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ROLE OF PARATRANSIT IN REGIONAL PASSENGER MOVEMENT: SILCHAR, ASSAM

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ABSTRACT

Paratransit is a specialized transport service which acts as a bridge between the private automobile and public transit. It mostly provides shared ride service and door to door service maintaining flexibility in terms of route and schedule. The goal of this study is to assess the role of paratransit in the regional passenger movement. The paratransit vehicles are used as a substitute of bus service in the vicinity of urban area particularly in the NE region. The reason may be lower population density, narrow roads and the frequency of service. The small size Paratransit vehicles like Auto-rickshaw, Cruiser, Tata-sumo, Winger, Tata-magic, Auto-van, Mahindra Maxx, Ambassador are found to be very effective to provide services in the semi-urban/ rural areas at a higher frequency. Various surveys like modal spilt survey, vehicular occupancy survey, operator survey and techno-economic characteristic survey of the vehicle have been conducted in the study area and the share of Paratransit in passenger movement have been found out with respect to all the modes. The degree of variations of the level of utility of regional Paratransit at various locations has been studied and presented. Suggestions and recommendations have been made to improve the Paratransit service systems and the study area.

KEYWORDS: *paratransit, automobile, route, regional, passenger, road network*

1. INTRODUCTION

Paratransit service consists of small capacity vehicle such as Cruiser, Maxx, Tata Sumo, Winger, Auto-rickshaw, Tata magic etc. which operate on flexible schedule and route. Regional Paratransit plying for carrying passengers from neighbouring rural/ semi urban areas to and from urban areas. Motorized Paratransit have continued their dominant in carrying regional passengers over conventional public transit such as bus due to their smaller capacity (which required very less time to fill up the vehicle), less parking time, no fixed route and follows demand stop policy. Nowadays, their number is increasing day by day and hence passengers need not to waste their time for getting a vehicle and passenger can alight anywhere he likes on the road side. However, their services in respect of traffic safety, comfort, reliability and overall service condition should be improved. Therefore, there is need to study the existing Paratransit system on regional basis and to find how the service can be improved. The objective of the study is to assess the role of Paratransit in the transportation of regional passengers.

Paratransit is a transportation service usually in highway vehicles operated in public streets and highways in mixed traffic; it is generally provided by private operators and it is available to certain groups of users or to the general public, but adoptable in its routing and scheduling to individual users degrees (Vuchic 1979)

2. CASE STUDY AREA: SILCHAR

Barak Valley is situated in the southern part of the Indian state of Assam. It is located in between 24°49'N latitude & 92°48'E longitude. The pioneer city of the Barak valley is Silchar. The Region is named after the Barak River. Barak valley mainly consists of three districts namely Cachar , Karimganj, and Hailakandi. Karimganj is the second largest city in this region which is considered as the cultural centre of Barak valley. The official language of Barak valley is Bengali. Majority of the people speak a dialect of Bengali, which is known as Sylheti. Religious composition of the valley population is Hindu: 50%, Muslim: 46%, and others 4%. Hindus are majority in Cachar district (60%) while Muslims are majority in Karimganj district (53%) and Hailakandi district (57%). Apart from the Bengali nation, Barak Valley is the home land of Kacharis, Hmar, Manipuris (Both Bishnupriya and Meitei), Rongmei Nagas and tea garden labourers.

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2.1 Location of study area

Silchar and its hinterland the pioneer city of Barak Valley, has been selected as the study area in this dissertation. The study area is being indicated in figure 2.1. The study area includes Silchar and its hinterlands. The study area has been concentrated along the main roads.

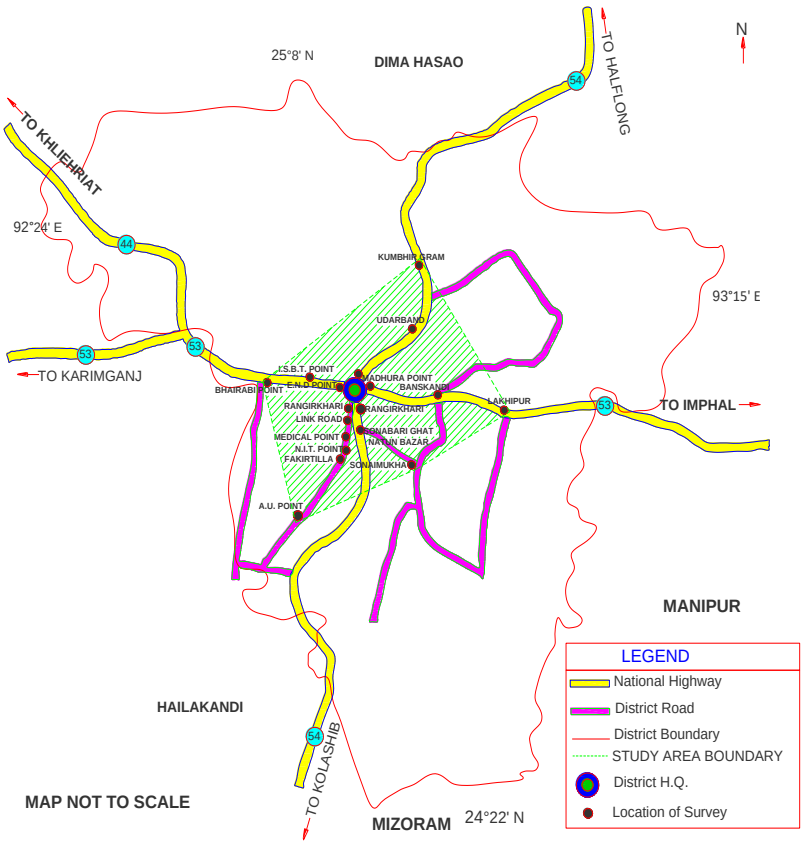
2.2 Population

As per 2011 census the population of Silchar found to be 172,830

2.3 Regional Linkage:

Silchar is connected by all weather road with other districts of the Barak Valley and the neighbouring states. The Silchar – Imphal road (National Highway no.-53), Silchar-Aizwal road (National Highway no.-54), Silchar- Badarpur road (National Highway no.-53) and Silchar-Shillong road (National Highway no.-44), Silchar-Halflong road (National Highway no.-54) are the National Highways which connect Silchar with the neighbouring states of Assam, Mizoram and Meghalaya. Silchar is also connected with other parts of our country by Air and Railways. All this road connectivity is shown in **Figure 1.1.**

Figure 1.1 REGIONAL ROAD NETWORK AND STUDY AREA, SILCHAR



3. SURVEY

Four types of survey were conducted to assess the role of regional paratransit in study area as shown in table. The number of samples collected under different types of survey are also indicated in the table 3.1.

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Table 3.1: Samples Collected

Types of Surveys	No. of Samples Collected
Techno-Economic characteristics of the vehicles	8
Operator Survey (no. of operators)	120
Traffic Survey (no. of vehicles)	13787
Vehicular occupancy Surveys.(no. of vehicles)	1342

3.1 Techno-Economic characteristics of the vehicles:

Table 3.2 Techno-economic characteristic of vehicles

Type of Vehicles	Cruiser	Tata-sumo	Auto Van	Tata magic	Winger	Auto-rickshaw	Ambassador	Mahindra Maxx
Physical Dimension	**Exterior dimension**	**Exterior dimension**	**Exterior dimension**	**Exterior dimension**	**Exterior dimension**	**Exterior dimension**	**Exterior dimension**	**Exterior dimension**
Length in (mm)	4832	4258	2800	3790	4290	2800	4325	4445
	1660	1726	1270	1500	1905	1120	1662	1834
Height in (mm)	2055	1925	1885	1845	2045	1185	1593	1975
Weight in (kg)	2850	1800	855	1000	1740	435	1200	1720
Wheel Base in mm	3050	2425	2000	2100	3200	2000	2464	2794
Engine Type	Diesel	Diesel	Diesel	Diesel	Diesel	Petrol	Diesel	Diesel
Seating capacity	9+1	9+1	6+1	5+1	9+1	3+1	5+1	9+1
Ground clearance in mm	210	190	130	160	165	130	152	200
Engine displacement	2596CC	2956CC	395CC	702CC	1948CC	338CC	1995 CC	2523CC
Tyre size	7.00R15	185/85R16	4.50*10 8 PR	R12		4.00-8.6PR	165/58R15	185/85R16
Mileage km/l	16.9 km/l	18 km/l	36+/-2	30 KM/L	17km/l	36 KM/L	16KM/L	14 km/l
Engine description	2.6L60bhp 4 stroke	70PS(51KM ,69hp)	7.5HP	16BHP	90bhp	11HP	2.0L DSZ 80BHP	2.5L TC1-4 (63bhp)
No. of cylinder	4	4	1	-	4	1	4	4

Techno-economic characteristics survey of the vehicles was done to know the technical specification of the vehicles that is being operated in the study area. It was collected from the agency or the suppliers of the vehicle. The techno-economic characteristics of the paratransit vehicles are shown in table 3.2.

3.2 Operator survey

Operator survey was carried out to understand the socio-economic status of the Paratransit operator, service facilities and infrastructure facilities. The data are directly collected from the Paratransit operators at their parking lots where the operators were resting or waiting for passengers. A set of questionnaires were asked to know the characteristics of the operators. The summarised data of socio-economic characteristics of the operators are tabulated in the following Table 3.3.

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Table 3.3 : Socio-economic Characteristics of the Operator.

Sl. no.	Items	Percentage
1.	Age group in year	
	18-30 yrs	40%
	31-40 yrs	32.5%
	41-50 yrs	15.83%
	51-61 yrs	10%
	61-70 yrs	1.67%
2.	Educational qualifications	
	Illiterate	0%
	Under H.S.L.C	60%
	H.S.L.C	20.83%
	Under Graduate	14.17%
	Graduate	4.17%
	Post Graduate	0.83%
3.	Number of income earners in the family	
	Earning member one	72.5%
	Earning member two	21.67%
	Earning member three	5.83%
	Earning member four	0%
	Earning member five	0%
4.	Residential Status.	
	Migrated	9.17%
	Permanent resident	90.83%

3.3 Traffic Survey

Modal Split Survey

Modal Split survey is the traffic survey of different class of vehicles operating in the particular road sections. The survey has been conducted for one hour at every major intersection along the five major roads connected to Silchar. The major roads considerated are Silchar-Hailakandi road, Silchar-Sonai road, Silchar-Lakhipur road, Silchar- VIP road and Silchar-ISBT road. The data collected are indicated in table 3.4 .

Table 3.4 : Modal Split Survey Data for Silchar

SL No.	Types Of Modes	No. of Average hourly vehicles
1	**Bus**	324
2	**Winger**	1638
3	**Auto-rickshaw**	3477
4	**Cruiser**	4324
5	**Rickshaw**	552
6	**Tata-sumo**	774
7	**Auto van**	187
8	**Tata-magic**	100
9	**Ambassador**	284
10	**Maxx**	192
11	**Car**	272
12	**M. cycle**	293
13	**Bolero**	269
14	**Van**	135
15	**Bicycle**	959
16	**Others**	398

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3.4 Vehicular Occupancy Survey

Vehicular occupancy survey was conducted on different point location of the study area at different time of the day. Some time number of passengers per vehicle are found to be less than normal seat capacity and some times over loaded on the back of the vehicles during peak hours of the day. But average vehicular occupancy is found to be near to normal seat capacity. But private vehicle like Car, Bolero, Van etc are found to be very less vehicular occupancy value in comparison to their seating capacity.

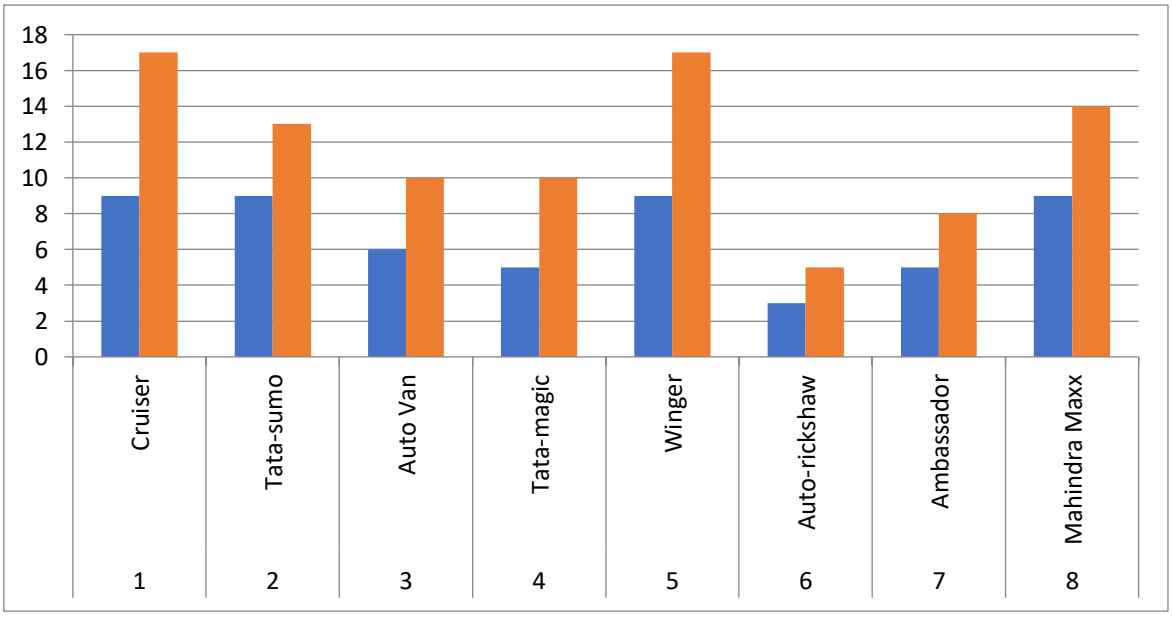
The objectives of the survey were to find the average number of passengers carried by different types of vehicles. The survey was conducted on different locations of the important roads under considerations. Each type of vehicle was observed independently on a section and number of passengers carried by the vehicle type was recorded and from it average vehicular occupancy of the vehicle was found out which is shown in Table 3.5 below.

Table 3.5. Average Vehicular Occupancy of Different modes in the Study Area.

Sl. No.	Types of Modes	Total no. of vehicle	No. of passenger	Average vehicular occupancy (Passenger/Vehicles)	Seat Capacity Excluding Driver
1	**Bus**	101	2554	25	34
2	**Car**	120	287	2.4	4
3	**Auto-rickshaw**	120	430	3.6	3
4	**Motor cycle**	120	198	1.65	1
5	**Rickshaw**	78	126	1.6	2
6	**Cruiser**	115	1613	14.03	9
7	**Bolero**	85	158	2	7
8	**Winger**	105	1572	15	9
9	**Van**	95	264	2.78	9
10	**Tata-sumo**	105	1276	12.15	9
11	**Auto van**	65	525	8.08	6
12	**Tata-magic**	40	392	9.8	5
13	**Maxx**	58	617	10.64	9
14	**Ambassador**	35	272	7.77	5
15	**Bicycle**	120	120	1	1

After analyzing the modal Split Survey and vehicular occupancy survey, percentage of the number of passengers can be found out.

Figure 3.1: Seating Capacity Vs Actual Capacity of Paratransit Vehicles Operating in the Study Area



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It is observed that most of the vehicles in Silchar are overcrowded.

Traffic density and modal split were found to be affecting the PCU value and PCU values for Indian highways based on empirical data were developed as enclosed in **Table 3.6** below. Traffic data is collected and analyzed for various locations, traffic densities and PCU values for each mode are derived.

Table 3.6. PCU factors suggested by IRC for Rural Roads

Sl. no.	Vehicle Class	Equivalency factor
1	Passenger car, tempo, Auto rickshaw, Agricultural tractor.	1
2	Bus, Truck, Agricultural tractor- trailer unit	3
3	Motor Cycle, scooter and pedal cycle	0.5
4	Cycle rickshaw	1.5
5	Horse drawn vehicles	4
6	Small bullock cart and hand cart	6
7	Large bullock cart	8

6. RESULT AND DISCUSSION

From figure 3.2 we observe that public transit is 9%, Private is 35% and paratransit is 56%.

Table 3.7 Regional Level Percentage Share of Vehicles in terms of P.C.U. for different category (combined)

Sl. no	Category	Percentage
1	**Public Transit**	8.73
2	**Paratransit**	56.18
3	**Private**	35.09

Figure 3.2 :

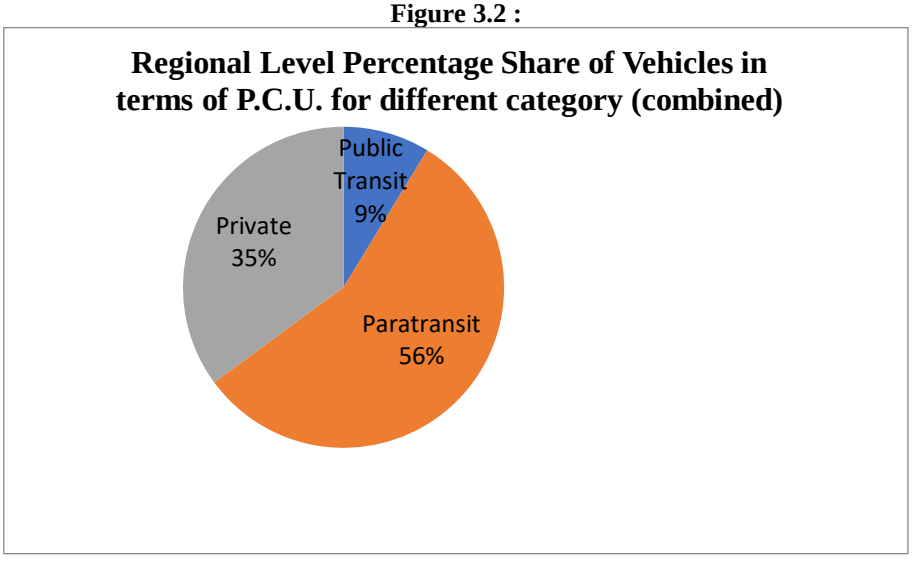

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Table 3.8: Regional Level Percentage Share of Vehicles within Paratransit modes in terms of PCU

Sl. No	Name Of Paratransit vehicles	Total no. of vehicles	Percentage Share
1	**Winger**	58.97	3%
2	**Auto-rickshaw**	761.41	44%
3	**Cruiser**	294.87	17%
4	**Rickshaw**	218.62	13%
5	**Tata-sumo**	72.62	4%
6	**Auto van**	69.63	4%
7	**Tata-magic**	122.12	7%
8	**Ambassador**	76.69	5%
9	**Maxx**	45.37	3%
Total		1720.3	100%

Table 3.9 Study area (Regional) level percentage share of occupants for different category

Sl. no.	Category	Percentage share of occupants on					
		Hailakandi Road	Sonai Road	Lakhipur Road	V.I.P. Road	I.S.B.T. Road	Regional level Percentage
1	**Public Transit**	14.49	12.35	1.94	19.31	25.8	15
2	**Paratransit**	63.46	70.35	76.4	51.56	50.02	62
3	**Private**	22.05	17.3	2166	29.13	24.18	23
4	**Total**	100	100	100	100	100	100

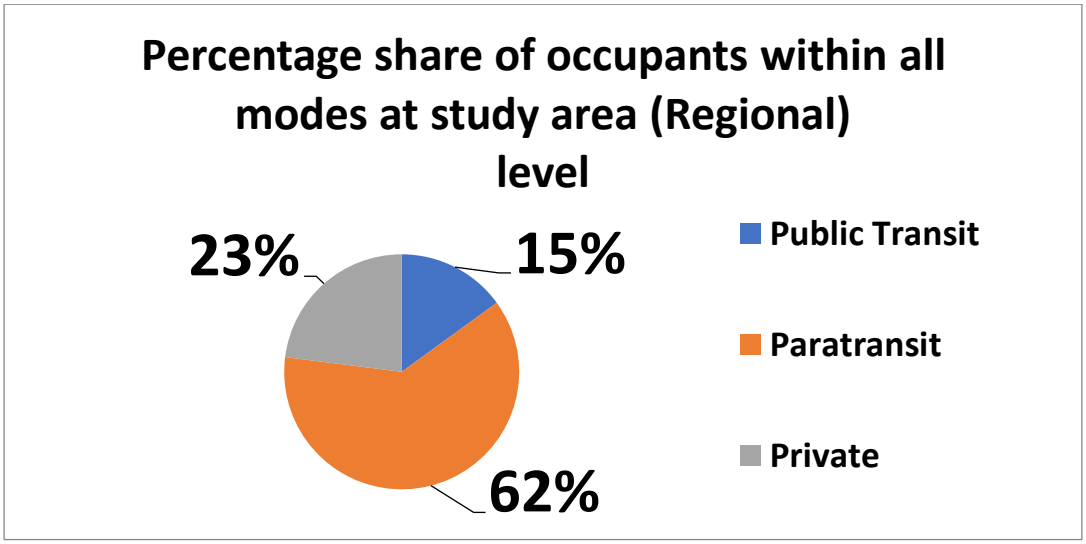

Figure 3.3:

From **Figure 3.3**, it is found that the Paratransit mode is the highest passenger carrier service which is playing very important role in giving mobility to those people who have not their own vehicle. As the population is increasing tremendously transportation demand is also increasing which is 62% fulfilled through the Paratransit service. The road condition in the Barak Valley is deteriorated and often big pot holes are found on the road for which speed of Paratransit vehicle have to be reduced. The travel time is increased and fuel consumption is also increases which is a great loss from the economic point of view. It also becomes a source of discomfort and it endanger to the safety of the passenger. Paratransit are medium size vehicle and hence it quickly filled up by passengers but in case of buses it takes more time . **Figure 3.4** , which shows the highest share of Cruiser 32%.

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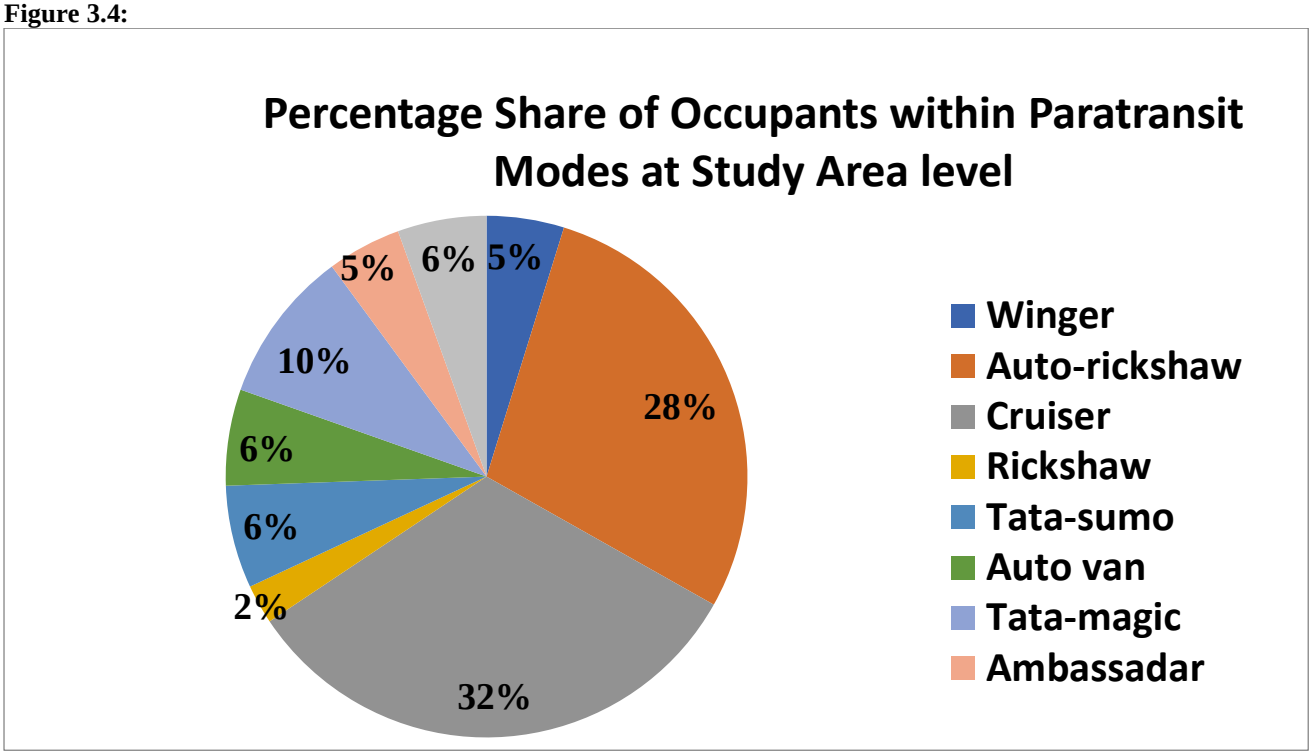
Figure 3.4:



7. CONCLUSION

After analysing the various modes under Paratransit operated in the study area and present scenario of the study area in terms of regional road net work of Silchar the following conclusions can be drawn.

- The important Paratransit modes plying on regional road network of Silchar are Cruiser, Winger, Tata-Sumo, Tata-Magic, Maxx, Ambassador, Auto-rickshaw, Auto-Van and Rickshaw.
- The private mode includes two wheelers, Bicycle, Car, Van, Bolero and the public transit includes buses.
- It is found that the Paratransit shared in terms of vehicles in the study area is 56% among all the modes. Private modes and public transit modes have 35% and 9% respectively.
- The Paratransit share in terms of PCU Auto are: rickshaw 44%, Cruiser 17%, Rickshaw -13%, Tata-magic-7%, Ambassador -5%, Auto-Van-4%, Winger-3% & Maxx- 3%.
- The role of Paratransit in terms of passengers carried is found to be 62%, private and public transits are found to be 23% and 15% respectively.
- Within the Paratransit in terms of passengers carried Cruiser has 32%, Auto-rickshaw 28%, Tata-magic 10%, Tata-Sumo-6%, Auto-Van 6%, Maxx 6%, Winger 5%, Ambassador 5%, & rickshaw 2%.
- 40% operator has age group 18-30 years. Maximum operators are under H.S.L.C. 60%, maximum operators are single income earners in their family 72.5%.
- Most of the operators are permanent resident of Cachar district 90.83% and only 9.17% are migrated from other district of Assam.
- The Paratransit is the maximum passenger carrier 62% but there are little proper parking lots and infrastructure facility for these Paratransit in the study area.
- Most of the vehicles are found to be over loaded during pick hours which sometimes cause accidents.
- Regional paratransit service gives mobility to passengers & all same time it gives employment to many youths of weaker section of society.

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