Feasibility Study of Metro Rail Project in Coimbatore City

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Abstract— **In India, atmospheric pollution and urban ecosystem are the serious impact due to public transport. Transportation plays a major role in developing country. Traffic congestion, higher fuel consumption and pollution are caused due to improved transportation. So metro rail has to be introduced will overcome these problems. The implementation of metro, traffic congestion has been reduced and pollution also reduced because it is operated with electricity. The current population of Coimbatore is 1.6 million and by 2025 the population is increased up to 1.9 million. Due to drastic change in population the bus transport system for his huge population is very difficult and very expensive. So the implementation of metro rail in Coimbatore city will be the solution of these problems and this the ultimate aim of the project.**

Index Terms— **Feasibility Study, Metro, Public Transportation, Terminal passengers, Traffic Scenario**

I. INTRODUCTION

Metro which is going to implement will cover all the residential, commercial and populated areas. By introducing this system will reduce the usage of personal cars and motor cycles. The usage of fuel and pollution will be controlled. Metro rail system is mostly needed when a cities' population exceeds more than 1million. All the cities need to plan for transportation infrastructure for better future. The usage of public transport for the past 50 years has been gradually decreased so that the increase in usage of private vehicles is increased. In reality, cities with a population of 7 millions should have a 75% usage of public transport .Because of usage of private vehicles it is resulted in traffic congestion; take maximum time to reach the work place and the CO_2 emission caused by the road transport. The development of this infrastructure project has more demand due to increase in urban population and also increase in migration of people from rural areas to urban areas for purpose like education and work etc. In 2030, the nation that will have large population in cities than villages (Tamil Nadu, Gujarat, Maharashtra, Karnataka and Punjab). In this case the infrastructural facility should support such large concentration of population which is lagging behind the pace of urbanisation. The long term benefits of metro rail is efficient than any other type of transportation system. The metro rail will be pollution free, less noise, reliable, comfortable and when compared to other system it will occupies less ground space. It will consume low energy per passenger and 50% of journey time will be reduced. The Indian government has announced that the metro rail will reduce carbon emission relative to its Gross Domestic Product (GDP) by 33% to35%. The need of mass

transits system is recommended when the Peak hour peak direction traffic (PHPDT) exceeds 40,000. So, that implementation of metro rail in Coimbatore city will be efficient.

II. OBJECTIVE

For better connectivity and travel throughout Coimbatore LPA. To address inter city transportation needs there should be an improvement in the mobility within neighborhoods, wards, zones and satellite towns. The efficient arrangement of land use and transport system will minimize overall travel cost. To reduce the dependency on cars, with widespread use of non motorized modes and mass rapid transit system, should offer reliable and viable transportation. For better connectivity and travel throughout Coimbatore LPA.To address inter city transportation needs there should be an improvement in the mobility within neighborhoods, wards, zones and satellite towns. The efficient arrangement of land use and transport system will minimize overall travel cost .To reduce the dependency on cars, with widespread use of non motorized modes and mass rapid transit system, should offer reliable and viable transportation.

III. METHODOLOGY

In this study the data are collected by terminal study where in the magnitude of the passengers at different terminal in the city are identified. In terminal passenger interview, a questionnaire survey was conducted to know the travel characteristics of traveler. Then interview of worker and work place are conducted to know their socio-economic conditions. A traffic volume count was taken to understand the travel characteristic. The population growth and the vehicle growth of the Coimbatore city for the base year 2015 are projected for the future. The survey of passengers is done online using Google forms and manually under various criteria like trip purpose, trip time, trip cost, trip mode etc.The results provide the summary of the transportation density and its viability in this sector. The short distance trip by daily trip users will bring more revenues for metro with regards to the infrastructure investment and running cost. The survey shows that the 84% commuters are willing to use Metro Rail for commuting, once the services are available. They prefer metro rail for travel comfort and reduction in travel time are the main considerations. It is seen from the analysis that this city requires immediate implementation of the metro rail system.

IV. DATA COLLECTION

The data are collected from highway department based on the traffic scenerio,population growth and vehicle movement in the corridor

4.1 TRAFFIC AND TRANSPORTATION SCENARIO

The traffic volume count is collected from the National highway department in Coimbatore. The population growth and the vehicle growth along the selected routes is rapidly increasing. The study takes the base year 2017 for practical purpose calculation.

4.2 POPULATION AND VEHICLE GROWTH IN THE CORRIDOR

PICTURE 1: POPULATION GROWTH OF COIMBATORE
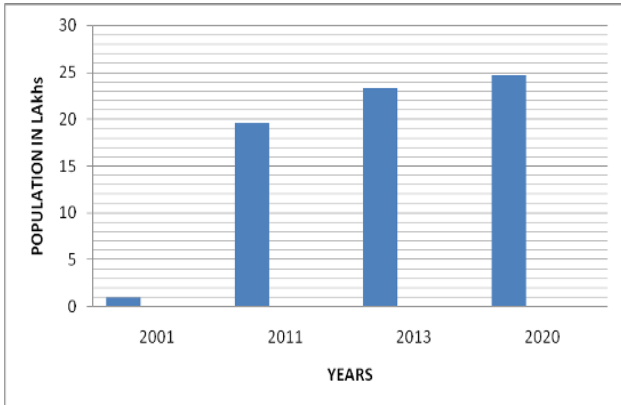
The picture1 shows the variation in population growth in the Coimbatore City. As shown in the graph it is understood that the growth rate is increased and the projection in this sector in the year 2030 is around 27 lakhs, so at this condition the present mode of transport will not meet the demand.

PICTURE 2: VEHICLE POPULATION FROM (INSTITUTE FOR TRANSPORTATION AND DEVELOPMENT AND POLICY).
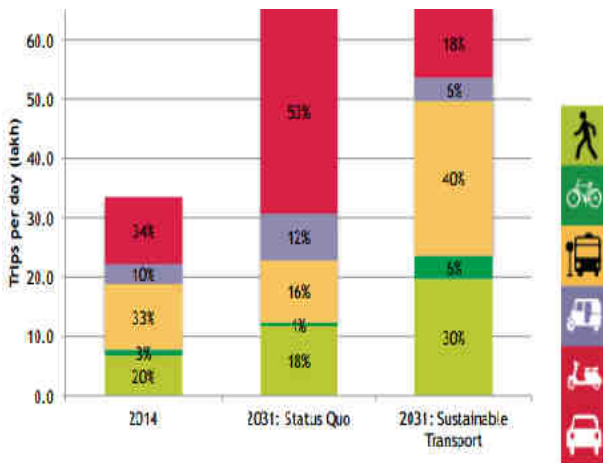
The picture 2 shows that the vehicle growth in Coimbatore city. The Coimbatore city is the second largest city of 1.5 lakhs vehicle added to the city roads every five month. By analyzing the movement of vehicles in the selected route for the year 2014 and 2031 it will be steep reduction in the speed of the vehcile.Again analyzing the movement of vehicles in the selected corridor for the year 2014 and 2018, we find steep reduction in the possible average speed of vehicle movement. The average speed of vehicles has come down from 27 km/hr to 17 km/hr in Ukkadam area; from 33 km/hr to 20 km/hr in Gandhipuram.This will show the traffic congestion in this area and there is a need for development.

4.3 Data Sampling

A questionnaire survey was conducted using Google form and data are collected to find the feasible patronage in the study route. The survey was taken from 200 people .the data contained their age group, purpose of metro use, their economic sector, choice for metro, preferential expected metro fare, regular commuting time etc. The data was collected by popularizing the link through various social media and mail. The participants of the survey were from different age group and economic background and as per Table 1 and Table 2.

Table -1: Distribution of income

SL.NO	PARTICIPANT'S INCOME	PERCENTAGE OF PARTICIPANTS
1	10K	18.6
2	10K to 20K	33.7
3	20K to 30K	21.1
4	30K to 40K	15.1
5	40K to 50K	5
6	>50K	8

Table -2: Distribution of Age

| SL. NO	AGE GROUP IN YEARS	PERCENTAGE
1	10-25	33.2
2	26-40	33.7
3	41-50	15
4	51-60	10
5	>60	5

V. ANALYSIS AND DISCUSSION

From the questionnaire survey various factors such as trip mode, trip time, trip rate etc; are obtained for analysis. The factors which indicate the individual characteristics analysis to evaluate traffic pattern. The travel depends upon the individual purpose which may regular or irregular by this individual reasons are calculated. Three characteristics were considered for the trip i.e., purpose of trip, travel distance and present mode of travel. The data collected under trip length picture 1(a) will be useful in decide the ticket pattern and for economical mode of pricing the tickets. In average the trip length of 15km to 20 km is used by maximum number of passengers in survey and this type of occurrence will naturally bring in more revenues since more number of long trips will bring in more profit. Passengers travelling for more than 6 km constitute to only 10%. This group from more than 15Km is expected to use metro rail mainly due to the convenience in travelling.

The distribution of trip purpose is illustrated in picture 1(b). The office trip and trip to education are regular and others are occasional. The regular trip was almost 66.9%, so there is a need of metro rail.
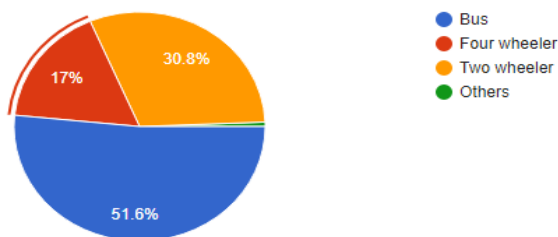
PICTURE 1(a) TRIP LENGTH
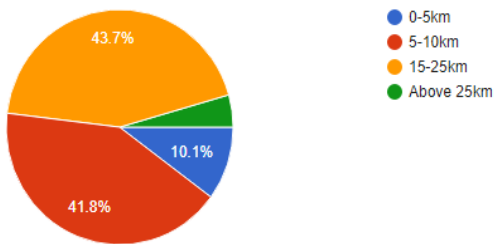
PICTURE 1(b) TRIP PURPOSE
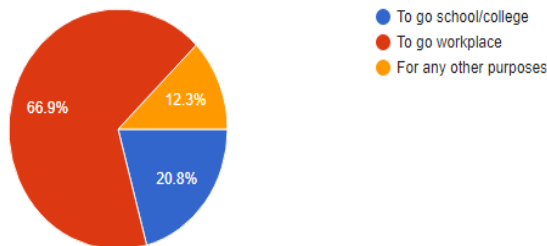
PICTURE 1(c) TRIP MODE

The travel mode as in picture 1(c). The figure shows many number of people are using bus 61.8 %. If metro is fast the public transport, the people will switch over to metro rail. Metro will also reduce the CO_2 and improves air quality.

CONCLUSION

Since most of the public are suggested the alternative mode metro rail transport because traffic congestion will reduced and also due to the traffic volume count in the Coimbatore city is exceeding 80000 Peak hour peak direction traffic (Phpd).So that the metro rail is feasible in the Coimbatore city. This result shows that the passenger in many cases the commuters are worried about the ticket price of metro rail. But the willingness of the people looking for an alternative mode of transport especially metro rail

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