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Mobility of Para Trasnport System (Pts) For Trichy

Banavath Babu Naik , Malle Rangappa Swetha, Dr. Nisha Radhakrishnan[3]

[1]National Institute of Technology, Tiruchirapally -620015. Tamilnadu.

Email: banavath8008@gmail.com

[2]National Institute of Technology, Tiruchirapally -620015. Tamilnadu.

[3]Assistant Professor, National Institute of Technology, Tiruchirapally -620015. Tamilnadu.

Abstract:

India is currently facing a huge lack of public transport and it does not seem probable to fix this gap in near future with the current practices as it further expands with boom in population and economic growth. Para transit System in India has been an important mode of transport. It has certain advantage being pro-poor and readily available but it has been constantly overlooked in transport planning of Indian cities. Being a major transport system, it still suffers the fluctuations of supply and demand. Also, there are other major shortcomings associated with the operation of Para-Transits viz. overcrowding, no separate parking space, air & noise pollution and arbitrary fare pricing. Para Transport System of Tiruchirapallyhas been undertaken in this study. In Tiruchirapally, a large fleet of buses are available from early morning to late night on all major routes which are managed by City Corporation while there is no comprehensive plan for the Para transit vehicles which are second major public transport system in the city. This study classifies and explains operational characteristics of the Para transit vehicles in the city using data collection from RTOs and questionnaire surveys to the drivers and passengers of the paratransit vehicles. A map of the auto and taxi stands surveyed is also prepared using GIS tools. The analysis of this data allows us to draw a number of conclusions on the economics of the industry as well as the social aspects associated with it. It also discusses the characteristics of the users of these Para transit vehicles as well as their typical use. This analysis has been used to develop an understanding of the manner in which the industry is being operated today. The paper concludes with a synopsis of the profile of the industry and its role within the wider transport sector.

Keywords: Para transit System,Questionnaire Survey, Intermediary Public Transport and Geographic Information Systems.

I. INTRODUCTION

Mobility has become an important prerequisite for economic growth in developingcountries like India which altered the Transportation land use pattern. Good infrastructure facilities connecting all parts of cities led to demand of huge number of public transport facilities with feeder system to complement it. Tiruchirapally is of no exception and the study of main feeder system was the prime moto of this study.

Para Transit System (PTS): Dynamic in definition with regard to developed and developing countries. In developed countries it is usually “Demand Responsive Transit” which works by ‘Dial a ride’ managed by single or multiple operators which are connected thorough call centre. In developing countries, the supply deficit of public transportation plays a key role in the existence of para transportation system (PTS) which is

affected by various parameters like type of vehicle, mindset of driver, requirement of passengers etc.,. In India, it is mostly of two types

a) trips along a more-or-less defined route with stops to pick up or drop off passengers on request.

b) a demand-responsive transport that offers door-to-door service from any origin to any destination in a prescribed service area.

The purpose of the study is to understand the Para Transit system of Trichy city in terms of demand profile of vehicles, tendency of passengers, drivers etc., causes that are making the Para Transit Systemsuccessful and remedial measureslike suggesting better alternatives ifany etc.,

A) Types of Para Transit System in Trichy:

PTS in Trichy includes the following type of vehiclesRickshaw, Share autos, Tourist Cabs etc., which are differs in terms of number of passengers that can be accommodated, fuel being used etc.,.

II.STUDY AREA

Tiruchirappalli is located at latitude of 10.8050°N and longitude of 78.6856°E. The Historical city of Tiruchirappalli, popularly known as Trichy, is situated on the banks of Kaveri river in the southern state of Tamil Nadu.

III. METHODOLOGY

Itincludes collection of data, it's analysis and interpretation, mapping of existing Auto stands and share auto routes using QGIS followed by summary of the work.

Similar work has carried out by**Ahmed et al. (2012)** for Imphal city in India. Auto rickshaw was the most popular mode of PTS and interestingly most of the operators were literate and generating employment opportunities to the people. The study suggested remedial measures like pre defined stoppage, parking for para transit modes for ensuring better and timely service of the para transit.

In **Bhat et al. (2010),** WRIcentre for Sustainable Transport has made an attempt to evaluate present PTS in Indore city of India. The study mainly aimed at calculating average time taken for refuelling the para transit and classifying the type of Para transits on the basis of fuel type.

Similar works were carried out for cities like Vadodara **(Ankita Sharma et al. (2016))**and Chennai **(Prabhuet al.(2011))**for studying the respective Para Transit Systems.

In this study, for better understanding the distribution of Auto stands, mapping was achieved by Trimble Juno 3B, 3D devices which includes an integrated GNSS receiver whose accuracy lies in between 5 to 6m. Height of antenna was fixed at 1m. Latitudes, longitudes of the Auto stands were mapped with references to WGS 1984.

Magellan device was employed in calculating the time taken by Auto rickshaw and share autos in between origin and the destinations. It also gives some useful information about the trip like distance, speed (average, minimum, maximum), total travel time and average delay time.

Data about Tiruchirapalli carriage system information was collected from district West, East Regional Transportation Offices. The data includes type of carriage vehicle, permitted count, no. of ceased permits, type of fuel being used etc.,.

Data collected about the Auto stands reveals that there are 272 auto stands out of which 45 % are only being regularized and the rest are in the process of attainingregularization by

consulting with local residents, consumer groups etc.,.

The following major share auto routes were identified

1. Central Bus stand (CBS) to Edamalaipattiputhur
2. CBS to KK nagar
3. CBS to Karumadabam

The route covering the CBS to Edamalaipattiputhur was mapped by using QGIS andshown in the figure 1.

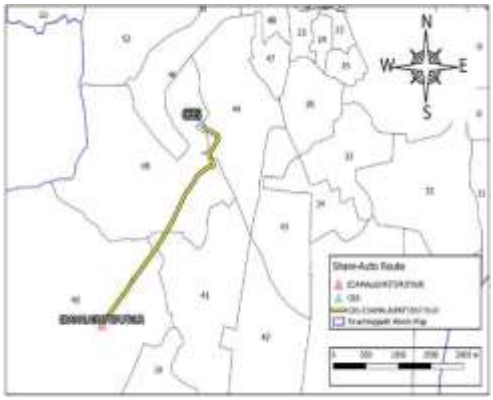

Figure 1: The road connecting CBS-Edamalaipattiputhur mapped in the base map of Trichy city.

Auto Stand mapping

There are 21 areas in which around 60 share auto stands are concentrating which are shown in the following map . The map was the combined geo reference of Google street map and ward map of Tiruchirapally city.

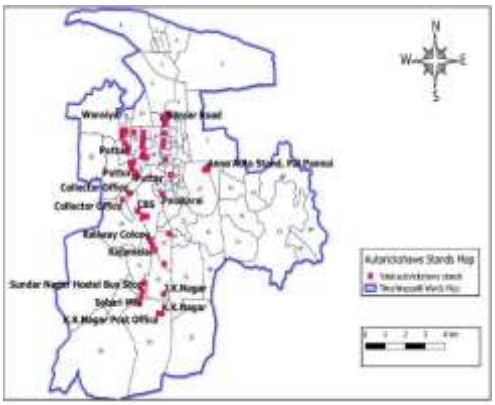

Figure 2: The locations of Auto stands in Trichy city.

Apart from the data obtained from Regional Transportation Offices, a questionnaire survey was conductedamong the stake holders like passengers, drivers etc., to know the tendency of them in operating or choosing a particular type of Para Transportation System in the city. In 20 areas of the city driver's questionnaire survey (Opinion of around 780 PTS operators has been considered) was conducted to know details like age, educational status, ownership, marital status etc.,.Similar survey was conducted among the passengers for knowing frequency of trip, comfort level, fare, time taken for journey, safety aspect etc.,.

Comparison between auto rickshaw and bus in the city

For better understanding the local bus, auto services in PTS, a comparison between the both for the route of

IV. DATA CLASSIFICATION

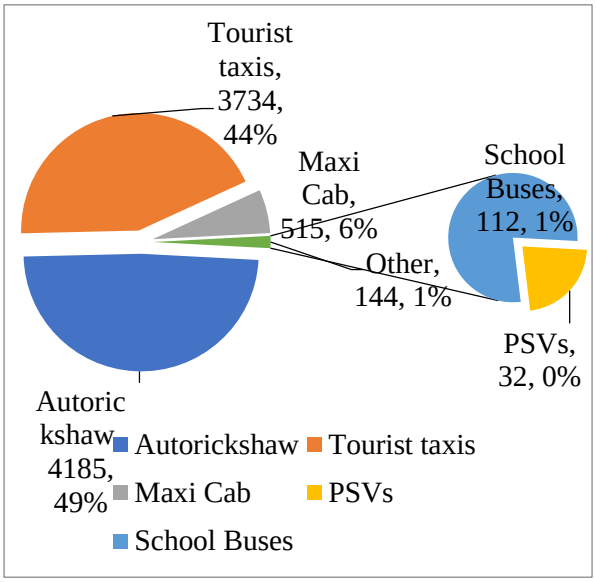

Figure 3: Classification of contract carriages collected from Trichy city Regional Transport Offices.

PTS of Trichy city is summarized in figure 5. Out of total vehicles of 12370 Auto rickshaw, Tourist taxis were observed to be leading service providers in complementing the Public Transportation means.

Majority portion of the auto rickshaws are being operated by petrol, taxis are being run by diesel. Interestingly only few number of para transit vehicles (216) are being operated by LPG. So, there is a great chance to shift vehicle owners towards the usage of eco friendly fuels.

Table 1: Details calculated for share auto Route – 3 (CBS - Karumadabam)

Trips	1	2	3	4	Average
Distance(km)	2.6	2.6	2.6	2.6	2.6
V_{Min} (km/h)	4	3.5	6	4.5	4.5
V_{Max} (km/h)	37	36	36.3	34.7	36
V_{Avg} (km/h)	20.8	21	22	19.4	20.8
t_{Avg} (min)	7	6	6	5	6
$t_{Avg\,Delay}$ (min)	3	1	1	3	2

Table 2: Details calculated for share auto Route – 2 (Cbs – KK Nagar)

Trips	1	2	3	4	Average
Distance(km)	6.2	6.2	6.2	6.2	6.2
V_{Min}(km/h)	5.1	5	5.2	5.5	5.2
V_{Max}(km/h)	38.1	40.4	40.5	34.8	38.45
V_{Avg}(km/h)	22	24	23	24.2	23.3
t_{Avg}(min)	18	14	15	17	16
$t_{Avg\,Delay}$ (min)	5	4	3	4	4

Table 3: Details calculated for share auto Route-1 (CBS-Edamalaipattiputhur)

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Trips	1	2	3	4	Average
Distance(km)	3.5	3.5	3.5	3.5	3.5
V_{Min} (km/h)	4.7	5	5.5	4.8	5
V_{Max} (km/h)	42	38	40	35	38.75
V_{Avg} (km/h)	25	23	22	24	23.5
t_{Avg} (min)	9	8	8	7	8
$t_{Avg\ Delay}$ (min)	2	3	3	4	3

Details like trip distance, Types of various speeds, time of trip, time of average delay for three major share Auto routes were described in detail in the above three tables.

Distribution of major auto stand locations along with the tentative number of auto rickshaws accommodated in the auto stand location was mapped in the base map of Trichy city and shown in the figure 4.The distribution also reveals that the number of accommodated autos are un evenly distributed with more number of auto s in Putur area (126) and least in TVS Nagar (10).

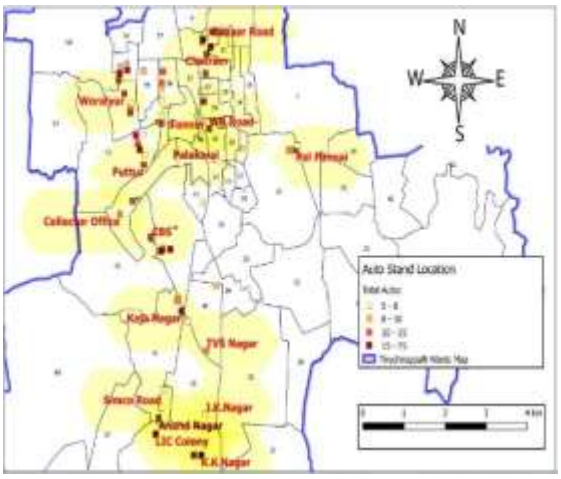

Figure 4: Distribution of Auto stand areas along with number of accommodated autos.

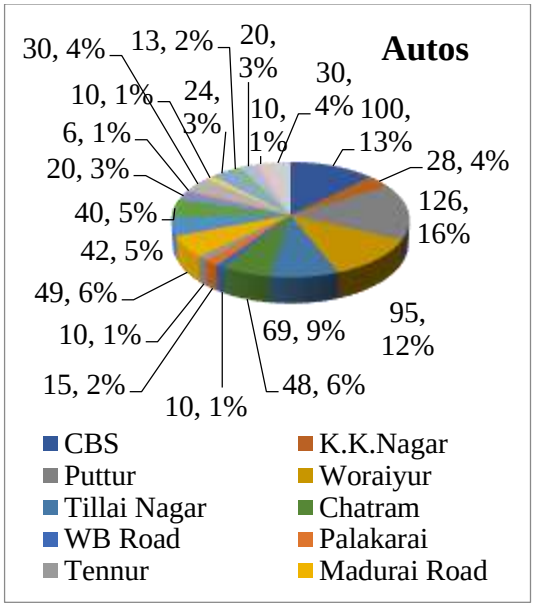

Figure 5: Distribution of Auto stands and no. of accommodated autos.

V. ECONOMY OF PARA-TRANSIT VEHICLES

From the driver's questionnaire survey thefollowing points were noticed with regard to the economy of Para – Transit Vehicle

- Diesel auto rickshaws are spending around Rs.3000 per month on maintenance while for LPG and petrol fueled vehicles, the maintenance cost is Rs.750-1000 per month.
- For each fuel type of auto rickshaw, average money spent on fuel every day is Rs.100-200 depending on the number of working hours and trip characteristics.
- Auto rickshaw drivers are earning much lesser than taxi drivers. On an average they are earning Rs.400 per day irrespective of the fuel type intheir vehicle. Their earnings range from Rs.300 to Rs.500/day.
- Auto rickshaws make maximum 20 to minimum 10 trips.Trip length varying between 1 to 10 kilometers.

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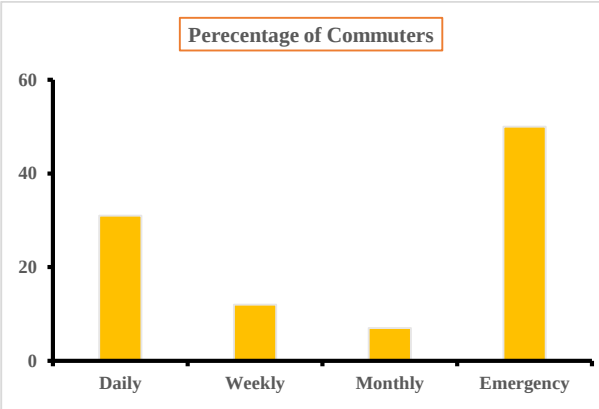

Figure 6 (a): Percentage of Commuters and their frequency of usage of PTS.

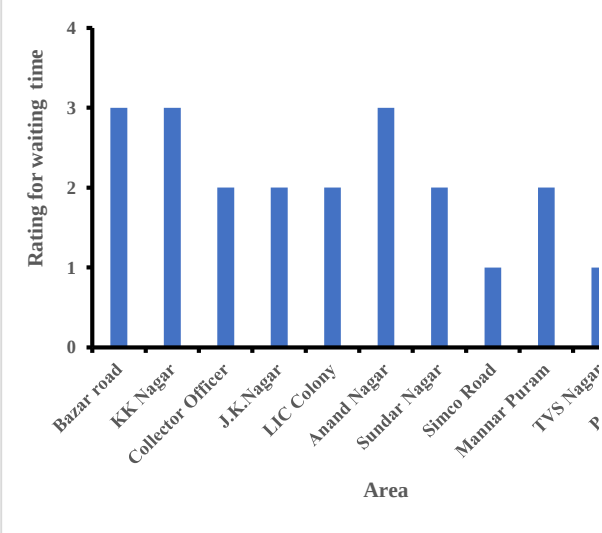

Figure 6 (b): Commuter's feed back about waiting time in PTS during their travelling.

From the commutators questionnaire survey, it was observed that

- In all areas 50% of passengers using PTS only in emergency case.
- Few areas waiting time was more which shows the less availability of PTS.
- For comfort criteria all areas are having fare comparing with buses.
  Some areas has average rating for Accessibility because of unequal distribution PTS.

VI. COMPARISON BETWEEN AUTO AND BUS AS PTS

i) Travel time and name of the road

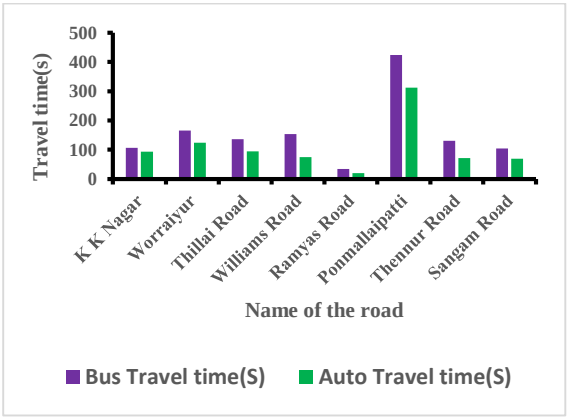

Figure.7 (a): Graph between bus travel time and auto travel time.

ii) Congestion delay and name of the road

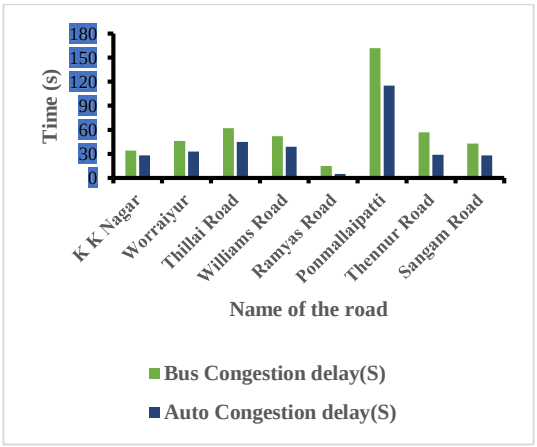

Figure 7 (b): Graph between bus congestion delay time and auto congestion delay time.

iii) Speed and name of the road

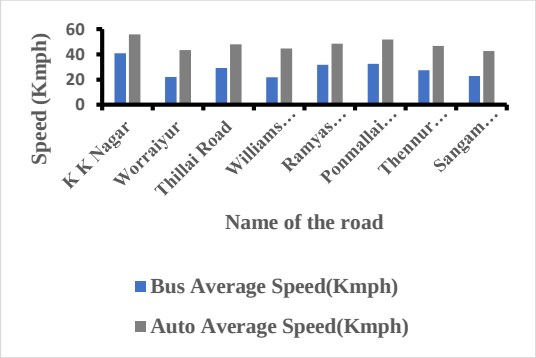

Figure 7 (c): Graph between bus average speed and auto average speed.

- By comparing bus and autos travel time and congestion delay, few areas bus has the more travel time due to congestion in those area.
- By seeing in all areas, the average speed of autos are more than bus average speed.

VII. SUMMARY

In a nutshell, the following salient points were emerged from this study

i. Share autos in the city have very competitive pricing with the city corporation buses and can be a great feeder system in the city if properly regulated and licensed.

ii. 68 per cent auto rickshaws use petrol as their fuel while only 3 per cent use LPG.

iii. Petrol as fuel comes more efficient for auto rickshaws as compared to diesel in terms of maintenance cost and money spent on fuel per day. Although difference between total costs incurred by petrol fueled and LPG fueled vehicles are insignificant.

iv. Because of no share autos in most of the areas, people are forced to take for-hire autos whenever and wherever bus service is not available.

v. All the maxi cabs operating in the city are Diesel fuelled.

vi. The Autos are unequally distributed in the various auto stands in the city. The distribution varies greatly from least value of 1% in J.K. Nagar, W B road and Tennur to the highest of 16% in Puthur.

vii. The public utility of share autos in available areas has fairly acceptable because less travel time but waiting time is overburden to the passengers.

viii. Mode wise percentage data of pedestrian fatal accidents show that only 4 per cent cases involved an accused auto rickshaw as compared to personal vehicles (two-wheeler 21%+ car 17%) whereas 22 per cent vehicles are unknown.

ix. By comparing bus and autos travel time and congestion delay, few areas bus has the more travel time due to congestion in those area.

x. By seeing in all areas the average speed of autos are more than bus average speed

xi. Auto rickshaws are meant to provide services to even a lower middle class commuter, but because of no share autos in most of the areas, people are forced to take for-hire autos whenever and wherever bus service are not available.

xii. Most of the auto rickshaws are not having fare meters and those which are having meters prefer to take passengers on non-metered ride to increase their earnings; since most of the auto rickshaws are accumulated at major junctions of the city without any proper management to carry the fluctuating nature of demand.

xiii. Commuters rating indicate that people would like to go by an auto as compared to a bus only if they are more accessible.

xiv. Ratings over private vehicles clearly indicate that people tend to go by their own vehicle. People who are using the auto rickshaws/ share autos are the ones who do not own a vehicle.

xv. There are no autos available during night at other parts of the city areas excluding Railway junction and CBS.

xvi. In all areas 50% of passengers using PTS only in emergency case.

xvii. Few areas waiting time was more which shows the less availability of PTS.

xviii. For comfort criteria all areas are having fare comparing with buses.

xix. Some areas has average rating for Accessibility because of unequal distribution PTS.

xx. Overcrowding is common in peak hours and occupancy is up to 6 for some trips.

xxi. Autos are standing for long hours waiting for passengers in CBD and Chattram areas because of disproportionate distribution of vehicles.

xxii. Due to absence of Rules and Regulations, they over- load and have arbitrary fares. Very few Para- Transit Vehicles clearly display the routes they play on and the corresponding fares. In addition, it was observed that the fares vary according to traffic conditions and time of day, thus causing confusion to the passengers.

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