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## ROLE OF E-RICKSHAW UNDER PARA TRANSIT DOMAIN IN URBAN AREAS

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**Abstract:** The number of E rickshaws are increasing day by day as of now there are almost 1,00,000 E rickshaws from 10,000 in the starting all over the city. This number is increasing rapidly because there is no specific rule or regulation to control them. Their increasing number will be an issue about what the future has in store. Thousands of these battery-powered vehicles are plying on arterial roads and alleys with speed ranging 20 to 35kmph, E-rickshaws are not only a safety hazard, but also a causes traffic jams in many areas, especially areas close to Metro stations. Police watch helplessly as these vehicles are outside the ambit of the Motor Vehicle Act. As there is no regulation or policy for these rickshaws anyone can buy them, most of the drivers are not having Driving License, these drivers have no sense of traffic and they try to ferry six-seven people in one go, which causes problem. The Main objectives are to appreciate traffic and travel characteristics in urban areas and also to assess the role of E-Rickshaw amongst different modes of transport, to analyse demand and supply chain of E-Rickshaw, to identify issues and constraints towards the development of E-Rickshaw and to recommend suitable policies and strategies for E-Rickshaw. Scope is limited to three different size cities -Delhi, Jaipur & Agra. The study is based on Primary surveys relating to E-Rickshaw Supplemented by secondary information relating to I.P.T. System and its characteristics. In conclusion I found that battery rickshaw are the need of the day. E -Rickshaws have enormous potential as compared to regular rickshaws, they are much better alternative to the regular rickshaws when it comes to cost and travel time. These motorized e-rickshaws can offer longer rides as compared to the regular ones as these rickshaws are not manually pulled. They are better than other modes in many manners like loading capacity, goods transport and most importantly they are Eco friendly as today we need a pollution free environment and the objective of E-Rickshaw is to ensure reduction in Carbon footprint with zero Carbon- emission. E-Rickshaw can also help to reduce the dependence on conventional fuel and contribute to greener earth.

**Keywords:** Arterial Roads; Motor Vehicle Act, Regulations, speed reduction; Congestion; IPT

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## INTRODUCTION

Transport plays a vital role in the economic development of any country. It is not only a key industry but also holds the key to the development process because of its intrinsic capacity to penetrate deep into the hinterland.[1] In India Urban Transport plays key role in the mobility of ever increasing population providing them a link between residence, employment and various amenities as well as between the consumers and producers to carry out urban trade and commerce.[2] Road based passenger traffic is basically catered by the public transport modes and personalized vehicles. A significant proportion of passenger traffic is served by personalized modes. While economic poor in the society are mostly dependent on public transport system but there is a wide range of demand which often remains latent because it is insufficiently catered for. This gap in passenger transport supply is filled by variety of intermediate transport modes (IPT). Amongst these predominant ones are Taxis, Auto Rickshaws, Cycle Rickshaws, Tonga & now E-Rickshaw. [3]

The E-Rickshaw is a battery powered Rickshaw which is made of a fully recyclable polyethylene cabin, a heavy duty modular steel frame and an advanced, digitally controlled electric propulsion system. It is eco-friendly and convenient mode of transport carries 3-4 passengers [4]

Encroachments by them are increasing in residential area, as due to lack of parking space they are parking them on road only. If they will keep on increasing like this they will replace cycle rickshaw (around 6 lakh) which will affect livelihood of around 50-60 lakhs people, including those in manufacturing units and mechanics, in Delhi alone. [5] With speeds ranging between 20 and 35kmph, e-rickshaws are not only a safety hazard, but also a reason for traffic jams in many areas, especially near Metro stations. [6]

### Evolution:

E-Rickshaws are made in China. In China, about 2,500 companies manufacture electric two- or three Wheeled Vehicles. The largest market after China will eventually be India.

### Objectives of the present study:

To appreciate traffic and travel characteristics in urban areas and also to assess the role of E-Rickshaw amongst different modes of transport.

To analyze demand and supply chain of E-Rickshaw.

To identify issues and constraints towards the development of E-Rickshaw.

To recommend suitable policies and strategies for E-Rickshaw.

E-Rickshaw profile and data collection

These E-Rickshaws may be useful, but not regulated by any legislation such as the Motor Vehicles Act. Earlier E-RICKSHAW was to run on 250-watt motors, carrying two passengers at 20kmph, which does not require registration as Motor Vehicle. But in fact more powerful Chinese motors are substituted at the time of assembly, the fabricators are using 850-1000watt motors running on four batteries and generate speed more than 25kmph. For now, all e-rickshaws are run by private operators and none of them is registered with the Delhi government.

E-rickshaw specification

The present form of E-Rickshaw in Delhi possesses the following specifications:

Price – Rs.85, 000-1, 20,000.

Capacity including driver: 4 to 6 passengers per trip.

Motor: 650-850W

Power: Four 12V batteries.

Run for 60-80km in a day

Charging time-8-10 hours

Electricity Consumed during charging of batteries: 8-10 units

Battery cost: Rs.22, 000.

Popular Local Brands: Mayuri, Sarthi, Yatri.

City & E-rickshaw network profile: To understand the role of E-Rickshaw in urban areas broad information was collected in cities like Jaipur and Agra. A detailed survey was done in Delhi. Following inferences were made from the analysis.

Delhi:-Parts of E-Rickshaw are supplied from China and assembled at Factories located at Peeragadi, Gurgaon and Patparganj. These assembling units sales E-Rickshaw to the dealers and union leaders .From them people buy to use them for the earning. Cost of E-Rickshaw is varying from Rs.85,000-1, 25,000.The E-Rickshaw in Delhi is being used for smaller trips and the average Trip Length of E-Rickshaw in Delhi is 2.09 km.

The fare of E-Rickshaw is more economical to the passenger comparing cycle rickshaw or auto rickshaw .The average fare is Rs. 10 for 1-2 km and Rs. 30 for 2-4km.

Survey locations : Sampling was adopted at different places of various corridors so that all type of characteristics are included in the samples as presented in Fig.1,2 & 3.



Figure 1: Chandni Chowk



Figure 2: New Delhi Railway Station



Figure 3: Delhi University

Source: Primary Survey (2014)

Jaipur: In, Jaipur, parts of E-Rickshaw are indigenously manufactured in factories located in Vishwakarma Industrial Area and some of the parts like motor and battery are imported from China.90% of the E-Rickshaw which are manufactured in Jaipur are sold to Delhi from these factories itself. E-Rickshaw in Jaipur is being used for smaller trips and the average Trip Length of E-Rickshaw in Delhi is 2.3 Km. The fare of E-Rickshaw is more economical to the passenger comparing cycle rickshaw or auto rickshaw .The average fare is Rs. 5 for 1-2 km, Rs. 10 for 2-3 km and Rs. 30 for 3-6 km.

Major Routes where E-Rickshaw are plying in Jaipur are presented in Fig. 4



**Figure 4: Major routes of E-Rickshaw**

**Source: Primary Survey (2014)**

Agra: In Agra, the E-Rickshaws are purchased from Delhi where these are assembled from the Chinese spare parts. The E-Rickshaw in Agra is being used for smaller trips and the average Trip Length of E-Rickshaw in Delhi is 1.98 Km. The average fare is Rs.10 for 1-2 km and Rs. 30 for 2-3 km.

Major Routes where E-Rickshaw are plying in Agra are presented in Fig. 5.



**Figure 5: Major routes of E-Rickshaw**

**Source: Primary Survey (2014)**

Criteria for fixing the role of vehicle in urban area of Delhi, Jaipur & Agra are presented in table 1.

**Table 1: Criteria for fixing the role of vehicle in Urban Areas.**

	DELHI	JAIPUR	AGRA
<b>VEHICLE</b>	E-RICKSHAW	E-RICKSHA W	E-RICKSHAW
<b>LEGAL STATUS</b>	NO	NO	YES
<b>FUNCTION OF E-RICKSHAW</b>	Feeder	Main Line Haul	Main Line Haul
<b>INFRASTRUCTURE (PARKING)</b>	At some places	No	Available
<b>SUPPLY PROFILE</b>	Raw material (Assemble Factories (Peeradi, Patparganj etc.)	China at Gurgaon (V.I Area).	80 % parts are manufactured factories (Battery, motor )
	Direct Supply from Delhi	20 % parts are imported from China	Direct Supply from Delhi
	Cost/E-Rickshaw- 85,000-1,25,000	Cost/E-Rickshaw- 85,000-1,10,000	Cost/E-Rickshaw- 90,000-1,20,000
	<u>Battery Life</u> - 60-80Km.	<u>Battery Life</u> - 60-80 Km.	<u>Battery Life</u> - 60-70Km.
	<u>Charging</u> - 7 -8	<u>Charging</u> -	<u>Charging</u> - 7

	hours. <u>Vehicle capacity-</u> 5-6		7 hours. <u>Vehicle capacity-</u> 4-5 persons per trip.		hours. <u>Vehicle capacity-</u> 5 persons
	persons per trip.		<u>Electricity charges-</u> Rs.50 /day.		per trip.
	<u>Electricity charges -</u>		<u>Avg hours of operation-</u> 11:00am-5:00pm (6 Hrs.)		<u>Electricity charges -</u> Rs.40 /day
	Rs.50 /day				
	<u>Avg hours of operation-</u> 10:00am -6:00pm(8 Hrs)				<u>Avg hours of operation-</u> 10:00am-5:00pm (7 Hrs.)
<b>OPERATOR</b>	<u>Ownership:</u> Most of the		<u>Ownership:</u> Most of the E – Rickshaws		<u>Ownership:</u> Most of the E –
<b>PROFILE</b>	E – Rickshaws in DELHI		in Jaipur are owned.		Rickshaws in Agara
	are Rented.		<u>Shift-</u> Mainly Auto rickshaw drivers are		Rented .
	<u>Shift-</u> Mainly	Cycle	shifting towards E – Rickshaw.		<u>Shift-</u> Mainly Cycle Rickshaw
	Rickshaws drive are		<u>Reason of shifting-</u> As there are		drivers are shifting towards E
	shifting towards	E –	registration plates in E – Rickshaw, they		– Rickshaw.
	Ricksha		do not		<u>Reason of shifting-</u>

w.	have to pay any challan.	More
<u>Reason of shifting-</u>	<u>Avg.Collect</u> <u>tion /</u> <u>Day-</u> Rs.400-500	Incom e.
More Income		<u>Avg.Collecti</u> / <u>Da</u>
No Regulations		<u>on</u> / <u>y-</u>
		Rs.250-300
	<u>Avg.Collect</u> / <u>Day-</u> <u>ion</u>	

**Key observations-**

Auto Rickshaws are banned in M.G Road because of increasing pollution. Cycle Rickshaws are banned near Taj Mahal due to steep slopes which are affecting operator’s health. So, only E-Rickshaws are plying on these routes as an I.P.T. mode. No Where in the country, the E-Rickshaw has been allotted any number except Agra.E –Rickshaws in Agra have a Unique SERIAL Number allotted by Municipal Corporation. This is displayed prominently by Municipal Corporation. License is also given to E-Rickshaw operator who is more than 20 years of age. Registration should be Renewed every year. The Charges of renewal of Registration is Rs.300.

E-Rickshaw are legalized in Agra under Municipal Co-Operation. Mainly E-Rickshaw are functioning as feeder mode in Delhi whereas in Jaipur and Agra they are functioning as main line haul. Official Parking is available in Agra .Mainly Cycle Rickshaw and Auto Rickshaw operators are shifted towards E-Rickshaw because of more income. Users are shifting from Cycle Rickshaw, Auto Rickshaw &Mini Bus. Reason of shifting towards E-Rickshaw is because of direct connection between high activity nodes and it is easily accessible, convenient and fast.

**Data Analysis**

All the data analysis is done separately in three cities DELHI, JAIPUR & AGRA.

The study is based on Primary surveys relating to E-Rickshaw Supplemented by secondary information relating to I.P.T. System and its characteristics.

Following Detailed analysis was carried out in Delhi to understand the role of E-Rickshaw in the overall transport system in the three locations(Delhi university, Chandni Chowk &New Delhi railway station) :

Operator characteristics

Personal characteristics

Operational characteristics.

User characteristics.

Trip characteristics.

Attitudinal characteristics.

Inferences are drawn on the basis of studying the effect of the above mentioned parameters which quantifies the effect of these parameters on transport system:

In Delhi University mainly, Cycle Rickshaw operators are shifted towards E – rickshaws whereas at New Delhi Railway Station-mostly Mechanics are shifted towards E-Rickshaw.

At some places, minors are driving E-Rickshaw as a part time job.

Unofficial parking with charging facility is available near Chandnichowk& New Delhi area (Mori Gate,)

Many Tourists are using E-Rickshaw near Chandnichowk through which they are earning more.

E-Rickshaw near Delhi University area are running at longer distance and with more speed because of less traffic and good road network.

Vehicle operating cost per km of E-Rickshaw is 4.09 Rs./Km which is high as compared to cycle rickshaw and auto rickshaw

Profit of E-Rickshaw owner per month(if owned)= Rs. 16,450

Profit of E-Rickshaw owner per month(if rented)= Rs. 12,000

In Delhi University area, mainly the students use E-Rickshaw as a predominant mode for travel from one place to another within the campus area and outside the campus too. A significant part of the education trips have been performed by metro which is main line haul mode for the students, most of the students take E-Rickshaw as a feeder and dispersal mode to and from metro station respectively.

It has been observed that the people who come to visit the Chandni Chowk area by metro or even by private modes, park their vehicle at metro station and take

E-Rickshaw as a feeder and dispersal mode. This phenomenon is very common due to heavy congestion at main Chandni Chowk road.

Comparison of e-rickshaw with other modes (CaseStudy:Delhi):- A comparison of various Characteristics of E-Rickshaw with other modes (cycle rickshaw & auto rickshaw) has been done. Following inferences were made from the analysis:

The study reveals that size of E-Rickshaw comes between auto rickshaw and cycle rickshaw. The number of E-Rickshaw in city is more than auto rickshaw and increasing day by day.

A comparison of cycle rickshaw drivers with E-Rickshaw drivers reveals that E-Rickshaw drivers earn more instead of experiencing high vehicle operating cost and working less than cycle rickshaw. Rent paid by E-Rickshaw drivers is much more than that of rent paid by cycle rickshaw drivers. Mainly E-Rickshaw are operating as a dispersal mode whereas auto Rickshaw operates as a main line haul. Vehicle operating cost of E-Rickshaw is comparatively more than that of Auto Rickshaw and Cycle Rickshaw because of the quality of raw material they use in E-Rickshaw.

## **RESULTS AND RECOMMENDATIONS**

The following findings are made from survey carried out for evolving E-Rickshaw characteristics:

Predominantly drivers having age band of 25-35 years are driving E-Rickshaw. Average age of the driver is found to be 32 years.

In Delhi around 40% of operators are owning E-Rickshaw and rest 60% are hiring it.

Average monthly income of a E-Rickshaw owner driver is Rs. 16,450 per month and hired driver is Rs.16,200 per month.

E-Rickshaw operates between high activities centres and hence work related trips experience high share.

Vehicle operating cost per km of E-Rickshaw is 4.09 Rs./Km which is high as compared to cycle rickshaw and auto rickshaw.

Size of E-Rickshaw comes between auto rickshaw and cycle rickshaw. The number of E-Rickshaw in city are more than the number of auto rickshaw in the city.

A comparison of cycle rickshaw drivers with E-Rickshaw drivers reveals that E-Rickshaw drivers earn more instead of experiencing high vehicle operating cost and working less than cycle rickshaw.

Rent paid by E-Rickshaw drivers is much more than that of rent paid by cycle rickshaw drivers.

Recommendations: Following improvements in E-Rickshaw Industry are required to be taken to make e-rickshaw safer and viable mode for efficient operation in urban area:

#### **ORGANISATION OF E RICKSHAW INDUSTRY**

Industry: Registration of these rickshaws should be made compulsory and accordingly they may be issued registration number. Trade license should be given to Dealers and manufacturers. Vehicle should be subject to crash tests, braking system tests and other security parameters through expert agencies

Drivers: Drivers should be trained and licensed. Training certificate should be given.

Vehicle: Speed, Seating capacity and lux of the vehicle should be fixed

Enforcement/operations: Transport Plan should be made by Transport Department to fix the operating environment for E-Rickshaw. Operations of E-Rickshaw must be linked with Metro. Halt & Go parking slots should be designated for them and their number at any junction should not exceed more than 8 to 10. Night parking & charging should be provided. Should be restricted within internal roads or for short distances (2-3km).

#### **Legal framework**

Details of licensing procedures: E-Rickshaw operations should be managed and controlled by a Board chaired by the Municipal commissioner of Delhi. License Fees: Rs. 300 (2% of their average earning) should be charged

License renewal: The license granted to the drivers shall be valid for a period of one year. E-Rickshaw licenses are granted subject to the fulfillment of laid-down terms and conditions at the time of seeking licenses at the Zonal level of the MCD.

Conditions for registration: Power of E-Rickshaw should be legally restricted up to 250 W and Speed Less than 25Kmph. Annual Safety Check should be done of these E-Rickshaws and should be certified by ARAI. Serial number must be painted on the payment of fees. The number shall not be removed, altered defaced or obliterated

Condition for driver license: The person must be well trained in driving the E rickshaw. No person of less than 20 years of age should drive E-Rickshaw

Penalty: No person can ply on hire any E rickshaw within the municipal limit without a valid from the respective zonal authority. The plying of rickshaw without license can be seized and disposed. A quota has been assigned for limit of registration of E rickshaw. As per demand of the city that can be issued for E rickshaw. The quota of required E-Rickshaw licenses is divided among the 12 MCD zones

Technological improvements measures: Quality of Raw Material should be improved.

Administrative measures: Management, Control and regulation should be the responsibility of Local Government in the city. E-Rickshaw needs to be regulated by standards in respect of power, design of vehicle, safety, Pricing and registration.

Financial/fiscal measures: IPT in general are major generator for less educated and less skilled persons. Presently there is no facility from government for maintenance or purchase of E-Rickshaw.

People having money people own most of the E-Rickshaw and give them on rent. They are charging arbitrary rent from Rs. 300-800

So Proper financial and fiscal measures should be taken in this direction.

## **CONCLUSION**

I.P.T modes play a very important role in the urban transport system in different forms and different degrees depending on the sizes of urban cities. In small and medium cities where public transport supply is not present, or not adequate, I.P.T complements and supplements, the role of public transport while in large cities and in metropolitans, I.P.T is supplementing the public transport demand.

Role of E-Rickshaw is also considered keeping in view of employment potential in operating and also in manufacturing, ancillary industries are related to them.

These motorized E-Rickshaws can offer longer rides as compared to the regular ones as these rickshaws are not manually pulled. They are better than other modes in many manners like loading capacity, goods transport and most importantly they are Eco friendly.

All E-Rickshaws are run by private operators and none of them is registered with the Delhi government. E-Rickshaw is operated between high activity centres. In small cities they are functioning as a main line haul whereas in metro cities 80% of E-Rickshaw are functioning as a feeder mode. Due to inadequate control and provision of E-Rickshaw stand, there is congestion on major traffic volume corridor. E-Rickshaw plays a dominant role in the movement of passenger, but uncomfortable for four persons to sit at a time due to small seating space. Average speed of E-Rickshaw is 12kmph which lies between speed of slow moving mode and fast moving mode the movement and operation of E-Rickshaws on arterial roads is one of the primary source of congestion and safety.

Mainly Cycle Rickshaw and Auto Rickshaw operators are shifted towards E-Rickshaw.

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