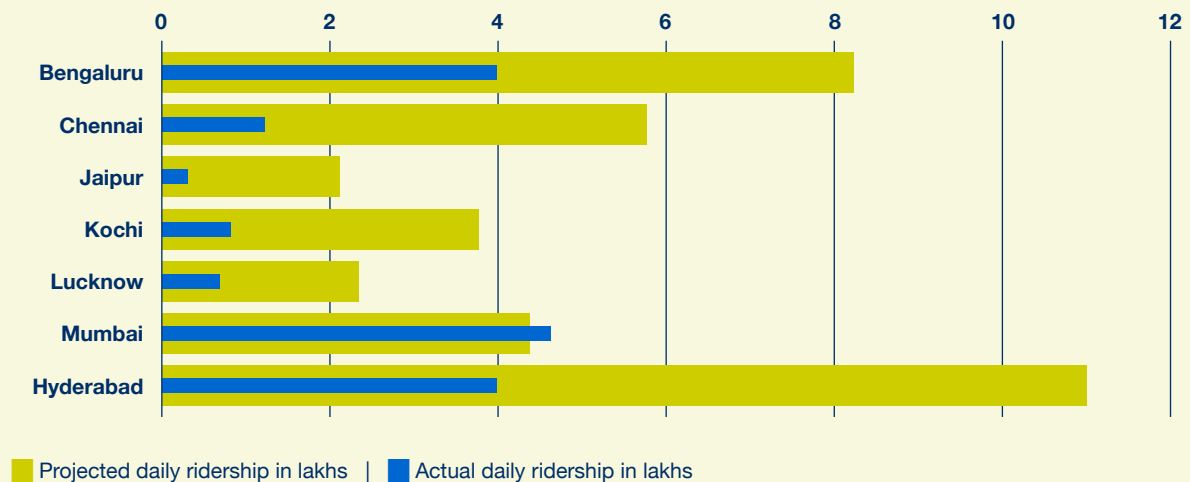


Cascading effect on ridership of mass-transit systems

Metro ridership in most Indian cities continues to lag behind projected numbers, partly due to inadequate network coverage and higher fares, but also due to poor connectivity to the metro rail network. Bangalore Metro, designed for a daily ridership of 820,000 passengers, currently caters to about 400,000 passengers (refer to figure below). A survey by the World Resources Institute, of potential metro passengers at major trip generation points around the Bangalore Metro, found that first- and last-mile connectivity poses a significant hurdle to metro usage, with 70% of respondents citing poor connectivity to the metro as a reason for not using it.³¹

CHART 4

Projected vs. actual ridership of metro rail systems in India



BMTC Metro feeder services

In Bengaluru, Although BMTC has initiated Metro-feeder buses with 155 feeder buses plying to metro stations with a frequency of 15 to 30 minutes according to their data, there are gaps in the routes and frequency causing poor last-mile connectivity and eventually creating lesser demand for the same feeder services. For example, feeder buses designated to serving the Yelachenahalli metro station do not have the metro station in their route. Another example is the lack of feeder buses from ITPL (one of the biggest tech parks in Bengaluru) to Baiyappanahalli metro station and Baiyappanahalli metro station to Manyata Tech Park. The movements in these routes are further elaborated in the next section.

Comparison of mass-transit integration with feeder services across three cities

	KOCHI	BENGALURU	DELHI
MoU	MoU signed between the metro rail operator, private enterprise, and the local auto-rickshaw association	The Bangalore Metro Rail Corporation (BMRCL) invited bids from private two-wheeler rental enterprises	Delhi Metro employed a gross-cost contract (GCC) with buses to provide feeder services
Service levels	N.A.	Lack of prescribed service levels	Service levels for the buses, including fares, routes, and schedules, are set by Delhi Metro
Services provided	Spaces to park, charge, and hail e-vehicles	Spaces to park	Enterprises are compensated at agreed-upon rates and intervals for the services operated
Reliability	Low reliability for commuters	Low reliability for commuters	High reliability for commuters
Risk for enterprises	Low-risk contract	Risk-based contract	No risk contract

We can observe that Delhi has implemented an end-to-end model which is risk-free for the private enterprises, reliable for the commuters and profitable for the metro rail network. This implementation can be replicated in Bengaluru with appropriate amendments, if necessary.

Private technology providers

ZipGo: Private bus aggregators like ZipGo had started but had to shut down their operations in Bengaluru because of regulatory concerns. The on-demand AC shuttle company had grown fast given that such private players offer seat booking, real-time tracking and on-demand services. The service had found favour with the commuters looking for alternatives to paying sky-high cab fares or driving through Bengaluru's nightmare traffic.³³

Bounce + Quickride: Bounce offers motorized two-wheeler (scooter and motorbikes) rentals for a short distance and Quickride is an intra-city carpooling platform which matches empty seats in private vehicles with extant travel demand in the same direction. These 2 companies are referred to as Com1 and Com2 in the following visuals respectively. In a pilot conducted by WRI in collaboration with these two companies, interesting insights regarding commuter movement behaviour were drawn. The following images showing movement behaviours by commuters from a metro terminal station named Baiyappanahalli. It is a transitional hub for work trips to key employment centres located in the eastern parts of the city. On weekdays, Baiyappanahalli witnesses an average of over 7,000 footfalls during peak hour, with 3,000 outgoing and 4,300 incoming commuters.³⁴ From the demonstrated usage pattern, we can infer that there is a sizable market for frequent micro-transit feeder services between metro stations and major employment centres. This inference is supported by discussions with corporate transport managers and corporate employee transport providers, who are actively looking to integrate the metro rail network to facilitate employee transport, for savings in commuting time and in the cost to the company of providing transportation for employees.

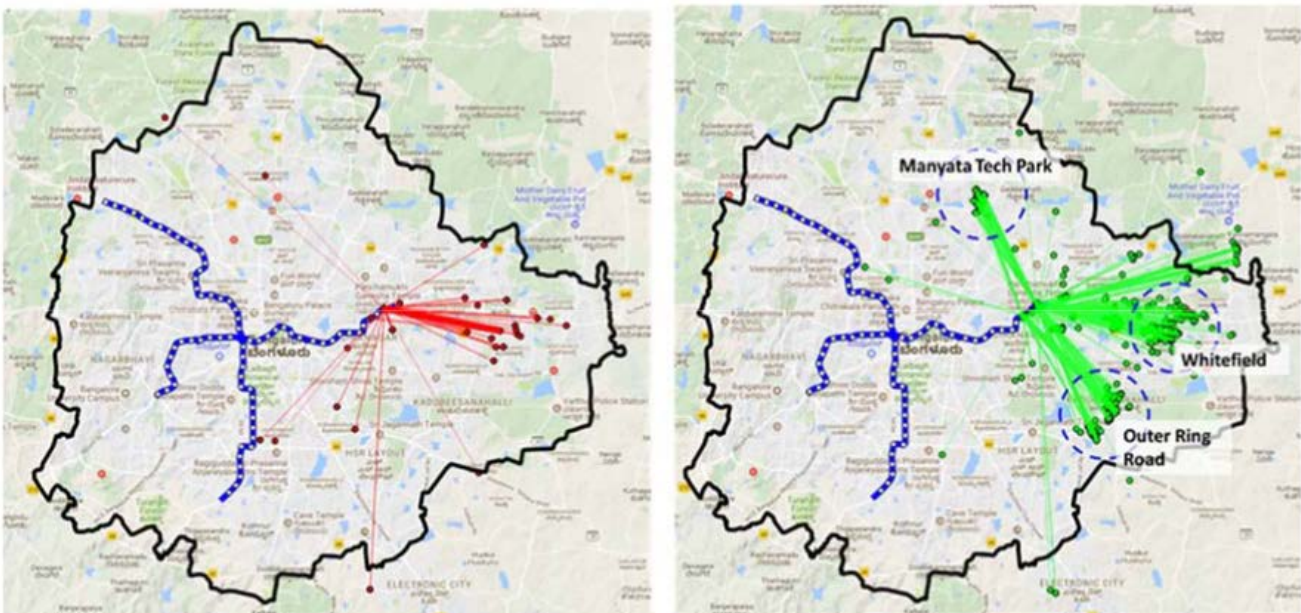


Figure: Origin-destination mapping of trips via (left) Com1 service; (right) Com2 service

The legality of private technology providers

BMTC buses run on 'stage carriage' permits which allow them to operate as a shared vehicle which can carry more than 6 people on a predefined route where they can pick-up and drop-off passengers at any point of the journey. Whereas, private-bus aggregators go around this by obtaining a 'contract carriage' permit which allows them to provide only end-to-end services between fixed origins and destination, thus making it optimum for them to ferry passengers from point-A to point-B completely on-demand. There is a need to resolve this conundrum urgently for Bengaluru to increase its public transit ridership through micro-transit and decongest its roads.³⁵

Policy/operational recommendations

1. Adopt central government guidelines: The state government should adopt the new guidelines provided by The Ministry of Road Transport and Highways (MORTH) which give the state government powers to permit bus-aggregation services for their citizens. Such a policy has the potential to make use of existing private buses to fulfil the last mile connectivity. Such a move by the state government would promote entrepreneurship in the state, and create a conducive environment with concrete policies so that technology start-ups can help revolutionise transport in Bengaluru.
2. Optimize routes/service: Optimize BMTC routes or add new metro feeder buses to increase focus on last-mile connectivity for IT parks. Encourage all IT parks contracting BMTC buses for ferrying employees to include a shuttle service to the nearest metro station and suburban station.
 - Collect survey responses from employees of various IT parks and collaborate with the analytics team from BMTC to understand the gaps in the metro-feeder services
 - Since these services will only be required during the office commute hours (twice a day), the operational efficiency of BMTC can be maintained with the current fleet size
3. Maximize the use of bus-lanes: BBMP commissioner announced last year that the civic body had identified 30km of dedicated bus lanes for BMTC buses in Outer Ring Road, from Tin Factory to Central Silk Board Junction. Bus lanes, if properly implemented with sufficient planning, have the potential to boost public transportation use in cities, as has been seen in the case of Bogota, Columbia. But one of the most important factors for its success is having a high frequency of buses plying on the dedicated lanes. In the case of BMTC, this might be difficult to do as its fleet is already decreasing. This opens up an opportunity to involve and allow private players to make use of these bus lanes, which they can utilise to run on-demand services or feeder services.

conclusion

Bengaluru is uniquely positioned to embrace shared mobility. Familiarity with shared services, strong digital infrastructure and vibrant entrepreneurial culture provide the right ecosystem for the development of shared mobility services. It can be the much-needed boost for Bengaluru's first-mile and last-mile connectivity, which provides the crucial link between commuters and PT. Thus, leading to the easing of congestion and reduced environmental pollution.

Bike taxis have been a runaway success in countries like Indonesia. Closer home, more than 10,000 jobs in 2018 in Punjab, Haryana and Telangana alone have reportedly been generated due to them. Bike-taxis have the potential to unlock several million full-time and part-time livelihood opportunities. The central government has highlighted the need for commercial usage of bikes for passenger transport. NITI Aayog, on its part, too has pointed in this direction.

In the area of micro-transit, we have seen how private players can play a significant role in complementing the traditional micro-transit bus systems. For this, the need of the hour is a framework of concrete policies and regulatory support from the government. It now remains for the Karnataka state government to take decisive steps to bolster shared-mobility solutions and unlock the next phase of transport revolution in the state.

endnotes

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