

# **"PUBLIC AUTO FARE OPTIMIZATION THROUGH TRANSPORTATION THEORY: THE INFLUENCING FACTORS"**

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Abstract: Sharing an auto-rickshaws is a green and economical way to get around urban areas, and it can help alleviate traffic jams. Due to the growth of India's most populous cities at an astronomical rate in a context where low incomes and outdated transportation infrastructure are aggravated by the rapid expansion of the suburbs and the rapid rise in the use of personal vehicles, the country's transport crisis has been magnified. Integration and policy efforts toward commuters' adoption are hindered by the informal structure and lack of studies. Therefore, this study is one of the first to examine the perceptions of commuters, drivers, and the district administration of Ranchi city regarding the use of shared auto-rickshaws. Understanding and improving commuters' satisfaction levels, raising awareness about sharing auto-rickshaws, and supporting the promotion of the shared mode are the goals of this research.

Keywords: Ride-sharing; public transportation; Developing nation; Sustainable transportation; Service quality

#### I. INTRODUCTION

An annual growth rate of 7.5 percent has made India one of the world's fastest-growing economies. There is a lot of focus on improving public transportation in the country's future, as the

\*Corresponding author: Jayashree Sinha E-mail: jayshree@gmail.com population continues to grow. As the number of people driving their own cars grows in Ranchi, traffic congestion and safety concerns are becoming increasingly prevalent. People in Ranchi rely primarily on paratransit for their daily commutes because the city lacks a formal public transportation system. Road widening

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and flyovers are by far the most common new transportation projects in the city. Real solutions to the city's transportation problems have not been developed because of a lack of concrete action.

There are a variety of recurring and intricate tasks involved in public transportation planning. Each transfer point must be forecasted for the number of passengers, which is often completely unknown and complicates the planning process. Ranchi's autos are officially unregulated, with no predetermined routes or times. For the system is actually selforganized by its driver-created methods of profit maximisation. Kanke Road, Ratu Road, and the Dhurwa-HEC road are just a few of the radial routes that have helped the city expand significantly. Private amenities and infrastructure such as parks and recreational facilities are provided for in the newer residential areas south of the railway line. Weak road infrastructure has stifled economic development between these two major corridors. People from the nearby villages of Ratu, Khunti, Ormanjhi and Kalamati, as well as the urbanised areas of Rampur and Ormanjhi, work in and around the city every day or for long periods of time. Tatisilwai, for example, sees a lot of commuting traffic. Transport Commissioner, members of the Regional Transport Authority (RTA) and the Auto rickshaw union decide about the nitty gritty of the system.

# **REVIEW OF LITERATURE**

The most common mode of transportation is by car (Tripathi and Gautam, 2010). For road transportation to continue, India's National Urban Transportation (NUTP) Policy emphasizes the importance of public transportation. Although the number of registered vehicles in the United States has decreased from 11.1 percent in 1951 to 1.3 percent in 2009, the number of people who use conventional public transportation like buses has remained the same (Maitra et al., 2015). In addition, the growth of the middle class, increased education, the availability of car loans, and an increase in aspiration among Indians due to the attractive marketing of car companies have resulted in a multifold increase in the number of car owners in India (Tiwari et al., 2016; Verma, 2015).

Known as "auto rickshaws" by locals, they are a common mode of public transportation in many Asian countries in development due to their small size, low cost, and ease of maneuverability (Rahim et al., 2013; Finn, 2012; Lukic et al., 2007). Auto-rickshaws, which number around 8 million in India, are a major mode of transportation for people of all socioeconomic backgrounds as well as a major source of daily income for millions of drivers. Around 75 percent of the global auto rickshaws are in India, and its share among motorized modes of transportation ranges from 11 to 20 percent in various Indian cities (Mani et al., 2012; Mani and Pant, 2012). In their current form, auto-rickshaws cannot be considered a sustainable mode of transportation, despite their role in promoting green public transportation. The road transportation sector in India is a major source of emissions because most auto-rickshaws run on gasoline or diesel (Mani et al., 2012; Mani, 2010). They are primarily used in urban areas. Various cost factors and methodologies have been studied over the years by researchers to estimate the costs of public transportation. The perspective, methodology, and scope of various types of studies are all affected by the different purposes for which they were designed. Hundreds of thousands of auto-rickshaws are summoned on a daily basis to transport people from one location to another. As a means of transportation for people in rural areas where buses or trains cannot reach, they employ millions of people. Auto rickshaws are the preferred mode of transportation for nine out of ten train passengers. Many people in developing countries rely on auto rickshaws to get around their cities because of the weak networks of conventional public transportation (Mishra, 2018).

There are more than 2.5 million Auto rickshaws currently on the road in India, and 250,000 new vehicles are sold each year in the country's major cities alone (Navi Vala et.al. 2007). Auto rickshaws can play an important role in promoting sustainable urban transportation in Indian cities, according to a recent publication (Mani Pai and Aggarwal, 2012). As the findings of this study demonstrate, auto rickshaws can be a catalyst for a shift away from private vehicles toward more environmentally friendly modes of transportation, in part by enabling people to use public transportation like buses and trains more frequently and, in part, by providing an affordable, door-to-door substitute to private vehicles for more infrequent trips (Emma Shales, 2013).

# METHODOLOGY

We begin by looking at the people and the media's perceptions of auto-rickshaws and their drivers, as well as the "civil society" organisations that advocate for both drivers and passengers. When it comes to press and online materials, we conducted an extensive investigation into topics such as driver behaviour, fare and fare enforcement, air pollution and safety, as well as traffic congestion; we chose to highlight only representative examples in our discussion because of space limitations. Instead of merely stating that auto-rickshaws are bad for urban transportation in Ranchi, we examine the daily realities and economics of auto-rickshaw ownership and operation from the point of view of the drivers in order to provide a counterargument to these claims. We rely on peer-reviewed articles, publicly available data from government agencies, and nongovernmental organisation research reports when discussing the importance of autorickshaws in urban transportation. It is based on these findings that we are able to discuss the realities of auto-rickshaw ownership and operation.

#### The Factors

At the moment, public transportation in Ranchi is at a critical point. In 2019, only 5% of trips were made by bus, which carried about approximately 1,000 people per day. Currently, work is being done on the Outer Ring Road by the state government and the National Highways Authority of India. Due to a lack of adequate public transportation, the most common modes of transportation for getting around the city are private shared vehicles, taxis, cycle rickshaws, and e-rickshaws. Women-only "pink autos" serve as a prominent mode of public transportation for female passengers throughout the city. The factors influencing the viability and acceptability of auto rickshaws as a mode of transport can be categorized into three broads aspects: firstly the public/customers as the end user, secondly the auto rickshaw drivers/owners as the service provider and lastly, the district administration as the facilitator.

## The Fare

Many urban poor Indians are unable to afford even the low fares on Auto rickshaws, the most common mode of public transportation in India. With no separate rights of way of any kind, they are forced to walk or cycle increasingly long distances and suffer the most of any mode users. As the city grows, those who can't afford a car will find themselves increasingly unable to get to work, further limiting their options.

There is a presumption that the poor use Auto rickshaws because they have no other means of getting around. Due to this, fares have been maintained at a low level as a socially equitable measure. Most Auto rickshaw systems have been unable to recover their operating costs as a result of this situation. Rather than encouraging better practises, it has rewarded inefficient systems that have only been able to stay afloat financially by making significant sacrifices in their level of customer service. However, they are more concerned with higher standards of service than with lower prices. As a result, different Auto rickshaw services for different commuter groups must be considered. Those who place a high value on cost are the poorest in society and should be given reasonable prices. Auto rickshaws must be provided at a reduced cost to them by the rest of society. Another market, on the other hand, places a higher value on convenience and saving time than on price. This market segment has a higher standard of living and would switch to auto rickshaws if they had access to high-quality systems. Their Auto rickshaws don't need to be subsidised, and the fare revenue can cover their costs.

#### Safety and fatalities

In 2019, an estimated 150,000 people died, 1.2 million people are seriously injured (requiring hospitalisation), and 5.6 million people were injured in traffic accidents in Indian cities. A total of 448 people were killed and 339 were seriously injured in various accidents in Ranchi

in 2021, according to data from the Road Safety Cell. From the beginning of the year until the end of the year, 644 traffic accidents were reported. Majority of the accidents, about 95% were related to two and four wheelers, and the auto rickshaws have been found to be a safe mode of travel. However, better road conditions coupled with intoxication and loss of control due to speed on roads has been found to be prime reason for auto accidents. Furthermore, the problem of unsafe driving behaviour has been exacerbated by a lack of traffic law enforcement and insufficient driver training, as well as by lax licencing procedures. The lack of traffic signals and signage as well as the lack of traffic management are also among the issues. Obligatory sharing of constricted, jam-packed rights of way by both motorized, non-motorized automobiles, pedestrians, animals, and street hawkers have also been perceived as major concerns towards safe travel.

#### **Environmental Pollution**

Indian cities are plagued by a variety of environmental issues, including noise pollution, air pollution, and water pollution, and transport sources contribute to all three kinds. Large number of mostly old fleet of three wheeled vehicles with inefficient, poorly maintained, and extremely polluting engines is still a major source of air pollution of the city. As a result of illegally adding up to 30% kerosene and 10% lubricating oil to their gasoline, many auto rickshaw drivers' pollution levels have increased even more.

#### **Roadway Congestion**

One of India's most pressing transportation issues is traffic congestion, which is visible, pervasive, and immediate. Everything from automobiles to social classes are impacted by it. Travelers are irritated and inconvenienced by traffic jams. The average trip distance in Indian cities has been rising as they spread outward to the periphery. As a result of suburban sprawl and the resulting longer travel times, the average distance travelled has increased dramatically. Disrepair is evident on many roads, with potholes and uneven or missing pavement common. As a result, even though it is more expensive, commuters prefer to save time by taking two-wheelers instead of auto rickshaws. People who want to get to their destination on time are also concerned about the time it takes for autos to arrive.

Socio-economic background

Considering that one-fourth of India's population lives in poverty, it is especially important to address the challenges faced by the poor in terms of mobility. Their needs are largely ignored by government policies aimed at serving the interests of the urban upper and middle classes, including transportation policy. Many of Ranchi's urban poor are unable to afford even the cheapest fares on public transportation, let alone own a car or two wheeler. It is likely that this trend will exacerbate Ranchi's already extreme disparities in mobility and accessibility. Increasing motorization will have a disproportionately negative impact on the poor, as they will suffer more traffic accidents, live in more polluted and noisy neighbourhoods, be relegated to the shoulder on congested roads, and lose their homes to construction of new roads. They will also be forced to move.

#### **Inadequate Public Transport**

Ranchi's public transportation system requires major upgrades, but the funds to make those improvements aren't readily available. Buses and cars are ageing and poorly designed; they are overcrowded; they are unsafe; they are unreliable; and they are slow. In general, the city's public transportation systems are inefficient because of ageing technology, incompetent management, corruption, an excess of employees, and low productivity among workers. In spite of the high number of they require ever-increasing passengers, subsidies. As passenger traffic increases in such dense urban areas, it would appear that enhancing and expanding public transportation is the best course of action. New modes of transportation, such as electric or CNG vehicles, can help alleviate some of the problem.

#### Conclusions

There appears to be a growing understanding that Ranchi's transportation woes must be addressed. In order to persuade people who aren't already using a mode to do so, it's helpful to know what current and potential users have experienced and expected. Lack of studies that combine user and non-user knowledge is a problem. Auto-rickshaw sharing studies and knowledge are scarce, so the development of broad dimensions to advance theory on the quality of service provided by auto-rickshaw sharing is needed. Development of extents is at the heart of a theory's development and as a result, auto-rickshaw sharing users require service quality scopes to be developed; one possible component to investigate is how service quality measurements of auto-rickshaw sharing users influence satisfaction.

### References

- Finn, B. (2012). Towards large-scale flexible transport services: A practical perspective from the domain of paratransit. Res. Transp. Bus. Manag., 3, 39-49.
- Lukic, S.M., Mulhall, P., Choi, G., Naviwala, M., Nimmagadda, S. and Emadi, A., (2007), September. Usage pattern development for three-wheel auto rickshaw taxis in India. In 2007 IEEE Vehicle Power and Propulsion Conference (pp. 610- 616).
- Maitra, B., Dandapat, S. and Chintakayala, P. (2015). Differences between the perceptions of captive and choice riders toward bus service attributes and the need for segmentation of bus services in urban India. J. Urban Plan. Dev., 141(2),
- Mani, A. (2010). Why Auto-Rickshaws Matter for India. Available:. (Accessed 11 February, 2021). <u>https://thecityfix.com/blog/why-auto-</u>

# rickshaws-matter-for-india/

- Mani, A., Pai, M. and Aggarwal, R. (2012). Sustainable Urban Transport in India: Role of the Auto-Rickshaw Sector. Available:. (Accessed 11 February, 2021). <u>https://wrirosscities.org/sites/default/files/S</u> <u>ustainable-Urban-Transport-IndiaAuto-</u> rickshaw-Sector EMBARQ.pdf
- Mani, A., Pant, P. (2012). Review of the Literature in India's Auto-rickshaw Sector: A synthesis of findings. EMBARQ India, Mumbai.
- Mishra. (2018). Over 70% of all share auto routes in city are illegal. Available:. (Accessed 11 February, 2021). <u>https://mumbaimirror.indiatimes.com/mum</u> <u>bai/cover-story/over-70-of-all-shareautoroutes-in-city-are-</u> illegal/articleshow/65834933.cms
- NITI Aayog. (2019). Moving forward together: Enabling Shared Mobility in India. NITI Aayog. Available: (Accessed 1 June, 2021). <u>https://niti.gov.in/sites/default/files/2019-</u>01/Shared-mobility.pdf
- Rahim, M.A., Joardder, M.U.H., Houque, S.M., Rahman, M.M. and Sumon, NA, (2013), Socio-economic & environmental impacts of battery driven auto rickshaw at Rajshahi city in Bangladesh. In International Conference on Mechanical, Industrial and Energy Engineering 2012.

Tiwari, G., Jain, D. and Rao, K.R., (2016). Impact of public transport and nonmotorized transport infrastructure on travel mode shares, energy, emissions and safety: Case of Indian cities. Transp. Res. Part D Transp. Environ., 44, pp.277-291.

- Tripathi, S. and Gautam, V., (2010). Road transport infrastructure and economic growth in India. J. Infrastruct. Dev., 2(2), pp.135-151.
- Verma, M., (2015). Growing car ownership and dependence in India and its policy implications. Case Stud. Transp. Policy, 3(3), pp.304-310.