

# CRITICAL APPRAISAL ON STUDY OF PARA-TRANSIT (AUTO-RICKSHAW) MODE OF URBAN TRANSPORTATION SYSTEM UNDER MIX TRAFFIC CONDITIONS

<sup>1</sup>Bhayji Javid I., <sup>2</sup>Jayesh Juremalani

<sup>1</sup>M. tech student, <sup>2</sup>Assi. Prof. civil engineering department  
Transportation engineering

Parul institute of engineering and technology, Vadodara, India

**Abstract**— Auto rickshaws, which qualify as a para-transit mode of transport, are one of the most popular modes of public transport in India. They stand incomparable in their segment of providing door-to door transportation and last mile connectivity at an affordable cost to the Indian population. It is widely agreed upon that auto rickshaws are a dynamic mode of transport in Indian cities, providing low-cost mobility and connecting travelers to mass transit or directly to their destinations. The auto-rickshaw sector provides an existence for some of India's poorest citizens. Para-transit vehicles are a for-hire flexible passenger transportation that does not necessarily follow fixed routes and schedules. This paper presents the literature review regarding the study of the para transit (auto rickshaw) vehicles.

**Index Terms**— para-transit, auto rickshaw, urban transport

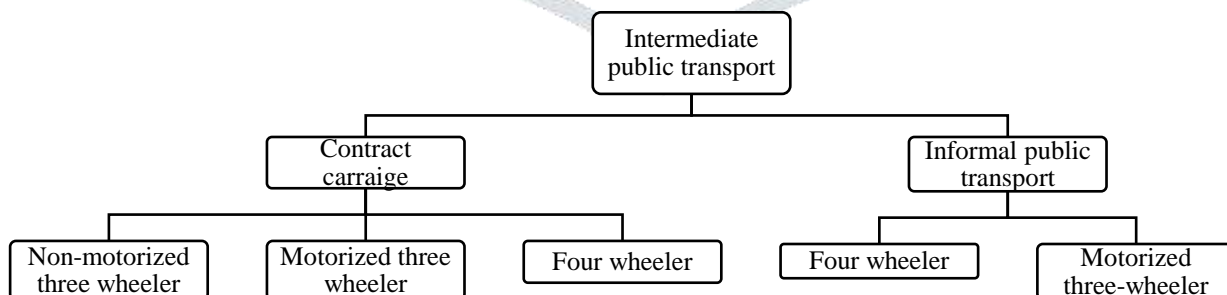
## I. INTRODUCTION

India is urbanizing. Its urban population is growing at an average rate of around 3% per year. The average rate of growth of the urban population is not expected to change significantly during the next ten years or so. Assuming decadal increase of around 32%, India's urban population is expected to increase from 377 million in 2011 to 500 million in 2021. In terms of percentage of total population, the urban population has gone up from 17% in 1951 to 31.8% in 2011 and is expected to increase up to around 35% by the year 2021. In the trend of urbanization need of flexible transportation increases. Para-transits mode is one who provide a flexible and dynamic transportation.

## II. PARA-TRANSITS (INTERMEDIATE PUBLIC TRANSPORT)

Intermediate public transport (IPT) refers to modes that fill the gap between private transport and formal public transport modes in cities. Depending on a city's size and transport characteristics, IPT modes may fall under two broad categories:

- (1) Contract Carriage Services, which are flexible demand based services where the passenger determines the destination, and
- (2) Informal Public Transport (bus like) services, characterized by shared fixed-route services with intermediate stops for boarding and alighting. While contract carriage services are ubiquitous in cities, informal public transport services are typically seen in small and medium-sized cities, which may not have any or adequate formal public transport services. Such services are called informal because of their ownership structure (individual owners) and lack of (or poor) regulation and enforcement.



**Figure 1: characterization of intermediate public transport in Indian cities**

## III. AUTO-RICKSHAW AS A MAJOR MODE OF TRANSPORTATION

Auto rickshaws, a para-transit mode of transport, are one of the most popular modes of public transport in all over India, mostly in urban areas. It is one of the forms of intermediate or informal public transport system. Moreover, auto rickshaw belongs to the family of par transit vehicles. These vehicles have the operation characteristics of flexible routes and schedules as well. They mostly provide two types of services: one involving trips along a more or less defined route with stops to pick up or alight passengers on request. The other is a demand-responsive transport which can offer a door-to-door service from any origin to any destination in a service area. Para-transit systems definition and role changes from developing country to developed country. Developed countries, para-transit is often used for demand responsive systems such as shared-ride taxis, dial-a ride and subscription buses. Developing countries, the lower standard of living, high population density, availability of

cheap labor force etc., have supported the growth and popularity of these modes and bridging the gap between public bus and private automobiles. Auto rickshaw stand matchless in providing door-to-door transportation and last-mile connectivity at an affordable cost to all passengers. They are considered as car of poor people who cannot afford car. It is popular mode of urban transportation because of its smaller, befitting size and unchartered ability to provide connectivity. They are becoming more and more popular in mid-size Indian cities. Unplanned roads, narrow streets, lack of public transport system and different needs of people which cannot be fulfilled by public transport system, everywhere-to-everywhere movement pattern in Indian cities, higher shorter trips, lack of penetrability of public transport system in dense city area further increases the demand and significance of auto-rickshaws in the cities of India.

#### IV. LITERATURE REVIEW

Review of literature is important in any research work. Many researchers have carried out research work in problems related to the para-transit mode of transportation.

**Anindita Ghosh and Kanika Kalra (2016)** have carried out a study on Intermediate Public Transport (IPT) like 3wheelers auto rickshaws, tempos and Tata Magic. For their study they have visited 19 Indian cities across the country. They have categorized the 19 cities in three groups based on population of the city. They have collected opinions of 1900 drivers with the help of questionnaire survey. After the study Anindita Ghosh and Kanika have recommended some suggestion which was grouped in 4 heads Policy and Regulatory Framework, Infrastructural Facilities, Technological up-gradations, Socioeconomic stability of drivers. they have suggested some technological policy measure are, the government needs to provide financial incentives to drivers such as sales tax exemption, interest subsidy on loans, for retrofitting the existing vehicles with latest technologies, State governments should restrict the age of IPT vehicles, Setting up of more CNG/LPG stations, subsidy may be provided by government to the owners of these vehicles, Ride sharing app for IPT needs to be developed for providing the last mile connectivity to commuters. **Ashwani luthra (2006)** has carried out the study of para-transit system of transportation in medium sized cities are problem or panacea, she had also find some major problems regarding the para-transit system .for her study she had selected Amritsar, Punjab as a case study. Her study was based on various research findings regarding traffic characteristics and role of PTS (para-transit system) in medium sized cities. Role of PTS was empirically tested and was based on analysis of primary data collected for traffic volume, speed and parking characteristics during peak hours. Wherever required comparisons were done with norms and standards evolved by the Indian Road Congress to identify the problem areas in operations of the PTS. According to her study that 60 percent of the PTS drivers are illiterate. Only 20 percent drivers have attained education up to tenth standard. Thus low level of literacy and easy employment in PTM operations tempt the drivers to adopt this profession. On average an auto rickshaw driver earns Rs.200 per day, whereas a cycle rickshaw driver earns about Rs.100 per day. The PTS poses some serious problems and issues that alarm the city authorities to take corrective actions to improve its performance which are absence of planning for the PTS (para-transit system), Imbalanced Land Use Pattern, Encroachments, No Parking Facilities, Increased Heterogeneity of Traffic, Illiteracy and No Administrative Control, Planning for Routes and Operation, Controlled Land Use. After the study she had suggested some suggestions that Proper provisions should be made to provide required infrastructure for different PTMs. Proper parking lots, with provisions of shelter to counter the adverse weather, should be planned at appropriate locations. While designing the parking lots near intersections care should be taken to locate them at an appropriate distance from the junction. Generally, 100 meter clear space is recommended at the junctions. Efforts should be made to remove encroachments, if any, on/ along the PTM parking lots so that they can be optimally utilized.

**M. Ali Ahmed & Wickham Victory (2012)** have carried out the study on para-transit mode of transportation in the medium size city Imphal, the main objective of the study was to find the role of para-transit mode in the small and medium size cities in India. Major four types of para-transit modes are plying in the study area – cycle rickshaw, auto rickshaw, Tata magic, maruti vans in the city to provide the needs of transportation services to the urbanites. Among these, auto rickshaw has the highest percentage share of occupants with respect to all the modes. Three types of survey they have carried out which are modal split survey, vehicular occupancy survey, operator survey. to know the numbers of modes available they have carried out modal split survey. To find out the average number of passengers they have carried out vehicle occupancy survey. They have selected the specific places like market area, local roads, major roads, minor roads, important public places to know the usage of para-transit modes and its variations. From the analyzed data the para-transit auto-rickshaw has the maximum percentage share of 69%, Tata magic 16%, van 10% and cycle-rickshaw of 5%. Also they have analyzed that the 30 % of the auto drivers were between 20-30 age group. It is observed that para-transit modes are creating congestion in the urban street because of its slow speed, overcrowding of passengers, unsystematic parking policy, etc. Predefined stoppages to pick up and alight passengers. The maximum number of passengers carried should be less than or equal to the capacity of the vehicle. Auto-rickshaw may not be permitted further to reduce the noise pollution. Counter for collecting tickets for reserved taxis to be used by the passengers should be made. Separate lanes may be provided for the slow moving para-transit like Cycle rickshaw as it causes more traffic jams. The old auto-rickshaw may be removed from the city for pollution control.

**Laxman Singh Bisht & Mokaddes Ali Ahmed(2015)** have carried out the study on socio-economic characteristics of auto rickshaw operators in Silchar city, during Their study main objective was to find out the socio economic characteristics of the auto rickshaw drivers. The basic socio economic status indicators on which they have studied were literacy rate, average household size, housing status (kutcha, semi-pucca, and pucca), and household type. they have carried out a three types of surveys they have carried out Traffic Volume Survey, Auto rickshaw Operators Questionnaire Survey, Vehicular Occupancy Survey Based on the survey many important facts were revealed. Most of the operators are from Silchar itself or nearby villages of the Silchar city. Most of the operators are from the age group of 21 to 30. Most of the operators are under matric as educational qualification .many operators have taken loan for vehicle purchase from private banks or under government schemes. This study has established the role of auto rickshaw in urban passenger movement in Silchar city. Most of the auto rickshaw operators belong to low income group. They belong to the economically weaker section of society. Their main source of income is auto rickshaw operation only. Maximum operators are sole income earner in his family. In addition to basic problems of livelihood of auto rickshaw operators have other problems like non-availability of parking space at desired locations. All auto operators learned driving by themselves. Maximum auto rickshaw are not in good condition and polluting the city air.

**Mr.Pankaj Sharma & Dr.Srinivasan Reddy (2016)** have carried out a study of para-transit system of Alwar and Jaipur cities , Rajasthan , their study was to analyzed the role of para-transit system and identifies the need to recognize and legalese their existence for the benefit of the

people of India. They have selected two cities of Rajasthan namely Alwar and Jaipur. They have studied the para-transits mode of transportation in both cities. After the completion of the study they have suggested the policy measures which are listed below

- [1] The government should try to make policies which contemplate the IPT public transport system. Motor Vehicle Act, National Urban Transport Policy, state road and transport policies should be revised to classify IPT. And try to include IPTs while planning for cities or towns.
- [2] Local UIT's, municipal corporations, municipalities should take decisions on IPT regulations. License shall be given and standards laid down by these bodies for unified and integrated mobility.
- [3] IPTs should be planned in such a manner that it acts as a feeder system to other modes like BRTS, metro systems by integrating at different levels. This integration can be possible through route rationalization, infrastructure and design makeovers.
- [4] Implementation of these IPT's should be done by adapting technology by using Android apps and GPS systems. This would help in increasing the efficiency of the whole transportation systems and provide better customer satisfaction. The successful cases of IPTs in Alwar and Jaipur have shown that by integrating all the modes, efficiency can be achieved in the system.
- [5] If a very good, coordinated, well-organized feeder system is provided to the Metro, accessibility of metro will increase. JMRC is planning for an integrated ticket. If the integration works out, the same ticket will be valid in metro trains as well as buses. However, this will translate to higher rider-ship only if commuters are willing to accept the added transfer time and transfer costs.

*Simon E. Harding, Madhav G. Badami, Conor C.O. Reynolds, Milind Kandlikar, (Nov-2016)* have carried out a study on Auto-rickshaws in Indian cities, their major objective was to provide balance and nuance to debate, and to enable the perspective of drivers to be more effectively considered, along with that of auto-rickshaw users and the wider travelling public, in policy-making. They have critically discussed the criticism and underlying perceptions; highlight the niche role of auto-rickshaws in urban transport; and present an investigation of the realities and economics of auto-rickshaw ownership and operation. They have first discuss the key criticisms and underlying perceptions related to auto-rickshaws and their drivers on the part of the public, the media and policy makers, as represented in the English-language press, which reflects and shapes the views of the politically influential urban middle class; public contributions to online discussion forums and online material produced by "civil society" organizations advocating on behalf of both auto-rickshaw. They have conducted an extensive survey of items regarding various issues related to auto-rickshaws (driver behavior, fares and fare regulation and enforcement, air pollution, safety, and traffic congestion) from 2010; in our discussion, in this paper they have highlighted only representative examples which reflect public, media and policy-maker criticisms and perceptions, owing to space restrictions. For their discussion of the role of auto rickshaws in urban transport, they have drawn on the peer reviewed literature, data produced by government agencies and available in the public domain, and research reports produced by non-governmental organizations. Their discussion of the realities and economics of auto-rickshaw ownership and operation was based on the findings of reports on and surveys of the auto-rickshaw sectors in Bangalore, Chennai, Delhi and Mumbai. That survey includes, importantly, that conducted by one of them in Delhi in 2009; In that survey 381 auto-rickshaw drivers responded, covered a wide range of issues, including demographics, working hours and daily travel, vehicle purchase, and ownership and operation besides factors related to air Pollutant emissions. Demographic and socio-economic data was also drawn from surveys carried out by urban planners and researchers interested in the governance of the auto rickshaw sectors in Bangalore, Chennai, Delhi, and Mumbai, and from data collected by a special committee on auto-rickshaw fare revision in Mumbai. The data was supplemented by interviews with an auto-rickshaw advocacy group in New Delhi (Nyayabhoomi), which provided estimates of how maintenance costs change over the life of the vehicle. With concluding the study they have added, the perceptions of auto-rickshaws and their drivers amongst the middle classes, media, consumer organizations and policy makers are largely negative. The vehicles were seen as polluting, unsafe, and a significant cause of congestion, and the drivers as greedy. Auto-rickshaws are perceived as an intrusion into ordered urban space, to be tamed and controlled with strict policies and punitive penalties.

*Vaibhav Gaurkar (2016)* has carried out a study on systematic organization of para-transit system in context of public transport system in Surat city. In his study he deals with the methodology to be adopted to harmonize the present public transport system and para-transit system to avoid competition and to optimize the urban transport system of Surat city. In his study he has found out the three major problems regarding para-transit system which are absence of planning for auto rickshaw, inadequate parking lots, and heterogeneity in traffic. In the data collection process of his study first he has observed and identified the arterials routes of the Surat city on which the auto-rickshaw and public buses are running, after that he observed the schedule of the buses to find out the feasibility of peak hours and off-peak hours. After that he carried out the house hold survey to find the origin and destination matrix, as well as the socio-economic data like willingness to pay, also to find the various factors like safety and conveniences. After he has carried out the occupancy survey to know the average occupancy of buses and the auto rickshaws. With concluding the study he added that in the absence of effective public bus system in Surat city, the auto rickshaws are serving very well but not efficiently. It needs to be optimized and should be well coordinated with respect to the public buses in terms of fares, routes and frequencies.

#### IV. FINDING FROM LITERATURE REVIEW

This paper aims to present a review of the literature on para-transit mode of urban transportation. Anindita Ghosh and Kanika Kalra (2016), M. Ali Ahmed & Wickham Victory (2012) focused to find the role of PTS in urban transportation system, while Laxman Singh Bisht & Mokaddes Ali Ahmed (2015) focused to find the socio-economic data of PTS operators. Vaibhav Gaurkar (2016) focused on systematic organization of para-transit system. Ashwani luthra (2006) focused on traffic characteristics and role of PTS (para-transit system) in medium sized cities. Anindita Ghosh and Kanika Kalra (2016) took 19 Indian cities for their study, while Ashwani luthra (2006) took Amritsar city, M. Ali Ahmed & Wickham Victory (2012) took Imphal city, Laxman Singh Bisht & Mokaddes Ali Ahmed (2015) took Silchar city, Mr.Pankaj Sharma & Dr.Srinivasan Reddy (2016) took Alwar & Jaipur city, Vaibhav Gaurkar (2016) took Surat city for their study. Most of the above researchers have identified problems regarding para-transit mode of urban transportation which are unorganized system, irregular system, lack of parking, congestion due to irregular movement of PTS. From the brief review of the literature performed, it is possible to work on some indexes of para-transit, checking their methodology and problems in the study area, every city are suffering from the problems of unregulated and unorganized para-transit system. Public opinion can be taken by the questionnaire forms to find out the major congested area, also drivers opinions can be taken by the same way.

## REFERENCES

- [1] Ashwani luthra, "Para-transit system in medium sized cities problem or panacea" ITPI journal, 3: 2 PP. 55-60, 2006.
- [2] Dr. M. Ali Ahmed, Wickham Victory, "Para-transit Public Transportation Mode in Imphal" IOSR Journal of Mechanical and Civil Engineering (IOSRJMCE) ISSN: 2278-1684 Volume 2, Issue 6 , PP.08-12, Sep-Oct 2012
- [3] Vaibhav Gaurkar, "Systematic Organization of Para-transit System in Context of Public Transport System: A Case Study of Surat City" Int. Journal of Engineering Research and Applications, ISSN: 2248-9622, Vol. 3, Issue 6, PP.1372-1373, Nov-Dec 2013.
- [4] Laxman Singh Bisht, Mokaddes Ali Ahmed, "Socio Economic Characteristics of Auto rickshaw Operators in Silchar", National Conference on Advances in Engineering, Technology & Management e-ISSN: 2278-1684, PP 48-53, 2015.
- [5] Anindita Ghosh, Kanika Kalra "Institutional and financial strengthening of intermediate public transport services in Indian cities" Transportation Research Procardia 14, PP. 263 – 272, 2016
- [6] Mr. Pankaj Sharma and Dr. N. Srinivasan Reddy, "Study of Para-Transit System: A Case Study of ALWAR and Jaipur City", SSRG International Journal of Civil Engineering (SSRGIJCE) – volume 3 Issue 5, May 2016
- [7] Simon E, Harding, Madhav G, Badami, Conor c. o, Reynolds, Milind Kandlikar. " Auto-rickshaw in Indian cities: public perception and operational realities" Transport policy Journal, Volume 52, Nov 2016

