



# A STUDY ON SOCIAL AND ECONOMIC BENEFITS OF BENGALURU METRO RAIL TRANSPORTATION

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## ABSTRACT

The aim of this study is to analyse the Social and Economic benefits of the Bengaluru metro rail transportation in Karnataka. The Bengaluru Metro Rail Transportation system has emerged as a transformative and integral component of Karnataka's Social and Economic landscape. The metro has significantly improved urban transportation, reducing travel time and stress for commuters. By mitigating traffic congestion, it has indirectly enhanced productivity and air quality. Economically, the metro has facilitated connectivity, leading to the emergence of new business hubs and residential areas along its corridors. This has attracted investments, generated job opportunities, and stimulated local economies. The metro's influence extends to urban development, with transit-oriented areas around stations promoting organized growth and efficient land use. Property values around metro stations have appreciated, generating economic gains and potentially bolstering property tax revenues. The system's inclusive design has also improved accessibility for people with disabilities and lower-income individuals, fostering social inclusivity. However, challenges such as construction disruptions and fare structures must be considered. In the long term, the metro system's potential for reducing road maintenance costs, promoting a cultural shift towards sustainable transportation, boosting tourism, and serving as a model for other cities becomes evident.

**Keywords:** Social, Economic, Benefits, Bengaluru Metro Rail Transportation.

## INTRODUCTION

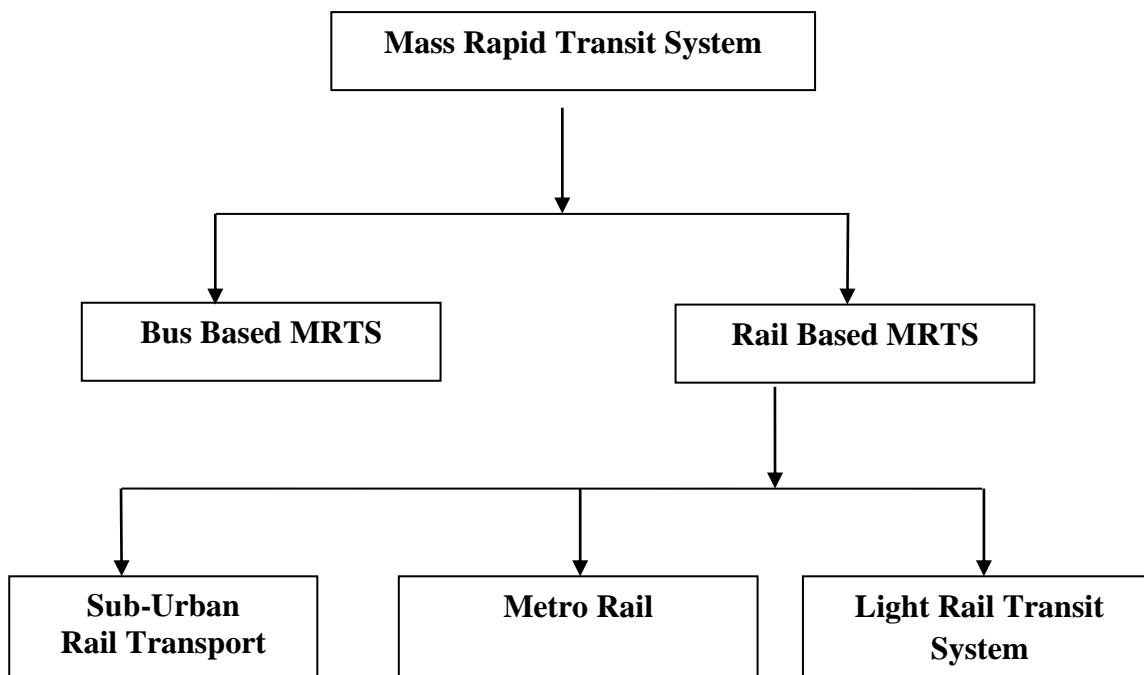
The Bengaluru Metro Rail Transportation system has emerged as a transformative force in the state of Karnataka, particularly in the bustling city of Bengaluru. Launched as a response to the escalating urban transportation challenges, the metro has rapidly become an integral part of the region's Social and Economic fabric. This modern transit network has redefined the way people traverse the city, offering an efficient, reliable, and sustainable mode of transportation. The introduction of the Bengaluru Metro Rail Transportation has addressed the ever-increasing congestion and travel woes faced by the city's residents. As one of India's technology hubs and a thriving economic center, Bengaluru's growth had strained its existing transportation infrastructure. The metro has alleviated this pressure, ushering in a new era of urban mobility that not only saves time but also enhances the overall quality of life. With its network expanding across the city and its surrounding areas, the Bengaluru Metro Rail has established itself as a symbol of progress and modernization. The project's success lies not only in its ability to provide efficient transportation but also in its contribution to reducing pollution, stimulating economic growth, and promoting sustainable urban development. As the metro system continues to evolve and cater to the dynamic needs of the metropolis, its impact on Karnataka's Social and Economic landscape remains substantial.

## TRANSPORT SYSTEM IN INDIA

Transport situation in most Indian cities of all sizes is rapidly getting worse because of the increasing travel demand and inadequate transport system. Indian cities of all sizes are facing the problem of urban transport. Large cities are facing an exponential growth of two wheelers and cars for personal use, while in medium and small cities public transport are struggling to meet the demand of resident. Many of the people in growing cities are opting for public transport. To cater this demand of growing population in growing cities Mass Rapid Transport System (MRTS) proves to be very useful.

Developing cities, growing population and increasing traffic has invariably called for a shift from private modes of conveyance to public transport. A glance at the world's developing nations indicates that well planned Mass rapid Transit System (MRTS) exist successfully. In 2009, Government of India decided to invest 2000 billion on metro rail projects in the following ten years. It is planned that all Indian cities having a population more than 2 million will have metro rail system. Currently, rapid transit system operates in more than 15 cities and more are under construction or in planning in several cities of India. The following figure shows the different MRTS options for cities in India.

Figure 1: Types of Mass Rapid Transport System in India



(Source: Author's own)

## REVIEW OF LITERATURE

A review of literature discusses and analyses published information in a particular subject area. Sometimes the information covers a certain time period. A literature review is more than a summary of sources; it has an organizational pattern that combines both summary and synthesis. A summary is a recap of the important information of the source, but a synthesis is a re-organization, or a reshuffling of that information. It might trace the intellectual progression of the field, including major debates. And depending on the situation, the literature review may evaluate the sources and advise the researcher on the most pertinent or relevant. The following are the research papers which have been reviewed for further study on Social and Economic Benefit Analysis of Bengaluru Metro Rail Transportation in Karnataka.

**Khandaker Rehman et.al (2012)** examines and prepared a report on Cost-Benefit analysis of Chennai Metro Railway limited. The study covered the aspects such as roads and railway network, Master plan of the project, Justification of the CMR Project. The study also focused on financial analysis using Financial Internal rate of return, Net present value and benefit- cost Ratio. Economic analysis is also considered by monetizing the economic Benefits and costs, savings in fuel consumption, reduction in air pollution, savings in travel time, and savings in vehicle operation cost and so on. Authors revealed that the financial evaluation yields an internal rate of return of 9.885 percent. The Chennai Metro Rail project is considered worthwhile economically but not financially due to negative NPV.

**Kanalli.S.A.et.al (2013)** conducts a survey on Necessity of Integrated Transport System to Namma Metro at Byapanahalli. The survey observed the opinion of target beneficiaries that there is a necessity of feeder

buses with regard to commuter's willingness, travel time, frequency, and bus occupancy. The study concluded with majority of the commuters is travelling by metro are willing to use feeder service from their pick up point.

**Jesus Gonzales Feliu (2014)** reviewed the Costs and Benefits of railway urban logistics: a prospective social cost benefit analysis. This article presents briefly the interests and possibilities of using Social Cost Benefit Analysis in assessing the suitability of urban rail logistics system by presenting the main element of the Social Cost Benefit Analysis methodology and an example of Paris Freight Tram. The author opines that, if the non-monetary costs and benefits are included in the assessment, the system can be justified and stakeholders can be motivated to use it on the basis of quantifiable potential benefits.

**Duelkaret.al (2015)** reviewed that Pune Metro rail project was an ad hoc decision with weak governance and inadequate public engagement. The study identifies shortcomings with methodological errors and over estimation of the benefits from the metro rail which are then used to prove that it has a positive social impact. The study is concluded that there is an urgent need to revisit all proposed metro rail projects and critical review is highly needed.

**Govind Nath Srivastava (2016)** carried out a Ph.D. research study by taking 14 variables and 1015 respondents at various busy metro stations in Delhi. The researcher widely focused on the study of Customer satisfaction using Delhi Metro. Regression equation and Chi square tests are used for testing of hypothesis. The author concluded that employees driven services satisfaction is relatively high as compared to the variables causing passengers satisfaction. The respondents of busiest metro stations gave low rating to the service of Delhi Metro as compared to the stations where customer's traffic is low. The results of Chi-Square test confirmed that there is significant relationship between demographic variables and variables causing passenger satisfaction.

**Aniket Raut et.al (2017)** analyses "the execution of Metro Rail projects- A Case study of Nagpur Metro Rail". The study made an attempt to understand the setbacks experienced by various metro projects and to learn the steps and cautious exercised by NMRCL. Secondary data are used based on informal interaction with the industry experts, project execution groups and various stakeholders was conducted to understand the issues related to metro projects in Maharashtra. The author concluded that the Nagpur Metro Rail Corporation reflects on the progress of the project. India has a huge need of Mass Rapid Transit system as a growing economy. The development of such metro projects would boost the infrastructure and help the economy to develop.

**Elangovan et.al (2018)** analyzed the effect of Chennai metro rail by limited-routing system and its future growth. The study covers the Chennai Metro Rail Corporation limited causes of concerns, parameters to be considered while planning the metro rail line, integration of transport network, urban styles and coming up with issues. The study suggests that the metro cities are always in a constant mode of transition and the city is looking forward to revitalize its stagnant and rethink its future of transport. As the country is rapidly urbanizing mass public transport will be the mainstay of cities having five million plus population.

## OBJECTIVE OF THE STUDY

1. To Study Bengaluru Metro Rail Transportation
2. To Evaluate Social and Economic Benefits of Bengaluru Metro Rail Transportation

## RESEARCH METHODOLOGY

This present study focuses on Social and Economic benefits of the Bengaluru metro rail transportation. The research methodology is used in the form of descriptive type and touch of theoretical, conceptual explanation has been done. The researcher has collected the required data and information from various official website of government department. This paper is completely based on Secondary source and to extract needful data survey method, explorative methods of data collection technique were used. In addition to books, reports and published article has been reviewed thoroughly to meet the set objectives of the paper.

## ORIGIN OF METRO RAIL TRANSPORT IN INDIA

Rapid transits in India consist of Metro, Monorails and light rail system. The first rapid transits system in India was Kolkata Metro, which started operations on 24<sup>th</sup> October 1984. 'Elattuvalapil Sreedharan', popularly known as "Metro Man" was behind this great effort. The metro rail system in India is popularized and developed due to his amazing efforts and hard work. Delhi Metro was India's first modern metro which began its operation in 2002. Rapid Metro Rail Gurgaon, which started operations in November 2013, is India's first privately owned & operated metro.

Metro rail lines in India are composed of both standard gauges and broad gauges. Project likes in Delhi Metro used broad gauge for their earliest lines but most of the new project in India are on Standard gauges as rolling stock is imported from Europe is on Standard Gauges. One exception is Ahmadabad Metro, which has planned to use broad gauges, as there is more space available inside the coaches.

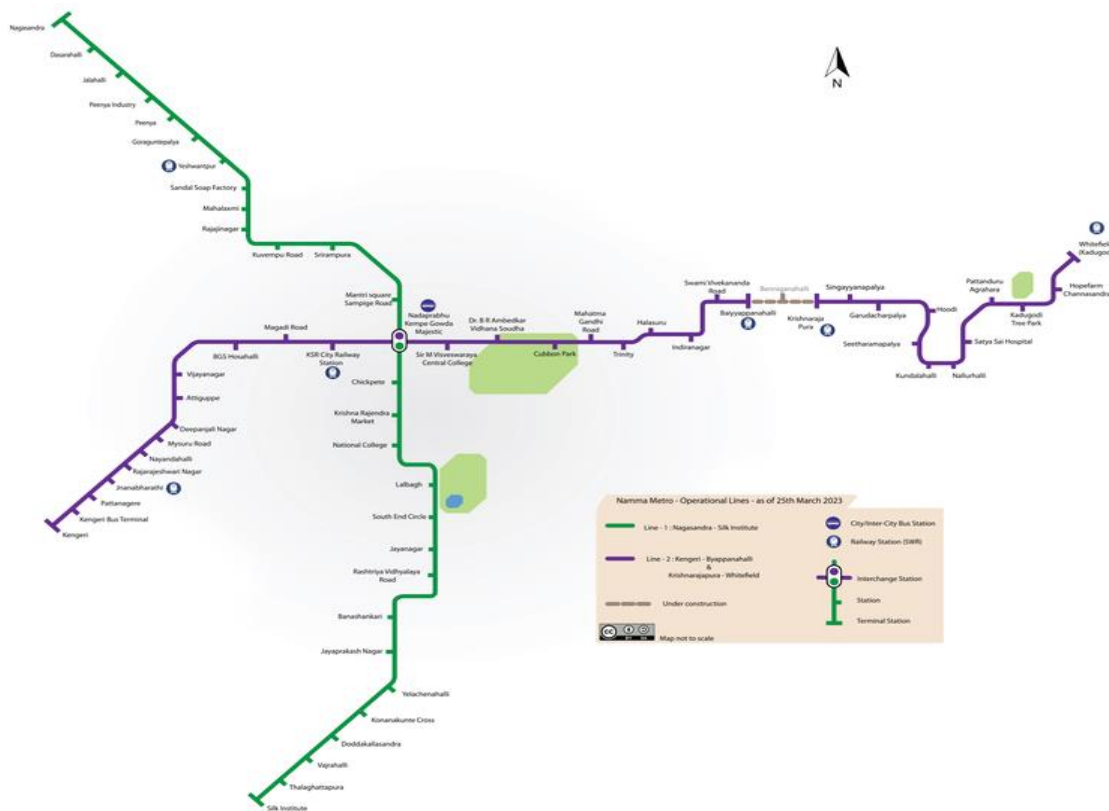
India like many other developing countries however has lagged behind, though its first metro, the Kolkata metro started working almost 37 years ago. The reasons could be attributed to the lack of funds as it is known that such project require huge capital investment, a long gestation period and complex technology. While the researches show that the ideal modal share of public transport should be around 70%, however it is in tune to 35% -40% in Indian metro cities. India is looking to create world class infrastructure with its existing resources at various metropolitan cities.

## BENGALURU METRO RAIL TRANSPORT

The Bengaluru Metro Rail Transport, popularly known as "Namma Metro" began its operation on 20<sup>th</sup> October 2011. Since then it has turned into the lifeline for a large number of commuters in Bengaluru. With the increase in the floating population of the city this rapid transit rail system has been a boon for the daily commuters facing hardship due to inadequate public transport. The new age air-conditioned metro trains

have provided commuters the key to fast, reliable, safe and comfortable journey. The metro system is designed for a maximum train speed of 80 km/hr. but the trains are allowed to commercially run at a speed of 67.50 km/h. These trains provide commuters the much desired option to reduce the commuting time by a considerable level. At present Bengaluru Metro Rail is operating in two lines. Namely: Purple line and green line. The Purple line is covering a total distance of 43.49 kilometers from Whitefield (Kadugodi) to Challghatta stations on east-west corridor with 37 stations. Whereas, the green line metro is operating between madavara to Central silk institute by covering a total distance of 30.32 kilometers on North-south corridor with 29 stations. In total Bengaluru metro is providing service to commuters with a total coverage of 73.81 kilometers in both Purple and Green Lines with 66 stations.

**Figure-2: Bengaluru Metro Rail Transport Operational Route Map**



Source: <http://bmrcl.co.in>

## Advantages of Metro Rail Transport

The following are the some of the advantages of metro rail transport system.

1. Metro rail transport is a cheap mode of transport.
2. Saves time for all commuters travels in metro.
3. It helps in low energy consumption.
4. It is eco-friendly (runs on electricity, thus minimizing air and sound pollution).



5. It averts the number of accidents.
6. Savings in vehicle operating cost.
7. Savings in foreign exchange.
8. Reduction in pollution.
9. It is efficient in terms of space occupancy.
10. It is highly used Mass Rapid Transit System.

## **SOCIAL AND ECONOMIC BENEFITS OF BMRTC**

Bengaluru Metro Rail Transportation has brought about significant Social and Economic benefits to Karnataka. Its impact can be analyzed in terms of improved transportation, reduced congestion, economic growth, and environmental sustainability. Transportation is the backbone of any city's development. The Bengaluru Metro has transformed the way people move, providing a faster, reliable, and efficient mode of transportation. This has reduced travel time and stress for commuters, improving their overall quality of life. The metro has also played a crucial role in reducing traffic congestion. As one of India's most traffic-congested cities, Bengaluru faced severe challenges in terms of productivity loss and air pollution due to traffic jams. The metro has alleviated some of these issues by encouraging people to switch from private vehicles to public transport, thus reducing the number of cars on the road. Economically, the metro has stimulated growth by enhancing connectivity. It has facilitated the movement of people, goods, and services across the city, promoting trade and commerce. New business hubs and residential areas have emerged along metro corridors, attracting investments and creating job opportunities. Environmental sustainability is another notable benefit. The metro produces lower emissions compared to individual vehicles, contributing to improved air quality and reduced carbon footprint. This aligns with global efforts to combat climate change and promotes a healthier urban environment. Urban development has been positively influenced by the metro system. The development of transit-oriented areas around metro stations has led to a more compact and organized urban form. This has reduced urban sprawl, promoted mixed land use, and encouraged higher density development, all of which contribute to efficient land utilization and better urban planning.

The presence of a well-connected metro system has also led to property value appreciation. Properties located in proximity to metro stations often command higher prices due to the convenience and improved connectivity they offer. This has led to increased investment in real estate and has potentially boosted local economies through increased property tax revenues. Accessibility has improved significantly for a diverse range of people. The metro system is designed to be inclusive, offering barrier-free access for people with disabilities. This not only enhances their mobility but also fosters a more inclusive society. Additionally, the metro serves as a lifeline for many low-income individuals who rely on affordable public transportation options. The Social and Economic benefits of the Bengaluru Metro Rail are not without challenges. Construction disruptions, initial investment costs, and fare structures have all been points of discussion. However, the long-term positive impacts on the city's growth and quality of life outweigh these challenges. Moreover, the Bengaluru Metro Rail has sparked a shift in the mindset of the city's residents towards sustainable transportation alternatives. By providing a viable and attractive alternative to private vehicle

usage, the metro has encouraged a cultural change in how people perceive and utilize public transport. This cultural shift is crucial for reducing the overall carbon footprint of the city and promoting a greener lifestyle. The metro has also catalyzed the growth of the tourism sector in Bengaluru and Karnataka as a whole. Easy access to key tourist attractions via the metro has made it more convenient for both local and international tourists to explore the city. This has led to increased spending in the local economy, benefiting various businesses such as hotels, restaurants, and souvenir shops.

## Social and Economic Benefits of Metro Rail Transport

Metro rail projects are meant to cater to cities with more than two million population and the costs in these cases are related to areas which are proposed to serve underground, elevated or at grade alignment. Larger the underground and elevated proposal, larger shall be the cost involved. It is highly advantageous to get funding from the central government or through private – public partnership or from international funding agencies. The following are the some of the Social and Economic benefits of metro rail transport.

**Table 1: Social and Economic Benefits of Metro Rail Transportation system**

Social Benefits	Economic Benefits
<ul style="list-style-type: none"> <li>▪ Mass Rapid Transport System</li> <li>▪ Equal social status among metro passenger during travel</li> <li>▪ Reduced traffic congestion</li> <li>▪ Fast and Reliable means of transport</li> <li>▪ Improvement in standard of living</li> <li>▪ Enhanced social integrity</li> <li>▪ Mobility of work force</li> <li>▪ Improvement of satellite townships</li> <li>▪ Improved relative connections</li> <li>▪ Safety and security during travel</li> </ul>	<ul style="list-style-type: none"> <li>▪ Savings in Time</li> <li>▪ Savings in Accidents</li> <li>▪ Reduction in distance</li> <li>▪ Savings in Vehicle operating Cost</li> <li>▪ Reduction in the number vehicles on road</li> <li>▪ Savings in Foreign Exchange due to reduced Fuel Consumption</li> <li>▪ Economic development of the region</li> <li>▪ Creates employment opportunities</li> <li>▪ Easy accessibility to public amenities</li> <li>▪ Improvement in income</li> </ul>

(Source: Author's own)

## CONCLUSION

The Bengaluru Metro Rail has yielded substantial and multi-faceted social and economic benefits that have profoundly impacted Karnataka's urban landscape. By offering a swift, reliable, and eco-friendly mode of transportation, the metro has not only eased the daily commutes of residents but also contributed to reducing traffic congestion and improving air quality. This has resulted in heightened productivity and an enhanced quality of life for the populace. Economically, the metro's influence is palpable through its role in fostering connectivity. It has acted as a catalyst for the growth of businesses, generating job opportunities, and attracting investments along its corridors. The emergence of vibrant commercial and residential hubs near stations underscores its pivotal role in shaping the city's economic landscape. Environmental sustainability has been a cornerstone of the metro's impact. Its reduction of carbon emissions aligns with



global climate objectives, while its inclusive design ensures accessibility for all, promoting social cohesion. Additionally, the metro's role in reducing road maintenance costs and encouraging a cultural shift towards sustainable transport habits offers lasting benefits that extend beyond its physical infrastructure. Though challenges like initial investment costs and equitable access persist, the Bengaluru Metro Rail's undeniable impact far outweighs these issues. As an exemplar of urban development and progressive transportation, it not only provides a blueprint for other cities but also cements its status as a vital driver of Karnataka's Social and Economic progress. With an expanding network and continued adaptability, the Bengaluru Metro Rail's legacy as a transformative force is poised to endure, leaving an indelible mark on the state's Social and Economic fabric for years to come.

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