

A Study on the Benefits and Satisfaction among the Kochi Metro Users

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ABSTRACT - This study explores the benefits and satisfaction levels of Kochi Metro users, operated by Kochi Metro Rail Limited (KMRL), considering Kochi's rapid urbanization. Surveys of 100 users indicate high satisfaction with cleanliness, safety, punctuality, and convenience, highlighting the metro's role in enhancing daily travel and supporting environmental goals. However, issues like the ticketing process, last-mile connectivity, and promoting public transportation over private vehicle use were identified. Recommendations include improving ticketing systems, feeder services, and station facilities to enhance user experience and support sustainable urban transportation. Insights from this research aim to help KMRL to meet the needs of its users.

Key Words: KMRL, Water Metro, Transportation in Urban Cities

I. INTRODUCTION

Public transportation efficiently moves people within urban areas. Mass Rapid Transit (MRT) systems offer fast, reliable service with strategically located stations, supporting economic development and sustainability while shaping urban landscapes.

Kochi, being a developing city, needs mass rapid transit. The Kochi Metro Rail project, managed by Kochi Metro Rail Limited (KMRL), was launched in 2017 to improve transportation. With modern facilities and eco-friendly operations, it has significantly enhanced the city's transit system. As the city grows, expanding and optimizing the metro network is essential.

KMRL aims to alleviate traffic, reduce pollution, and improve connectivity. This study focusses on

KMRL's services to enhance the Kochi Metro's effectiveness, accessibility, and sustainability.

II. STATEMENT OF THE PROBLEM

The Kochi metro is the most popular public transport in Ernakulam district, and understanding the reasons for it, will provide valuable insights. This study analyses Kochi Metro Rail Limited (KMRL) services, focusing on customer satisfaction, facilities, city interconnectedness, and future projects. The results will help KMRL improve services and enhance passenger experiences.

III. SIGNIFICANCE OF THE STUDY

The study analyses various aspects of Kochi Metro Rail Limited (KMRL) services, including customer satisfaction, traffic impact, interconnectivity, and future initiatives. It assesses present advantages and weaknesses, identifies issues, and suggests improvements.

This study is crucial for KMRL management, urban planners, and policymakers, helping in informed decision-making. Enhancing customer satisfaction and addressing problems can create a more effective and convenient public transportation system. Insights on future projects will support Kochi's infrastructure growth and sustainability, ultimately benefiting commuters and the broader community by promoting a more integrated and accessible transportation experience.

IV. OBJECTIVES OF THE STUDY

- To study the effect of Metro on the traffic environment of the city.
- To analyze the factors that satisfy the Passengers of Kochi Metro Rail Limited (KMRL) and understand the level of satisfaction.
- To study the mode and pattern of ticketing schemes.
- To examine the interconnectivity within the city regarding Kochi Metro.
- To understand the future developments of KMRL and contribute insights for its progress.

V. METHODOLOGY OF THE STUDY

The research conducted a descriptive study aimed at understanding various aspects of KMRL services and their impact on the residents of the city. Data collection involved both primary and secondary sources. Primary data was gathered through surveys conducted among residents, while secondary data was derived from KMRL reports, official documents, and relevant literature.

The study used a Non-Probability sampling method, specifically Convenience sampling, to select 100 participants from the resident population of Ernakulam. This method was chosen for its practicality and accessibility, considering the demographic composition of the area. Data analysis used statistical tools such as percentage analysis, charts, tables, and graphs to interpret findings and draw conclusions from the collected data.

VI. LIMITATIONS OF THE STUDY

There are some limitations to consider in this study. First, potential bias in survey responses could impact the accuracy and reliability of conclusions. Additionally, the use of secondary data sources may be limited by their availability and the accuracy of the existing data sources. Moreover, the use of convenient sampling methods introduces a bias by selecting participants based on ease of access. These limitations highlight the importance of interpreting the findings with caution.

VII. Literature Review

Table 1: Literature Review

Year	Author	Title	Objective	Data collection tools	Outcome of the study
2023	Poornima S Menon	Impact of transport integration initiatives of Kochi Metro Rail Limited (KMRL) on youth: A study with reference to Ernakulam	Assess digitalization and pricing strategies of KMRL	Questionnaires, KMRL reports	Recommendations for improving last-mile connectivity and promoting ticket schemes
2023	Aloke Mukherjee, Sowmya Muruganantham, Archana Balachandran, Sudeept Maiti, and Prasanna Kumar Ganesh	Improving metro access in India: Evidence from three cities	Address urban traffic congestion and enhance metro usage	Surveys	Recommendations for fare affordability, station access, and last-mile connectivity
2023	Pankaj Sharma, Jinendra Kumar Jain, and Pawan Kalla	A study of efficiency measurement of Jaipur Metro mass transit system using Data Envelopment Analysis (DEA)	Evaluate metro system performance and identify improvement areas	DEA analysis	Found DEA useful for performance comparison and help authorities to make the system more efficient
2023	Aromal Sajeevan, Anusha E.S, and CEO Sunny	Factors influencing preference of Kochi metro as a mode of public transportation	Analyse customer preferences and challenges	Primary and secondary data; using convenience sampling,	High passenger satisfaction; recommendations for fare reductions and amenities improvements
2023	Anushka P. Menon	A study on shift in consumer behaviour - Public transport	Analyse the reasons behind public preference for metro	Questionnaire, Chi-square analysis	Factors driving commuter behaviour; insights into success factors and areas for improvement

2023	Vignesh Dhurai, Arun Chandran, and Shaheem S	Identifying commuter's preferences of feeder modes for first and last-mile connectivity: A case study of Kochi	Enhance traffic connectivity within public transport system	Questionnaire	Preferences for autos as feeder services; recommended facilities for feeder services and single ticketing schemes
2023	Midhun Madhu and Sneha MD	The role of Kochi Metro Rail in urbanization	Analyse KMRL's impact on urbanization	Surveys, primary and secondary data	High satisfaction with KMRL services; recommendations for increased train frequency and feeder services
2023	Priyanka Prabhakaran, S Anandakumar, E B Priyanka, and S Thangavel	Development of service quality model computing ridership of Metro rail system using fuzzy systems	Understand factors influencing ridership numbers	Questionnaire surveys, regression analysis	Identified factors significantly affecting ridership
2022	Vipin Mathew Thomas and Sangeeth K	Impact of Kochi Metro Rail Limited (KMRL) on traffic environment	Compare traffic conditions before and after KMRL	Traffic analysis, surveys	Insights about the transformative effects of KMRL on urban traffic patterns
2021	SENES Consultants India Pvt. Ltd	Environmental Impact Assessment Study and Environment Monitoring Plan for Kochi Metro Rail Project	Assess baseline environmental conditions and propose mitigation measures	Environmental data analysis	Discussed benefits, drawbacks, and environmental management strategies
2021	Nithin Ninan Thomas	A study on the popularity of Kochi-1 Smart Card	Identify factors influencing card purchase and enhance its popularity	Surveys	Insights on effectiveness and satisfaction; recommended promoting kiosks and avoiding delays

2021	Dr. Shamsi Sukumaran Kunnathully	A study to identify the factors influencing passenger satisfaction towards Kochi Metro Rail Ltd (KMRL)	Assess customer satisfaction levels and influencing factors	Questionnaire using convenience sampling	Identified 14 variables affecting satisfaction; recommendations for light metro systems
2019	Anu Tressa Jose and Sherin Cyriac	A study on the customer satisfaction on the services of Kochi Metro	Identify factors influencing metro usage and assess service quality	Interviews, primary and secondary data	Key factors: cleanliness, facilities, safety; recommendations for future phases and bus services
2019	Centre for Public Policy Research (CPPR)	Kochi metro ridership improvement survey	Enhance public transportation in Kochi	Survey using random sampling	Suggestions for station amenities and transit improvements
2019	Chaitanya Kanuri, Krithi Venkat, Sudeept Maiti, and Pawan Mulukutla	Leveraging innovation for last mile connectivity to mass transit	Investigate last mile connectivity challenges	STAMP survey, experimentation at metro stations	Initiatives like two-wheeler rentals, shared taxis; need for multimodal integration and further research
2018	Shankar Kumar and Dr. B. Jeyaprabha	An empirical study on commuter satisfaction towards Chennai Metro Rail Limited (CMRL)	Understand commuter profiles and satisfaction levels	Surveys	Suggestions for improving token systems, parking, and station maintenance
2018	Dr. N. K. Babu	A study on satisfaction level of passenger in Kochi Metro Train	Assess customer satisfaction with KMRL	Surveys using random sampling,	Insights on influencing factors such as physical condition, cleanliness, safety
2017	Sibi K I	Major concerns of transgender employees in Kochi Metro train service work environment	Highlight challenges faced by transgender employees	Interviews, case studies, secondary sources	Found their issues with gender-specific washrooms, commuting difficulties, permanent residency challenges, and discrimination

VIII. Industry Profile

Mass Rapid Transit (MRT), also known as heavy rail or metro, is a high-capacity public transportation system usually built in metropolitan areas. MRT offers quick, economical, and environmentally friendly transportation for densely populated urban regions, addressing urban mobility issues. Ongoing technical developments, such as automated train control systems and smart card technology, enhance passenger experience, safety, and efficiency. MRT systems prioritize sustainability, focusing on electrification, energy-efficient designs, and eco-friendly materials to reduce carbon footprints. Investments in MRT projects generate significant economic gains, creating jobs and promoting urban redevelopment.

MRT systems originated in the late 19th century to address urbanization challenges. The first rapid transit system, the Metropolitan Railway, introduced in 1863 in London with steam engines, which has now evolved into today's high-speed rail networks

Global Scenario:

In 2021, China leads the world with 40 rapid transit systems covering over 4,500 km (2,800 mi) of track, spearheading global expansion in the 2010s. The Shanghai Metro has the longest single-operator route length, while the New York City Subway tops in station count. Busiest systems by yearly ridership include Shanghai, Tokyo, Seoul, and Moscow metros. The expansion of metro systems globally, especially in Asia, Europe, and North America, reflects efforts to address urbanization challenges with eco-friendly transport solutions. Emerging economies are heavily investing in extensive metro networks, signalling a shift towards sustainable urban transportation.

Indian Scenario:

In India, urban rail transit, comprising tram, monorail, suburban rail, and rapid transit systems, plays a crucial role in major cities. India ranks among the world's largest urban rapid transit hubs, with seventeen cities having operational metro systems, including Delhi Metro as the popular one. With 902.4 km (560.7 mi) of metro lines, India has the fourth-longest network globally, operated mainly by local authorities, except for Kolkata Metro under Indian Railways. Indian Railways also manages mass transit systems in Chennai and Hyderabad, known as the Chennai MRTS and Hyderabad MMTS, respectively. The Delhi Metro, inaugurated in 2002, revolutionized urban transportation in India, inspiring metro projects across the country. Cities like Bengaluru, Chennai, Mumbai, and Kolkata followed suit, each with its unique challenges and successes. As metros like Namma Metro in Bengaluru and Chennai Metro contribute to smarter, greener cities, they encounter obstacles but ultimately drive progress. The Indian metro sector symbolizes the nation's modernization efforts, connecting aspirations and fostering hope for a brighter, more interconnected future. With each new metro line, India's urban history evolves, promising a dynamic narrative of development and connectivity.

Kerala Scenario:

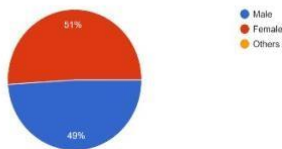
Kerala's metro system was emerged out of the state's rapid urbanization and mounting traffic challenges, especially in Kochi. Understanding the need for sustainable public transport, the government launched the metro to enhance mobility, reduce emissions, and ease congestion. Established in 2011, Kochi Metro Rail Limited (KMRL) led the charge through a partnership with Delhi Metro Rail Corporation (DMRC), government funds, and private investment. Beyond its ridership,

Kochi Metro promoted economic growth, attracted businesses, and transformed daily commutes. The success of Kochi Metro spurred plans for metro projects in Thiruvananthapuram and Kozhikode,

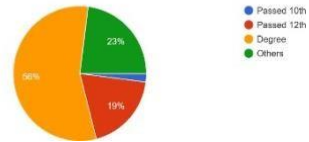
reflecting Kerala's commitment to urban connectivity. Taking the metro in Kerala signifies more than just travel—it symbolises collaborative progress, bridging past and present for a better future.

IX. Data Analysis and Interpretation

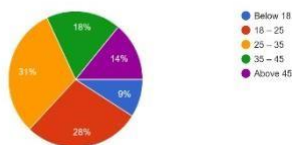
Gender
100 responses



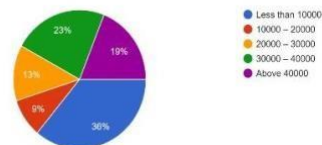
Educational Qualification
100 responses



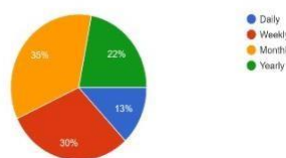
Age
100 responses



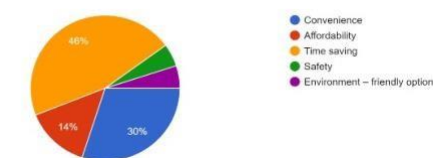
Monthly Income (In Rupees)
100 responses



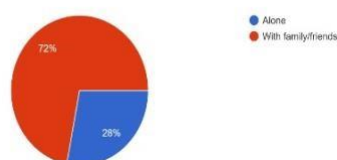
How frequently do you use metro mode of transport ?
100 responses



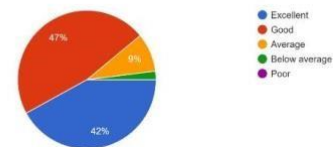
6. What is the primary reason for choosing Kochi metro as your mode of transport ?
100 responses



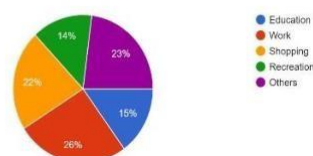
Do you prefer to travel alone or with your family/ friends ?
100 responses



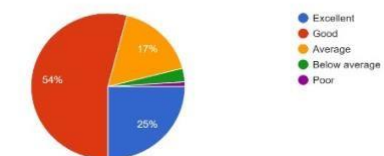
7. How would you rate the cleanliness and hygiene of Kochi metro stations ?
100 responses



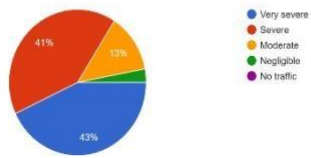
1. For what purpose do you use Kochi metro the most ?
100 responses



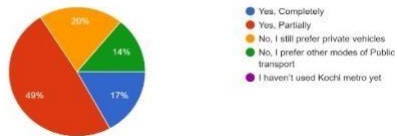
8. How would you rate the availability and accessibility of information regarding Kochi metro services ?
100 responses



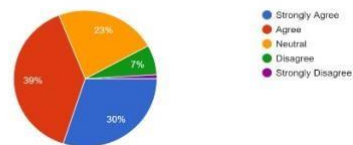
2. Before the introduction of Kochi Metro, how would you describe the traffic congestion in Kochi ?
100 responses



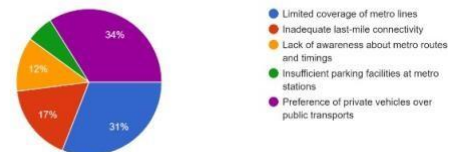
3. Have you personally shifted from using private vehicle to Kochi metro for travelling ?
100 responses



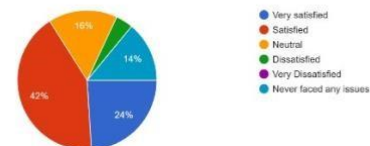
4. Do you agree that the Kochi metro has reduced traffic congestion in the city ?
100 responses



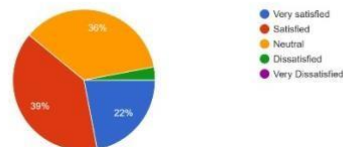
5. What do you think is the main factor contributing to traffic congestion in Kochi despite the presence of Metro ?
100 responses



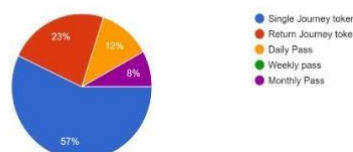
13. Have you experienced any technical glitches or malfunctions with AFC gates while entering or exiting Kochi metro stations? If yes, how satisfied... response and assistance provided by metro staff ?
100 responses



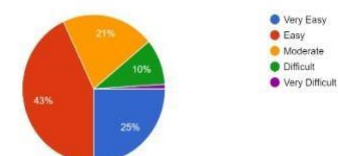
14. How would you rate the process of purchasing and recharging smart cards or tickets at Kochi metro station ?
100 responses



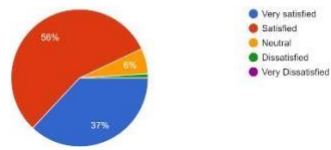
15. Which type of Pass or ticket do you use most frequently when traveling on metro ?
100 responses



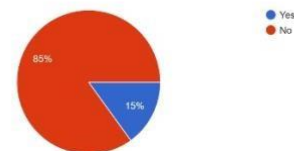
16. How easy do you find it to access Kochi metro stations from your location ?
100 responses



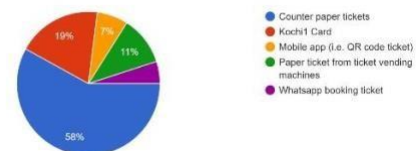
9. How safe and secure do you feel while travelling on Kochi metro trains and stations ?
100 responses



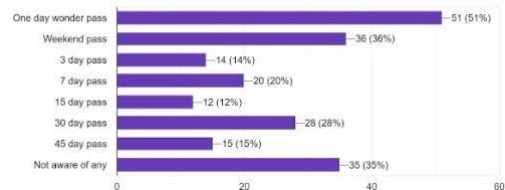
10. Have you observed/faced any issues with accessibility for differently-abled persons/pregnant women inside Kochi metro stations and trains ?
100 responses



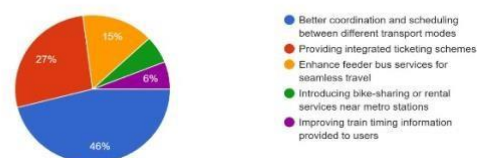
11. What mode of ticketing do you primarily use while travelling on Kochi metro ?
100 responses



12. Which all ticket schemes are known to you ?
100 responses



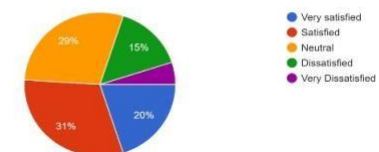
20. How do you think the interconnectivity between metro and other transport services can be improved ?
100 responses



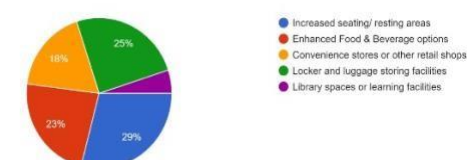
21. How do you think the Water Metro project will impact transportation in Kochi ?
100 responses



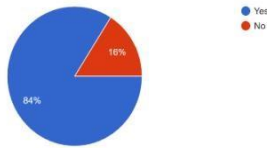
22. How satisfied are you with Parking facilities in metro stations ?
100 responses



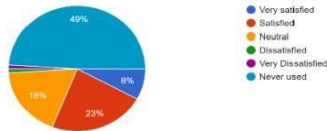
23. What additional amenity would you like to see the most at Metro Stations in the future ?
100 responses



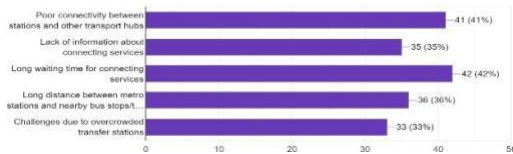
17. Do you often combine Kochi metro with other modes of transportation for your commute?
100 responses



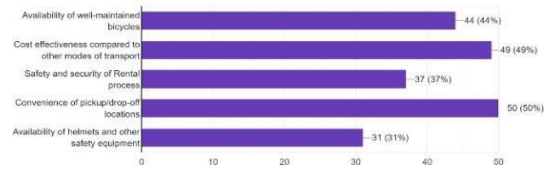
18. Have you ever utilized feeder services (shuttle Buses) provided by Kochi metro. If yes, how satisfied are you with the frequency and reliability of feeder services?
100 responses



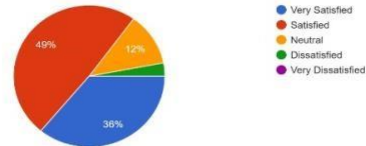
19. What challenges do you face when travelling between Kochi metro and other modes of transportation?
100 responses



24. What factors would influence your decision to use cycle rental service at Kochi metro stations? (select all that apply)
100 responses



25. How satisfied are you with the developments or the progress of Kochi metro in the past years?
100 responses



X. Findings

Based on responses from a questionnaire sample of 100 respondents, several key findings emerged:

- Kochi metro serves a diverse demographic, with a nearly equal gender distribution and a majority falling within the 18 to 35 age range, emphasizing its appeal to a younger population.
- Introduction of Kochi metro has significantly alleviated severe traffic congestion, with 84% of respondents experiencing improved traffic conditions, despite a prevailing preference for private vehicles.
- Passengers primarily choose the metro for its time-saving convenience (46%) and generally express high satisfaction with cleanliness, safety, and staff assistance, although ticketing

processes receive mixed feedback.

- Counter paper tickets are the preferred mode of ticketing (58%), while improved coordination between transport modes is favoured for enhancing interconnectivity (46%).
- Satisfaction with feeder services among users (31%) highlighting their potential to enhance metro operations, with expectations that the Water metro will further enhance tourism and alleviate congestion.
- Kochi metro's efforts to address passenger needs extend to facilities, including parking satisfaction reported by 51% of respondents and desires for increased seating/resting areas, while the majority (85%) express

satisfaction with their overall developments.

XI. Conclusion

This study explored Kochi metro user satisfaction, focusing on detailed objectives. Insights from literature review aided in understanding passenger satisfaction. Data from 100 respondents revealed demographics, usage patterns, and satisfaction levels. Challenges like limited last-mile connectivity persist, urging integrated solutions for sustainable mobility. High satisfaction was noted in cleanliness, safety, ticketing, and information availability. Improvement areas include interconnectivity and accessibility for differently-abled persons. Continuous monitoring and KMRL's improvement initiatives are crucial for reliability. Overall, passengers are satisfied with services, but there are still opportunities to improve by addressing the ongoing challenges.

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