PROVIDING CENTER FOR EFFICIENT DYNAMIC RIDE SHARING

Mira Rameshbhai Patel[*]

Prof. S. B. Khara*

ABSTRACT:

To reduce the ill effects of private vehicles and also due to inadequate mass transit system, dynamic ride sharing facility should be provided. If this service is provided in large area, the driver has to travel a long distance to pick up a passenger and the efficiency of the system reduces. Thus, to provide a flexible and reliable facility, centers at some location should be provided. By considering the area as hypothetical, locations where the traffic flow is heavy and the demand for the facility is high, are selected as proposed locations of centers. Classified volume count survey at peak hours and also, willingness to shift survey is carried out at each location. From the analysis of this data, center is proposed at location where maximum demand is there and maximum private vehicles can be diverted.

Keywords: Center, dynamic, hypothetical area, demand.

[*] Student at Department of Civil Engineering, L.D. college of engineering, Ahmedabad, Gujarat, India

Introduction:

Economic growth, urbanization and modernization of our society have increased the demand for new transportation facilities. The traditional services available in urban area are private vehicles and public transportation system. Private cars are always preferred as it allows complex travel patterns and provides privacy and flexibility; while use of mass transit system decreases the traffic congestion, pollution and thereby improves efficient economic development in general.

But both of them are facing some limitations like, increased demand for private vehicles, together with low occupancies, has lowered the efficiency of transportation system; increased traffic congestion and pollution, increased oil prices fluctuations, etc. while mass transit system has lesser flexibility and reliability, ridership is concentrated on few routes only, people have to wait for a longer time, occupancy per vehicle is small and most of the vehicles move empty seated during off peak hours and during peak hours, they frequently get overloaded.

One of the solutions to above mentioned problems is to provide Dynamic ride sharing. Real-time ridesharing enabled by automated matching is a service that dynamically arranges shared rides. Requests for rides are received over time, each consisting of two points, an origin and a destination as well as time of travel. The Ride share agency matches the information with other participants registered in the Database and identifies potential Ride share partners. The goal is to schedule requests in real-time and to minimize the users' traveling times.

Dynamic Ride sharing attempt to provide added flexibility to rideshare arrangements by allowing drivers and passengers to arrange occasional shared rides ahead of time or on short notice.

Need of centers:

The area selected is corridor of income tax, Shahpur and Dariyapur. Mass transit system like AMTS and also traditional ride sharing system are there, but they are inadequate. Thus, it is necessary to provide some solution and if dynamic ride sharing service is provided in large area like this, it will frequently occur that driver will have to travel long distance to pick up a passenger. In this case, it is quite possible that either the driver will refuse to provide the service or he will ask for extra money per extra – ineffectual distance he will have to travel to pick up a single passenger.

Possible solution to this problem is to provide centers in given area, where the vehicles, to provide ride, are always available. The centers are provided at locations, where the demand of this service is very high. When a user of this facility asks for a ride, the driver available at the nearby center of the origin of user is provided to facilitate; also after providing the service, driver can go and stay during idle period, to the nearby center of the destination location of user. This facility will reduce the above mentioned negative effects like, it will minimize the extra distance a driver and other passengers have to travel, reduce congestion, pollution and cost also; users will not have to pay extra money and so, efficiency of system increases and more and more private vehicle users would be able to diverted to this facility.

Selection of locations:

Proposed locations for centers are selected assuming the area as hypothetical. One place of each area, especially where traffic flow is very heavy, is selected and out of these, locations where demand is high, are proposed as centers for ride sharing facility.

1.   Shahpur: Shahpur cross road

2.   Dariyapur: Dariyapur Darwaja

3.   Incometax: Incometax cross road.

Data collection:

1)   Classified volume count survey:

Traffic data were collected manually on the field. All intersections comprise both motorized and non-motorized vehicle. In this study, for analysis purpose traffic have been grouped into seven classes:

    1)   Car (Car, jeep, taxi)

    2)   Large Bus

    3)   Truck

    4)   Two wheelers

    5)   Auto rickshaws

    6)   Light commercial vehicles (LCV)

    7)   Bicycle

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The traffic data were recorded for about 120 minutes for each approach. Traffic data was collected for both during morning peak hours of 9.00 a.m. to 11.00 a.m. and evening peak hours of 5.00 p.m. to 7.00 p.m. Number of approaches was noted down. Total traffic flow (PCU/hr) in each area:

Total PCU/hour of average of morning and evening peak hour at junction of Dariyapur Darwaja is 9685.51, at Shahpur cross road is 8554.81 and at Incometax cross road is 15415.72.
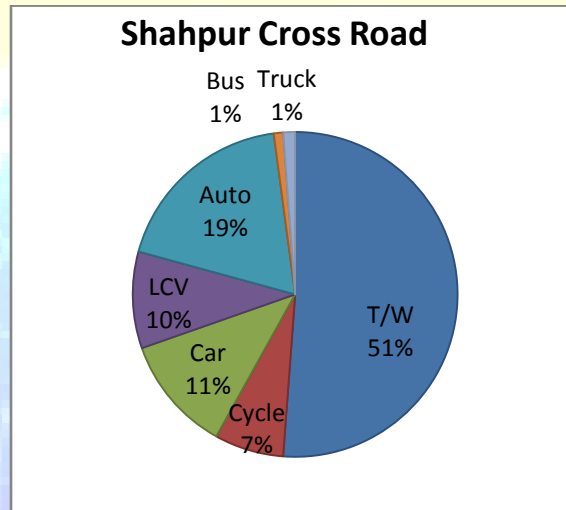

Figure 1: Classified volume count data at shahpur cross road
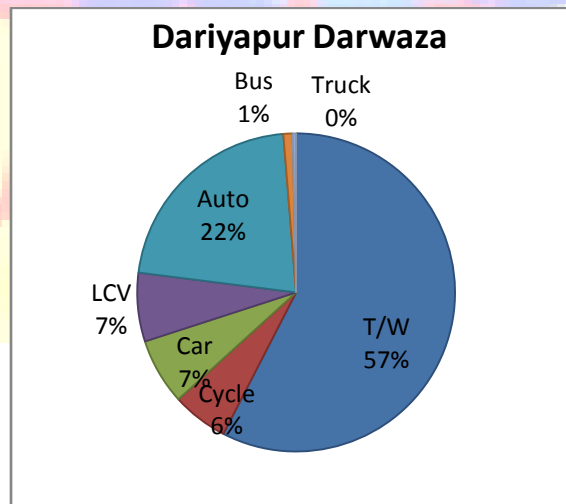
Figure 2: Classified volume count data at Dariyapur Darwaja

Incometax Cross Road

Bus 3% Truck 2%

Auto 15%

LCV 9%

Car 12%

Cycle 7%

T/W 52%
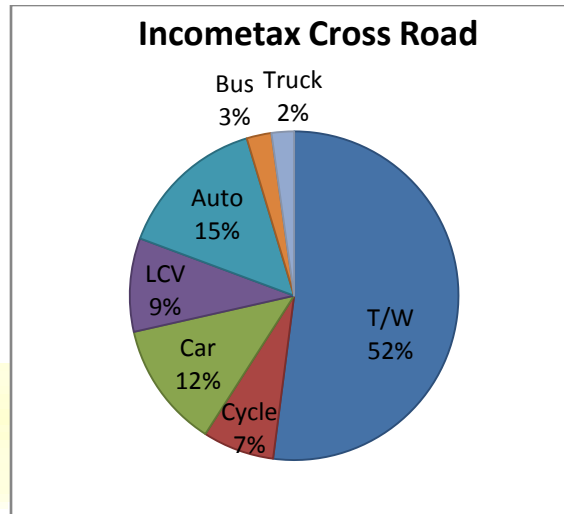
Figure 3: Classified volume count data at Incometax cross road

2)   <u>Willingness to shift survey:</u>

Willingness to shift survey is carried out to know the number of passengers want to shift to the facility of ride sharing, how much they can afford for the trip, number of private vehicles that can be reduced, problems during the use of transit system and their preferable mode of travel.

Willingness to shift survey was carried out at each locations mentioned above. At each location, around 30 to 50 random samples were selected and results were obtained by interview method.
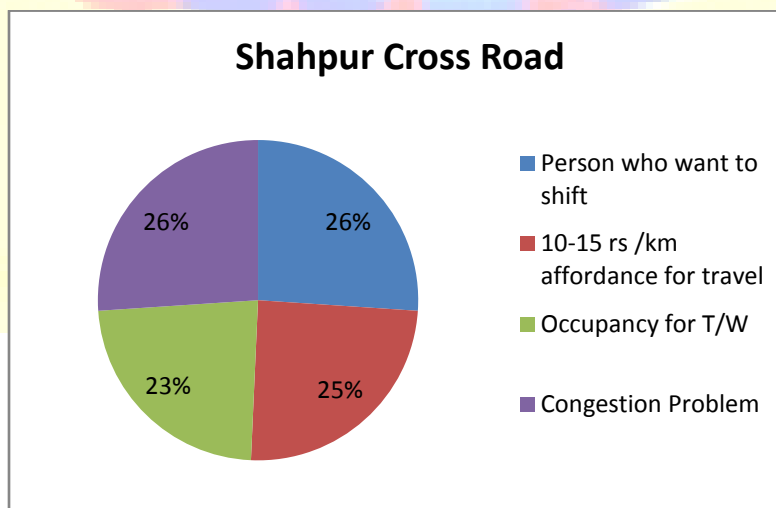
Shahpur Cross Road

26%   26%

23%   25%

- Person who want to shift
- 10-15 rs /km affordance for travel
- Occupancy for T/W
- Congestion Problem

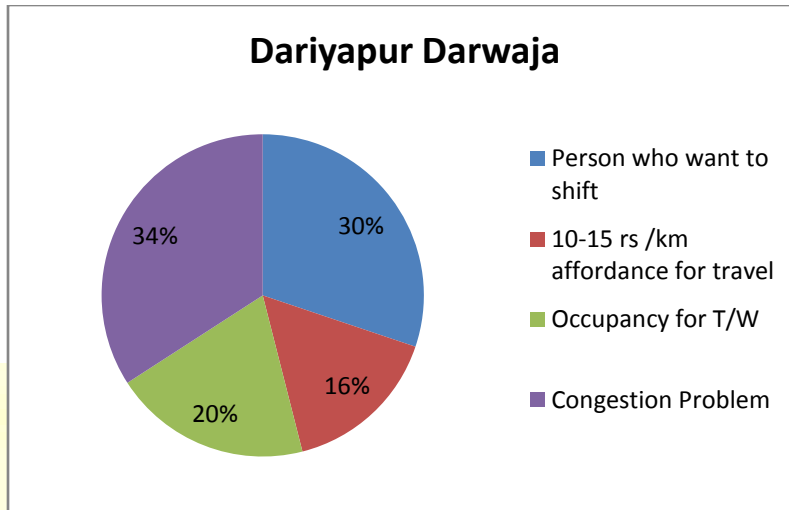**Figure 4: Willingness to shift data at Shahpur**

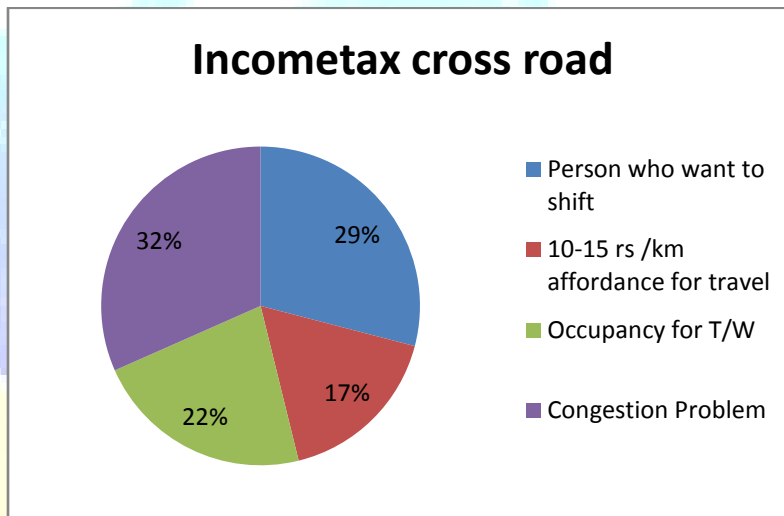**Figure 5: Willingness to shift data at Dariyapur**

Figure 6: Willingness to shift data at Incometax

Out of 50 samples collected at each location, samples who shown willingness to shift to ride sharing facility are 31 at Incometax cross road, 34 at Dariyapur Darwaja and 28 at Shahpur cross road.

RESULT:

The location where maximum number of private vehicles that can be diverted to ride sharing facility i.e. where maximum demand for the facility is there, is selected for providing center so as to provide reliability and flexibility to passengers.

Incometax:

Number of Samples willing to shift = 31 out of 50.

Percentage = 62%

Total PCU/hour = 15415.72

Total number of vehicles = 28892

Number of vehicles that can be reduced = 62% of 28892

$$= 17913 \text{ vehicles}$$

Similarly, at Shahpur cross road, total number of vehicles are 15830 and at Dariyapur Darwaja, total number of vehicles are 17632. Also, percentage of samples willing to shift is 64% and 69% respectively. So, number of vehicles that can be reduced are 10131 and 12166.

CONCLUSION:

To provide centers for dynamic ride sharing in given study area, classified volume count survey as well as willingness to shift survey and data analysis is carried out. The result of this analysis shows that, Income tax is the place, where maximum demand for this facility is observed and also, it is located so that the driver can easily maneuver to fulfill demand from any internal location. So, Income tax is proposed as center for providing a flexible and reliable ride sharing facility.

Acknowledgement:

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