Public Transport Access in Bengaluru: BMTC Bus Services as a Local Public Good

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PUBLIC TRANSPORT ACCESS IN BENGALURU: BMTC BUS SERVICES AS A LOCAL PUBLIC GOOD

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Abstract

A key means of guaranteeing a high urban mobility, economic efficiency and a sense of social integration in booming cities is through the means of urban public transport. Bengaluru, being one of the largest metropolitan regions in India, relies on Bengaluru Metropolitan Transport Corporation (BMTC) to transport people across income groups on a day-to-day basis. This study looks at the access to public transport in Bengaluru by analysing BMTC bus services in the context of a quasi-public good. The research utilises both primary and secondary data in the form of to study the capacity of operations, access, as well as emerging challenges in service provision. The primary data was gathered by means of a structured commuter survey filled out via Google form of 30 participants, and secondary data consisted of BMTC annual reports, government publications and spatial data on depot distribution. Preliminary findings suggest that BMTC has extensive coverage of the city, but as it grows, there is congestion and spatial imbalance and as such, efficient access to BMTC is limited in certain areas. The paper identifies some of the policy issues associated with capacity limitations, equity and financial sustainability. The analysis combines the results of the primary commuter survey with secondary institutional and statistical data on determining the accessibility, service quality and commuter experiences. The primary survey data also aids in capturing the experiences of the commuters like waiting time, congestion, affordability and general satisfaction with the BMTC services and hence supplements the secondary analysis of the transport infrastructure and transport operation.

Keywords: *Urban Public Transport, BMTC, Quasi-Public Goods, Market Failure, Equity–Efficiency Trade-off,*

INTRODUCTION

The high rate of economic development and spatial growth in Bengaluru has greatly led to the high demand for efficient and affordable transportation in the city. Being one of the leading metropolitan cities in India as well as one of the largest job, education, and service centres in the country, Bengaluru has witnessed high commuting rates with residential,

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commercial, and industrial areas being the most common. The Bengaluru Metropolitan Transport Corporation (BMTC) has a key role in providing mobility to a major part of the populace of the city in this urban setting. To optimally comprehend commuter experiences and patterns of use, this paper integrates both secondary and primary data by use of a commuter survey done on 30 respondents in Bengaluru via Google Form.

BMTC has a vast bus network in the Bengaluru Urban area spanning various neighbourhoods and employment centres. In addition to personal transport, BMTC has wider economic and social benefits such as facilitating labour market access, alleviating individual vehicle reliance, and eliminating traffic congestion. Being a publicly delivered transport system, BMTC creates positive externalities, which go beyond immediate users, impacting efficiency in the urban system, environmental sustainability, as well as social inclusion. The operations of BMTC, therefore, do not only affect commuters but also the wider urban economy.

Although it has continued to invest and expand the network, service quality and access issues have increased over the past years. The concern of population density, increased travel demand, and substantial congestion have put a significant strain on the operation capacity of BMTC. Popular routes often tend to be overcrowded and delayed whereas marginal and newly emerging markets tend to have lower frequency of services and poor connectivity. Such issues bring up significant concerns on whether the transport of people by bus is efficient in terms of addressing the mobility demand of a fast-growing metropolis and of whether transport such as bus is equitable in terms of accessibility to various socio-economic segments and geographic locations. The study is a mixed-data approach to investigate these issues. The secondary data will be acquired through the annual reports of the BMTC, government publications, and transport statistics available. Moreover, a structured survey of the 30 commuters on the Google Forms was used to gather primary data about user attitudes toward the use of buses, waiting time, congestion, affordability, and satisfaction with the services offered by BMTC.

In this context, the present study aims to address the following research question: to what extent do BMTC bus services in Bengaluru operate as an effective quasi-public good in providing access to equitable urban mobility, and what key economic and policy constraints limit their performance in a rapidly growing metropolitan city?

CONCEPTUAL FRAMEWORK

The present study uses relevant concepts from public economics like market failure and public provision, quasi-public goods, congestible public goods, and the equity-efficiency trade-off to analyse the functioning of BMTC bus services in Bengaluru. Public transport ensures mobility, accessibility and economic participation in large metropolitan cities. However, the private markets fail to provide adequate and low-cost bus services due to high operational costs and low profitability on socially desirable routes and the inability to internalise broader social benefits. This situation reflects Market Failure and Public Provision, where reliance on private operators alone leads to under-provision of essential transport services. In Bengaluru, the Bengaluru Metropolitan Transport Corporation (BMTC) is an instance of government intervention to correct this market failure. It provides affordable bus fares, guarantees continuity of services, and covers the entire city including unfeasible areas.

Even though BMTC bus services are publicly supplied, they do not exhibit the traits of a pure public good. Access to buses is excludable through fare payment, and services become

rivalrous when demand exceeds capacity. BMTC bus services can therefore be understood as quasi - public goods, which are publicly supplied owing to their social importance even when they are excludable and congestible. Moreover, the nature of the Congestible Public Goods influences the nature of the operations such that during peak times, there is overcrowding and resultant delays in the operations which reduce the quality of services delivered. Even though the public transport produces positive externalities like reduced pollution and traffic jams, they are restricted because of capacity limitations and inefficiencies in their operations.

The public transport supply entails a trade-off between equity and efficiency. Efficiency refers to the cost-effectiveness of using resources and the smooth running of services. Equity, on the other hand, is about fair access to transport services for all sections of the population as well as for all areas of the city. In the case of BMTC, some zones have more buses, depots, and better infrastructure than others. This suggests that although services may be efficiently run in certain areas, access does not always get achieved in the same level across all zones, showing the equity - efficiency trade-off. The concepts offer a framework that can be used to evaluate BMTC bus services as a quasi-public good and be able to determine the significant economic and policy limitations.

LITERATURE REVIEW

The idea that urban public transport is a market failure-prone industry is well-established in the literature of the economics field, which explains its provision as a governmental policy concern. The public-goods framework developed by Samuelson (1954) explains how services that generate widespread social benefits tend to be under-supplied by markets. This argument is extended to social infrastructure by Musgrave and Musgrave (1989) and Stiglitz (2000), who suggest that market prices often fail to reflect full social costs and benefits. This is particularly evident in urban transport, where congestion, pollution, and inequality impose costs beyond individual passengers.

Public transport is frequently conceptualised as a quasi-public good since, although access can be restricted through fares, the benefits of mass transit extend to the wider urban community. Cullis and Jones (1998) explain that partial excludability can lead to under-provision unless public subsidy or regulation exists. Glaister (1974) further argues that fare-based systems may restrict low-income populations from accessing the broader external benefits of public transport.

The concept of congestible public goods is also central to transport economics. Buchanan (1965) introduced the idea that congestion creates rivalry in otherwise non-rival services, reducing utility as usage increases. Small and Verhoff (2007) show that congestion in transport systems result in welfare losses to commuters which can be attributed to delays and congestion. They conclude their analysis stating that the mechanism of fare-reductions is not sufficient in reducing these negative effects and that capacity-building along with demand-control measures are necessary corrective policy responses.

Public transport planning debates are often shaped by the equity–efficiency trade-off. Litman (2015) argues that reforms that focus on efficiency, including the introduction of cost-recovery measures and route rationalisation, can result in the positive effect of financial results, and at the same time, compromise equity, especially in the case of shrinking services in low-income or low-demand areas.

In the Indian context, Pucher et al. (2005) discovered that buses are still the most convenient form of transport in the city despite the unabating under-investment and operational problems. In studies about the Bangalore Metropolitan Transport Corporation (BMTC), the main focus is on institutional failures and operational performance indicators. While Nagenborg and Phatak (2018) and Sharma and Sharma (2021) consider efficiency and reliability using the operational indicators, the BMTC Research Booklet (CiSTUP, 2019) uses the secondary sources in evaluating the fare policies and financial sustainability. These sources have significant information on the operational efficiency and institutional work, but have a few details on the commuter level experiences and friendliness in the various areas of the city. Thus, the current work is a complement to the current literature because it will integrate secondary data with primary survey data that will be gathered among BMTC commuters to understand the usage pattern, the level of congestion, the affordability of buses, and the levels of satisfaction with bus services in Bengaluru.

DATA SOURCE AND METHODOLOGY

This research employs secondary and primary research in order to examine the operations and availability of BMTC bus services in Bengaluru. Secondary data is used in this study that has been obtained from official BMTC Annual Reports and operational data for 2023–24, which is the latest available information at the time of the analysis. The data also give the zonal wise details of BMTC buses across Bengaluru and is a basis to analyse operational performance, capacity utilisation and infrastructure distribution. These variables are the number of routes and route kilometres, scheduled and operated kilometres, gross vehicle requirements, dead kilometres, fleet utilisation rates, vehicles on road, number of depots, and spare vehicle capacity. Derived indicators such as vehicles per depot, and the difference between scheduled and effective km are also developed to represent infrastructure pressure, as well as deviations in planned vs. actual service delivery among zones. To facilitate the zone-wise operational analysis, the secondary spatial data of Open City sources was used to get spatial maps of the study area and BMTC depot locations.

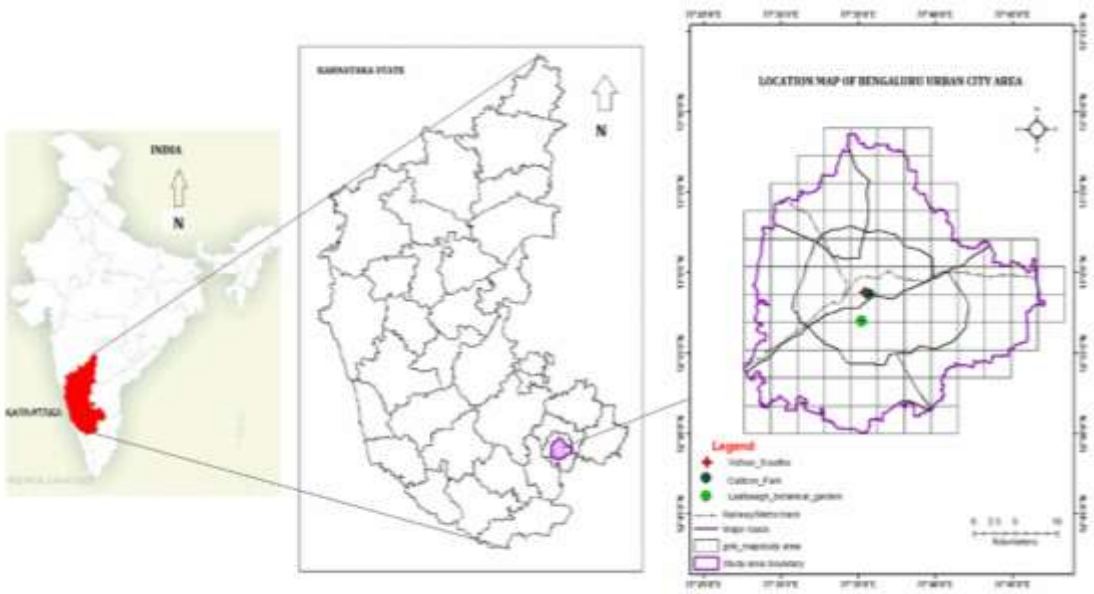
The methodology is descriptive and comparative, seeking to identify more explanatory patterns, clusters and differences in the delivery of services rather than establishing causal relationships. Operational data are organised through tabular analysis on a zone-wise basis, and visualisation may be enhanced using scatter plots and bar charts of the relationships between efficiency, capacity utilisation and infrastructure allocation. These approaches enable the analysis to interpret operations in relation to ideas from public economics, however retaining analytical transparency. No advanced statistical techniques are applied, and findings derived from secondary data are treated as preliminary.

Primary data were gathered via a structured commuter survey in Google form in addition to secondary data. The participants of the survey were 30 respondents who use the services of BMTC on a regular basis, with the majority of them being students and professionals of the age group 18-30 years. The role of convenience sampling was to sample out the responses of commuters in various areas of Bengaluru. The questionnaire was based on the travelling behaviour, how often people use the bus, wait time, the level of congestion, the price of the fares, the availability of routes, and their satisfaction with the BMTC services. The main survey assists in the reflection of commuter level experiences and perceptions that are not demonstrated by aggregate operation statistics. Results of the primary survey are discussed with the help of the descriptive statistics and graphical representation and are combined with

the operational analysis based on the zone to obtain more detailed insights into the accessibility, congestion, and equity in the Bengaluru system of public transport.

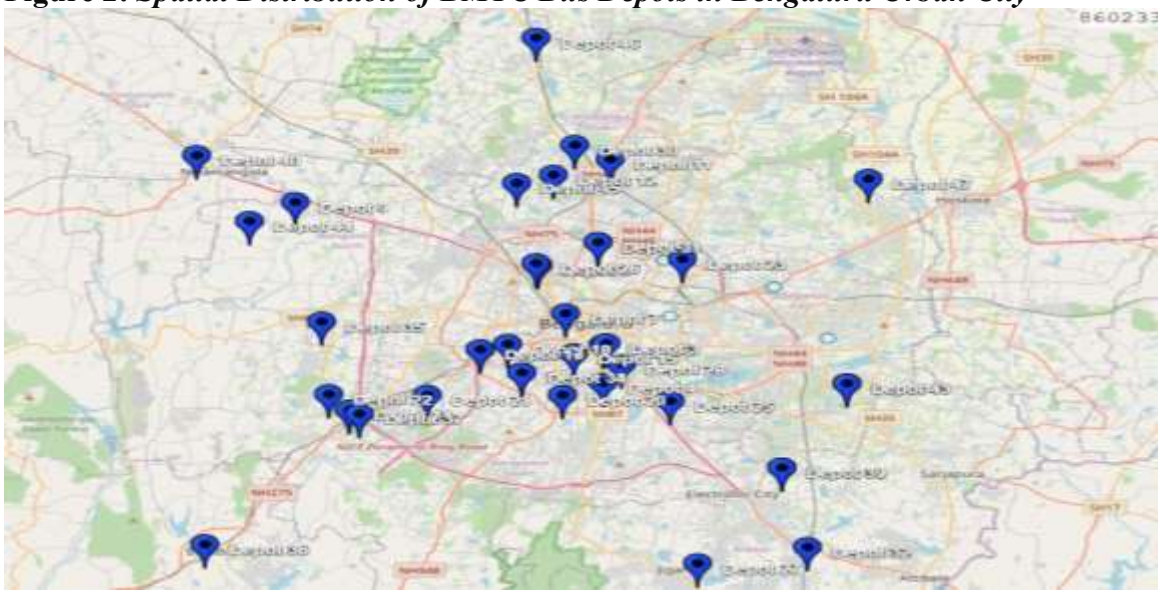
STUDY AREA AND DEMOGRAPHIC PROFILE

Figure 1: ***Location of Bengaluru Urban City within Karnataka and India***



Bengaluru, one of the most developed cities in India which is the capital city as well as a major business centre of Karnataka state,nestled on to the Deccan Plateau with an existing altitude of approximately 920 meters above mean sea level. The city is located on a total land area of about 741 square kilometres, with the Bengaluru Metropolitan Area occupying an area of about 1,284 square kilometres reflecting its expansive urban footprint. Bengaluru is a big Indian city which has undergone a high rate of urbanization and economic growth especially due to the growth of the IT and service industry. Bengaluru is one of the most populous cities in India with the current population being 8.4 million as of the 2011 Census and the rate of urbanization remains to be very high.

Figure 2: ***Spatial Distribution of BMTC Bus Depots in Bengaluru Urban City***



The spatial distribution of BMTC bus depots in the Bengaluru Urban City boundary against specific major bus corridors of BMTC is shown in Figure 2. The map indicates that the depot locations are distributed on central, northern, southern, eastern, and peripheral locations of the city, in general along main north-south, east-west, and outer ring road corridors. Depot concentrations are visible around key transport nodes such as Majestic, Yelahanka, KR Puram, and Electronic City,, indicating the availability of BMTC operations along major movement axes. This spatial representation gives critical geographic perspective to the zone-based operational and infrastructure information that will be analysed in further sections.

RESULTS

BMTC Data Description

This section describes the zone-wise operational and infrastructural characteristics of BMTC bus services in Bengaluru.

TABLE 1: Overall Scale of BMTC Bus Operations in Bengaluru (2023–24)	
NO. of Routes	1756
Route Kilometers	46327.1
Daily Scheduled Kms,	1143240

Table 1 presents some aggregate indicators of the overall size of BMTC operations, including the number of routes, total route kilometres and daily scheduled kilometres operated. These factors give a sense of the scale of BMTC in urban transport and the overall systematic conditions under which zone-wise operations function.

TABLE 2: Operational Efficiency of BMTC Bus Services by Zone (2023–24)			
Zone	**Scheduled Kms (lakhs)**	**Effective Kms (lakhs)**	**Dead Kms (% of effective)**
East	544.02	536.91	2.6
West	652.83	648.15	4.3
North	630.76	632.18	1.6
South	639.2	630.85	2.4
NorthEast	606.78	604.61	1.9
NorthWest	553.23	557.53	4.4
Central	378.66	382.19	1.3

The indicators of operational efficiency, presented in Table 2, comprise the scheduled kilometres, the effective kilometres and the dead kilometres which have been expressed as a percentage of effective kilometres. Scheduled kilometres refer to the intended level of service, while effective kilometres refer to the actual service delivery. Dead kilometres capture non-revenue movements of buses. Together, these variables describe the operational structure of BMTC services across zones.

TABLE 3: Spatial Distribution of BMTC Infrastructure by Zone (2023–24)			
Zone	**Depots**	**Vehicles**	**% Spare Vehicles**
East	8	830	7
West	8	1029	7.6
North	7	900	5.5
South	7	1006	7.9
NorthEast	8	917	10.2
NorthWest	9	826	7
Central	5	594	22.7

Table 3 reveals the variable spatial distribution of the infrastructure of the BMTC. It reveals the number of depots, number of vehicles and percentage of spare vehicles across the zones. This information depicts the physical distribution of transport resources in the city. It provides an understanding of why certain areas in Bengaluru have more service than others.

TABLE 4: Capacity Utilisation of BMTC Bus Fleet by Zone (2023–24)				
Zone	**Avg. Vehicles On Road**	**% Off-road Vehicles**	**Avg. Vehicle Utilisation (kms)**	**% Fleet Utilisation**
East	739	6.1	198.5	86.9
West	904.6	6.5	195.8	85.9
North	819.9	6.2	210.7	87.7
South	902.4	9.5	191	85.9
NorthEast	794.8	6.2	207.8	88.7
NorthWest	743.8	7.9	204.8	85.1
Central	444.2	21.1	235.1	61.8

To put it differently, the section on fleet capacity and utilisation indicators is presented in Table 4. It is measured on the average number of vehicles on the road, the percentage of off-road vehicles, average vehicle utilisation in kms, and rates of fleet utilisation. These variables document how intensively the available fleet is deployed across different zones.

Primary Survey Findings

Table 5: Demographic Characteristics of Survey Respondents (n = 30)					
Age Group	**Respondents**	**Zone**	**Respondents**	**Occupation**	**Respondents**
18–21	13	North	4	Students	13
22–25	12	South	9	Working Professionals	17
26–30	5	East	7	Self-employed	0
31–35	0	West	6	Other	0
		Central	4		

The demographic features of the respondents indicated that most of them belong to the younger age groups, like 18–25 years. It demonstrates that young professionals and students have dominated the user base of BMTC. Geographical distribution indicates that the maximum number of respondents are in the zones of South and East of Bengaluru, which would mean that they are more reliant on the services of BMTC in these regions. The majority of the respondents are working people, and the second-largest number of respondents are students. This means that BMTC buses are extremely essential for travelling to work and education centres on a daily basis.

Table 6: Commuting Behaviour of Survey Respondents			
Usage Frequency	**Respondents**	**Purpose of Travel**	**Respondents**
Daily	18	Work commute	17
3–4 times/week	12	College/Education	13
1–2 times/week	0	Shopping/Errands	0
Occasionally	0	Leisure	0

Survey results indicate that 18 respondents (60%) use BMTC buses daily while 12 respondents (40%) use it three to four times a week. Thus, there is a huge reliance on BMTC services. Regarding the travel purpose, out of the total 30 respondents, 17 (56.7%) are using BMTC buses mainly for work commute and 13 (43.3%) use them for college or educational travel. According to the survey, no respondent uses the bus primarily for shopping activities. BMTC services help residents meet their daily mobility needs whether it is for work or education.

Table 7: Accessibility of BMTC Bus Services			
Indicator	**Category**	**Respondents**	**Percentage (%)**
Waiting Time	5–10 minutes	17	56.7
	10–20 minutes	13	43.3
Route Availability	Good	17	56.7
	Moderate	13	43.3

The survey result indicates that the 17 respondents (56.7%) wait for a bus for about 5–10 minutes and the other 13 respondents (43.3%) wait 10–20 minutes. . These figures reflect the frequency of BMTC services, which is in a mediocre range, but still leaves commuters with some waiting time. In terms of route availability, 56.7% of respondents rated BMTC availability good in their area whereas 43.3% rated it as moderate The relatively positive impression of route coverage could be due to the fact that respondents were from well-connected areas like South, East and West Bengaluru where bus transit is more commonly utilised.

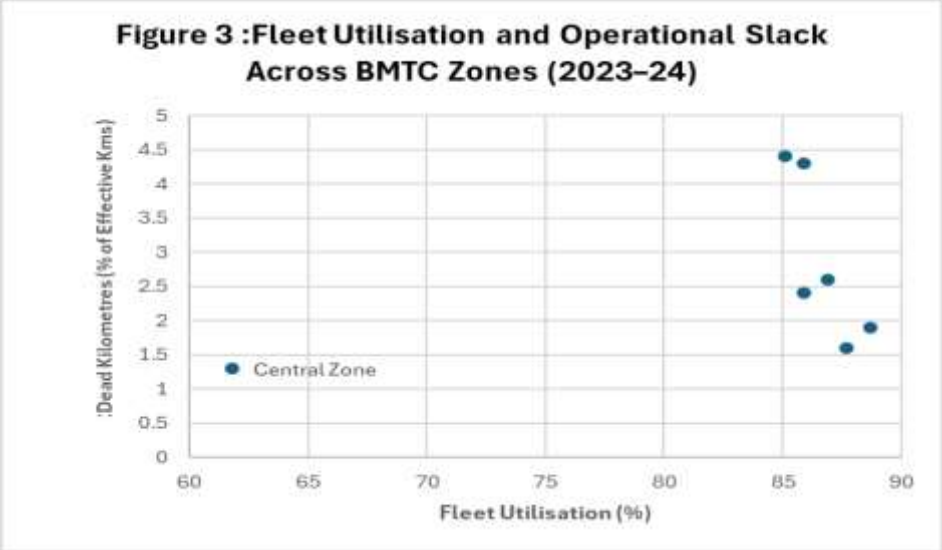
Table 8: Service Experience of BMTC Bus Users			
Indicator	**Category**	**Respondents**	**Percentage (%)**
Congestion	Frequently overcrowded	18	60
	Very frequently overcrowded	12	40
Fare Affordability	Affordable	17	56.7
	Very affordable	13	43.3

According to the findings of the survey, overcrowding is a major challenge to commuters. The majority (60 percent) of the respondents have congestion a lot of the time, and very often (40 percent). This implies that the high demand for the services of BMTC especially for work and educational travel often exceeds bus capacity during peak hours. Bus fares, on the other hand, are viewed by most as affordable with 56.7% response rate cited as affordable while 43.3% as very affordable. This perception may also be influenced by the availability of concessional passes and relatively lower fares compared to other modes of transport such as ride-hailing services. The other survey indicators such as reliability and overall satisfaction which are not presented in detailed tables also had a more or less positive response. This reiterates that BMTC is an accessible and mostly relied upon public transport in Bengaluru

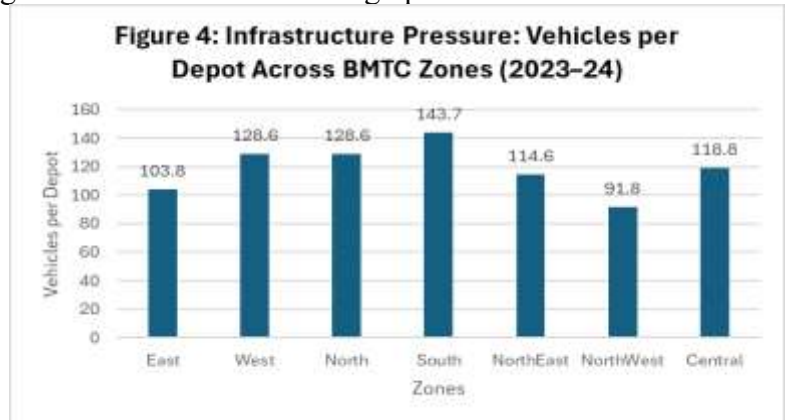
DISCUSSION

Analysis of BMTC Operational Analysis (Secondary Data)

The analysis of BMTC bus services in Bengaluru is grounded on concepts used in public economics. It assesses whether the system is effective in supplying equitable urban mobility in a growing metropolis. BMTC operates at a large scale with a total of 1,756 routes, 46,327 route kilometres and over 11,40,000 scheduled kilometres each day as shown in Table 1. This scale put forward that public provision is important in case of market failure in urban transport as the existence of private markets will not lead to affordable and widespread mobility. The effectiveness of such a public provision, however, is dependent on the distribution of operational capacity, infrastructure, and service delivery across various zones of the city

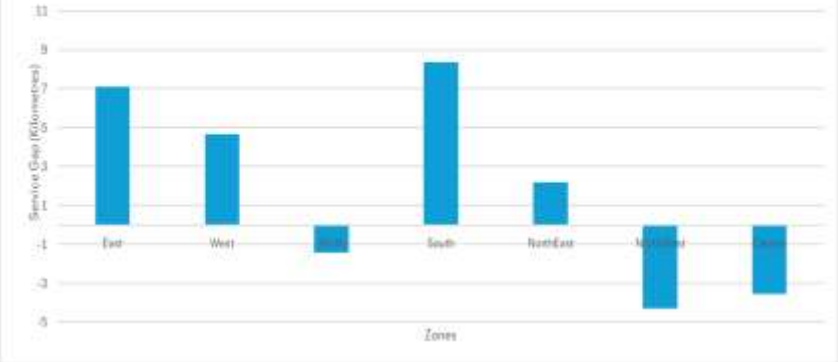


Operational indicators on zone basis (Table 2) indicate that scheduled and effective kilometres tend to be quite similar across all zones, although differences remain in operational slack. Dead kilometres as a proportion of effective kilometres varies from 1.3% in the Central zone to 4.4% in the North-West zone, reflecting variances in non-revenue movements and route efficiency. According to Graph 1, which is illustrative of these patterns, a plot of fleet utilisation (%) and dead kilometres (%) is provided. The graph exhibits a high clustering of zones operating at high fleet utilisation range between 85 and 89. This suggests that BMTC services of a large part of Bengaluru operate at near capacity. In the Central zone, however, fleet utilisation is 61.8%, significantly lower than the mean, even with a low number of dead kilometres. The gap indicates that capacity does not meet demand in all zones and BMTC services are congestible. Bus services although public are rivalrous due to



Distribution of infrastructure also modulates these responses. As can be seen from Table 3, the number of depots and vehicles differ substantially among the zones to varying extent: The South zone runs 1,006 buses over 7 depots while the Central zone operates 594 vehicles through just 5 depots and the North-West zone manages 826 vehicles across 9 depots. To better take account of the infrastructure pressure, Graph 2 depicts up to now the vehicles-per-depot ratio. The finding is that the South zone is the most pressurized infrastructure with 143.7 vehicles per depot and the West and North zones are equally pressure (128.6 vehicles per depot) while the North-West zone has a low-directed pressure of 91.8 vehicles per depot compared to others. The Central zone ratio is also quite balanced at 118.8 vehicles per depot, even though the zenith contains fewer depots. These differences bring out the equity-efficiency trade-off that exists in the providing of public transport. Although an increase in infrastructure utilisation might reflect the efficient use of the scarce collective resources, it can also help to concentrate the operational load in some areas, which may impact the overall service reliability and availability in the city.

FIGURE 5: Gap Between Scheduled and Effective Kilometres Across BMTC Zones (2023–24)



Deviations between planned and actual service delivery give additional information on operation limitations. Table 2 and Graph 3 show that, there is a significant variation of the service gap between scheduled and effective kilometres in the different zones. The largest positive gap of 8.35 lakh kilometres is achieved in the South zone, then the East zone with 7.11 lakh kilometres, indicating shortfalls in delivered services relative to plans. However, zones, including North (-1.42 lakh km), North-West (-4.30 lakh km), and Central (-3.53 lakh km have negative service gaps, i.e. where effective kilometres are greater than scheduled kilometres. These ambiguous results indicate the lack of consistency in planning and implementation in the system of BMTC of public provision execution, highlighting institutional and operational limitations rather than uniform service performance.

In general, the results indicate that the services of the BMTC bus are a sort of quasi-public good which are characterised by a large demand, congestion challenges, and uneven distribution of infrastructure. Although the provision of services by the government allows the delivery of services to many people, accessibility and performance of operation in various zones is different because of differences in capacity utilisation, infrastructure pressure, as well as service realisation. These trends reveal that, despite BMTC being essential in solving the problem of market failure of the urban transport system, the ability to provide equitable mobility is limited by the issues of congestion and operationalization.

Analysis of Primary Survey Findings

The analysis of the primary survey results provides light on Bengaluru commuters' opinions and experiences with BMTC bus services. The survey data is an indication of how these services are being utilized by the regular users whereas the secondary analysis focuses

on the size of the system and its functionality. The analysis is helpful in determining how BMTC contributes to an ordinary city mobility through examining the aspects of accessibility, congestions, affordability, dependability, and alternative transport modes.

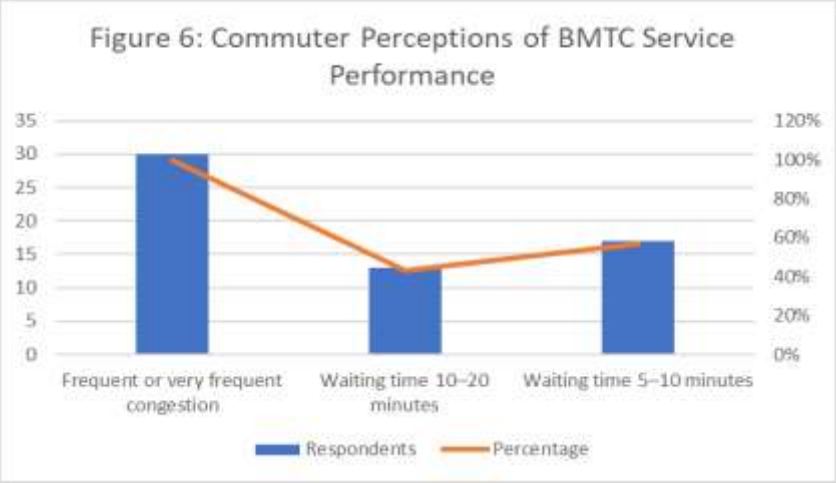
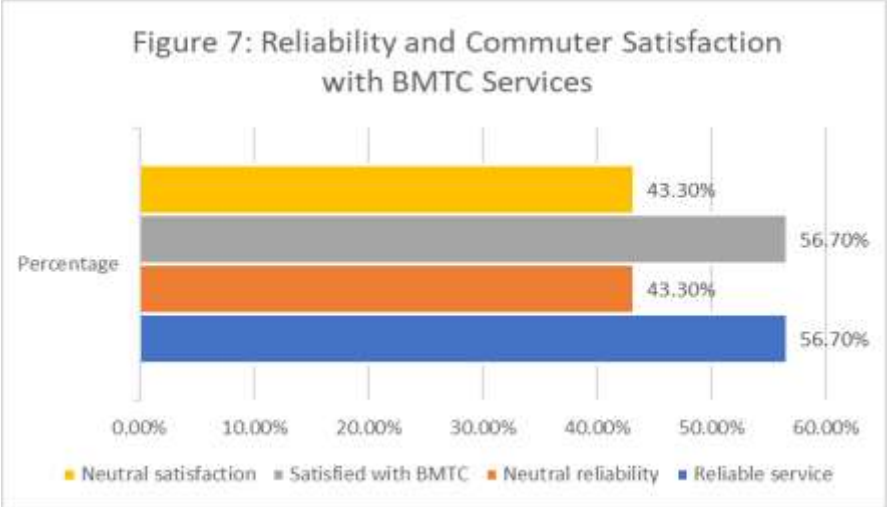
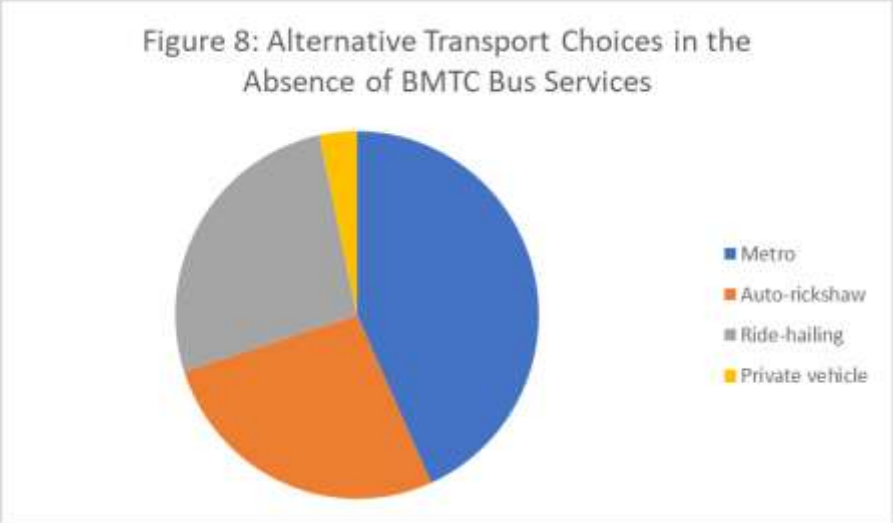


Figure 6 highlights commuter perceptions of congestion and waiting time in BMTC bus services. Accordingly, the reported congestion levels were quite high, indicating that demand frequently exceeds capacities during peak periods as a large number of commuters rely on BMTC for work and education travel. The wait time of 5-20 minutes indicates the strain on the services in the high-demand corridors and congested areas of the city. These perceptions indicate that while BMTC remains an essential and widely used transport mode however there is inconsistency in the service capacity along with operational efficiency pressure due to higher demand.



The general commuter perception of BMTC service satisfaction and dependability is shown in Figure 7. Irrespective of the pressure on operations, the system still provides the commuters with their fundamental mobility needs, which is manifested by most respondents claiming that they find the services of BMTC dependable and are satisfied with the service. These perceptions may be affected, the survey results showed, by the relatively low fares and the high frequency of using buses as the means of commuting to work or to education. However, the existence of neutral answers implies that commuter perceptions of dependability may be impacted by elements like congestion and waiting time, which were highlighted in earlier findings. These findings are in line with the secondary operational analysis which showed that although BMTC offers extensive zone coverage and high utilisation, the demand and pressure of the infrastructure can compromise service consistency.



In figure 8 it is shown that there are alternative means of transport that commuters would use in case the services of BMTC buses were not available. Although a lower ratio said that they used ride-hailing services and a very small percentage depended upon personal cars, a significant number of respondents indicated that they would change to other shared or communal transportation services such as the metro and the autos. This pattern indicates that commuters' daily mobility is mostly dependent on inexpensive, group transportation. The results also support the idea that BMTC fares are reasonable, which promotes continued use of bus services. From a public economics perspective, this reinforces the role of BMTC as a quasi-public good, whereby government assistance guarantees affordable and easily accessible transportation for a significant portion of urban commuters.

KEY ISSUES AND CHALLENGES

Despite BMTC's vast operations and vital role in Bengaluru's urban transport system, several operational and structural issues restrict its ability to provide fair public transport access. Capacity congestion is one of the most urgent problems. The analysis reveals that the rate of fleet utilisation remains high in most of the zones since it means that buses are running at their carrying capacity. As a matter of fact, this, in most cases, translates to overcrowded buses, particularly during the rush hours. Besides reducing the comfort of passengers, overcrowding increases the boarding and travelling time, thereby reducing the quality of services. Such situations have been reported in the media more than once, pointing out that commuters, often, have to suffer discomfort and delays due to congestion in BMTC buses (Times of India, 2025). This can also be noted in the primary survey results wherein most respondents indicated that they had experienced frequent overcrowding in the BMTC buses.
The second major problem is the unequal spatial distribution of infrastructure and service delivery, especially of the outskirts and recently developed locations of Bengaluru. A number of suburban neighbourhoods and newly developed employment hubs are still not well connected, despite core zones receiving comparatively more frequent services. The low route coverage and low frequency of buses in these regions lead to long waiting time and reduced accessibility for commuters (Murthy & Ramanayya, 2007). The survey results on waiting time and route availability also emphasize the perception of the commuters on the restraint of accessibility in various regions of the metropolis. This reflects a built-in trade-off between equity and efficiency where high-demand corridors are oriented towards operational efficiency at the cost of equally fair service delivery throughout the city.

The efficacy of BMTC operations is further limited by inconsistent service delivery. Planning and execution gaps are indicated by discrepancies between scheduled and actual services. BMTC has been reported to fail to execute scheduled services during peak hours on most occasions, which might pose a challenge to the commuters in terms of uncertainty and lack of reliability (Times of India, 2025). These gaps point to coordination and institutional failures within the system of providing publicly, including workforce shortage, overcrowding and operational constraints.

Another constant issue is financial sustainability. Fuel, maintenance, and labour costs are all on the rise for BMTC, and fare changes are still politically volatile. According to media reports, the lack of willingness to raise fares by BMTC has hindered its ability to earn more income to expand its fleet and improve the infrastructure (Ministry of Housing and Urban Affairs [MoHUA], 2019).

The results of the primary survey also show how commuters perceive these problems in daily travel, in addition to the operational difficulties brought to light by secondary data. The answers associated with congestion, wait time, unavailability of certain routes and unreliability of services point to the fact that BMTC buses serve a significant number of people daily and as such, they are vulnerable to capacity pressures and moderate accessibility to services. The cheap bus fare and the unchanged habit of using BMTC to take to work and study trips highlight the fact that the services that public transport offers to people are very critical in moving around urban areas. These findings suggest that BMTC services are a quasi-public good and this helps meet mobility needs if the government provides. Nevertheless, the performance of the service in the city is still affected by the operational constraints and the increased demand.

POLICY IMPLICATIONS

Considering the discussion of the BMTC bus services and the major issues identified, the study provides the list of the policy recommendations that could help to increase the efficiency of the services, accessibility, and equity in the public transport sector in Bengaluru. These suggestions aim to enhance public provision, considering the present operational and financial limitations.

The priority needs to be in high demand corridors for capacity augmentation for decongestion and overcrowding. The main survey findings, which show that most bus commuters believe BMTC buses are often overcrowded, supports this recommendation. The zones with high fleet utilisation necessitate specific boosts of service frequency, especially at the peak hours, instead of the general growth of the network. The congestion can be alleviated by redistributing the unused capacity of low-pressure areas and adding more services during peak hours, as well as by increasing the comfort of passengers without increasing the expenses considerably.

Secondly, spatial imbalances in infrastructure provision need to be addressed. The unequal distribution of depots and vehicles in the zones indicates that they should invest in new depots or satellite maintenance stations in high pressure areas. At locations having a high ratio of vehicles per depot the enhancement of infrastructure capacity will improve turnaround time, fleet availability and overall service reliability which will ease the excess operational pressure. Third, To minimize the gap between scheduled kilometres and actual kilometres, there must be enhancements in service planning and monitoring mechanism. Increased route level monitoring, real time performance tracking and improved coordination with the traffic

management authorities will tend to make the planned services more consistent when they are delivered.

Fourth, financial sustainability should be supported by varied funding strategies rather than depending solely on fare increases. While affordability maintenance is of primary importance, a more moderate stance on fare rationalisation along with specific concessions to the vulnerable groups can help to boost revenue stability. Additional funding sources, which include advertising, non- fare sources and alignment with urban transport programmes at state and central levels may also reduce the reliance on the use of fares as a source of funding.

Lastly, greater use of primary user-level data should be integrated into transport planning and evaluation systems. Operational data can be supplemented by regular commuter surveys which include variables (waiting time, overcrowding, affordability, etc.) and service satisfaction, which can provide more accurate information on access constraints. The use of this kind of evidence would make the service planning process more responsive and equitable in the different parts of the city.

These suggestions imply that to achieve effective and fair urban mobility in Bengaluru, there will be a need to combine both operational factors, infrastructural investments, institutional coordination and data-driven planning to improve the performance of BMTC services.

CONCLUSION

This study explored the bus services provided by Bengaluru Metropolitan Transport Corporation (BMTC) and evaluated the bus services in achieving affordable urban mobility within a public economics model. The discussion shows that BMTC plays a significant role in urban transport market failure reduction through the large-scale mobility that could not be offered by the private provider with similar efficiency or equity. Results show that BMTC is a quasi-public, congestible item, including a high level of demand, capacity limitation, and uneven distribution of infrastructure in the different areas of the city.

The analysis demonstrates that congestion pressures are evident through high fleet utilisation in many zones. Simultaneously, the differences in depot and vehicle distribution introduce spatial imbalance that deteriorates access and performance. The differences between the intended and actual service delivery also highlight institutional and operational issues that limit the performance of the public provision. All these indicate that although it has a comprehensive coverage in the city, BMTC has the capacity to provide fair and dependable mobility but this is limited by zones because of capacity, infrastructure, and performance constraints.

In addition to secondary operational data, primary survey data was also included in the study, in which there was a questionnaire of 30 BMTC commuters on Google Forms. The survey findings reveal major user-level experiences which include constant overcrowding, average waiting time, heavy use of BMTC to commute to work and study, and an overall feeling that the bus fares are affordable. These results are complementary to the operational analysis which gives information on commuter behaviour, service reliability and perceived accessibility in various areas of Bengaluru.

The study shows that the policy interventions, which enhance the capacity of the service delivery, minimize congestion, and allocate the infrastructure distribution more equally throughout the city zones, are necessary. By enhancing efficiency, equity, and sustainability in the system of urban mobility in Bengaluru, improving BMTC services in terms of the fleet allocation, route planning, and further investment in the infrastructure of the urban transport system will assist in this issue.

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Appendix A: Survey Questionnaire: BMTC Bus Services in Bengaluru

1. Age Group
☐ 18–21
☐ 22–25
☐ 26–30
☐ 31–35

2. Occupation
☐ Student
☐ Working Professional
☐ Self-employed
☐ Other

3. Zone of Residence in Bengaluru
☐ North ☐ South
☐ East ☐ West
☐ Central

4. How frequently do you use BMTC bus services?
☐ Daily
☐ 3–4 times per week
☐ 1–2 times per week
☐ Occasionally
☐ Rarely

5. What is your primary purpose of travel using BMTC buses?
☐ Work commute
☐ College / Education
☐ Shopping / Errands
☐ Leisure

6. If BMTC buses were not available, which mode of transport would you most likely use?
☐ Metro
☐ Auto-rickshaw
☐ Ride-hailing services
☐ Personal car
☐ Other

7. On average, how long do you wait for a BMTC bus?
☐ Less than 5 minutes
☐ 5–10 minutes
☐ 10–20 minutes
☐ More than 20 minutes

8. How would you rate the availability of BMTC bus routes in your area?
☐ Very good
☐ Good
☐ Moderate
☐ Poor

9. How frequently do you experience overcrowding in BMTC buses?
☐ Rarely
☐ Frequently
☐ Very frequently

10. How affordable do you find BMTC bus fares?
☐ Very affordable
☐ Affordable
☐ Expensive

11. How reliable do you consider BMTC bus services?
☐ Reliable
☐ Neutral
☐ Unreliable

12. Overall, how satisfied are you with BMTC bus services?
☐ Satisfied
☐ Neutral
☐ Dissatisfied

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