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Research Article

A STUDY ON ASSESSMENT OF SERVICE QUALITY OF PUBLIC & INTERMEDIATE PUBLIC TRANSPORTATION BY ROUTE RATIONALIZATION: CASE STUDY OF UDAIPUR CITY

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ABSTRACT

Public transportation (PT) and intermediate public transportation (IPT) are very important component of urban system. Their contribution to the physical, economic, social and cultural development to any city is very well documented. The holistic growth of city, primarily depends on the quality of both. But now a days, the pressure on PT and IPT are rapidly increasing due to hasty growth in population of urban cities, which results in dilapidation of quality. The poor quality of PT and IPT results in increasing dominance of private vehicles. Therefore, to improve service quality and address the various issues, assessment of PT and IPT is needed. This study is concerned about the assessment of PT and IPT for Udaipur city and identifies the major issues related with service quality. In this paper, assessment of PT and IPT is done by the method of route rationalization, which helps to find the issues related not only to service quality but also to physical quality. This paper provides an overview on literature study, research methods and methodology, existing PT and IPT characteristics of Udaipur city. Also, the end of this paper concludes with suggestion to improve service quality of PT and IPT in case study area.

INTRODUCTION

Now a days, cities are experiencing the trend of increasing population (Noland, 2001: Tiwari, 2003). This trend of uncontrolled population growth put an adverse effect on urban system (Low and Glasson, 2003). As we all know that PT and IPT are the key components of urban system. The increase in population results in increase enormous strain on the PT and IPT system due to increase in travel and transport demand (Ewing, 1997). This phenomenon leads to dilapidation of the service quality of PT and IPT (Kokaz, 2001). Poor PT and IPT system forces people to opt for personal mode of transportation which creates many other problems in urban transportation. Therefore, to keep balance in urban transportation system, good service quality is required in PT and IPT system.

Like other cities, Udaipur city is also experiencing the rapid growth in population. Hence, to meet with increased travel and transport need, PT and IPT is required with good service quality. In this paper the major concern is on the assessment of PT and IPT for Udaipur city and identifies the major issues related with service quality. Further, assessment of PT and IPT is done by the method of route rationalization, which helps to find the issues related not only to service quality but also to physical quality. This paper begins with an overview on literature study, research methods and methodology, existing PT and IPT characteristics of Udaipur city. The assessment of PT and IPT is performed by comparison of service quality indicators with benchmark levels and based on the detailed assessment, the major issues are identified. Also, the end of this paper concludes with suggestion to improve service quality of PT and IPT in case study area.

LITERATURE REVIEW

The assessment of PT and IPT by route rationalization plays a prominent role in determining the service quality level, whether the system is fulfilling the desired benchmark or not (Ceder, 2007; Guihaire & Hao, 2008). Rationalization is defined as a systematic study to assess the existing PT and IPT routes on certain quality indicators with service level benchmarks (Armstrong *et al*, 1987). Rationalization is defined as a structured process to increase the effectiveness with a maximum use of resources (Benn, 1995). There are two method of route rationalization

- By Rationalization of individual routes in an existing route network
- By reorganizing the route network as a whole

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The first method to assess the service quality of the PT and IPT system using quality indicators is relatively easy to implement. Principally, there are various indicators which access the service quality with their benchmarks given as following table 1:

Table 1 Service quality indicators with benchmarks

S.No.	Quality indicator	Formulae	Benchmarks
1	Accessibility	Population falling within 500m of PT network = Avg. Density along the entire route length (PPH) * area of road (hact.)	-----
2	Adequacy	Population falling within 500m/ (avg. Trip length* total passenger seat capacity)	0.65<X<1
3	Headway	Time interval between the moments two successive bus pass a fixed point	5<X<10.
4	Regularity	Trip efficiency (%): - average number of trips operated/ avg. No. Of trips scheduled Km. Efficiency (%): -average number of kms operated/ avg. No. Of kms scheduled	0.92<X<1
5	Punctuality	At departures (%) = avg. No. Of trips departing in time/avg. Scheduled departures At arrival (%) = avg. No. Of trips arrival in time/avg. Scheduled arrivals	0.90<X<1
6	Load factor	Total passenger km./Total capacity km.	0.95
7	Fleet utilization	Number of running buses on allotted route/ number of buses allotted to route.	0.92<X<1
8	Vehicle utilization per bus (vehicle held)	Allotted route length (in km.) * (Allotted no. Of trips/ vehicle)	>=220Km.
9	Vehicle utilization per bus (on road)	Fleet utilization*Vehicle utilization per bus (vehicle held)	0.92<X<1

Note: X is the value of service quality indicator calculated by statistical methods.

RESEARCH METHODOLOGY

This study presents a simple and systematic methodology for assessment of performance of PT and IPT system from route rationalization. The proposed methodology consists of four major stages. The major stages of proposed methodology are presented in figure 1.

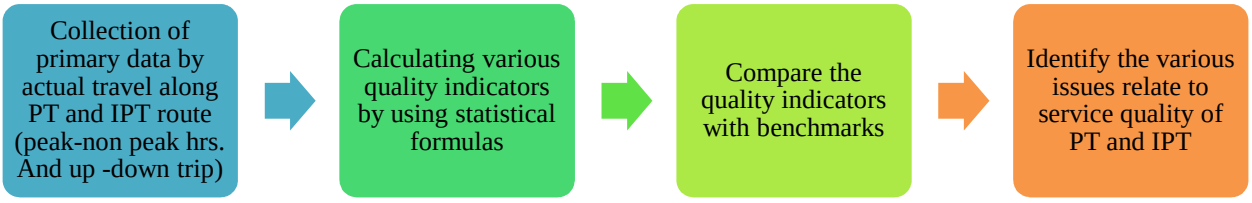

Figure 1 Research Methodology

RESEARCH METHOD

The research method for assessment of performance of PT and IPT used is quantitative method, aims to accurately describe the level of service quality. The information on various parameters are collected through actual travel along PT and IPT routes. The information on various parameters are collected by operator, passenger and by personal observation. The various parameters are like as route length, average trip length, mode, trip purpose, passenger per trip (peak- non peak hrs. and up-down trip), headway, no. of PT and IPT on each route, avg. speed etc.

About The Udaipur City

Udaipur city is considered as one of the important administrative, institutional, industrial, tourist and cultural centres in southern Rajasthan. It is a part of Girwa tehsil of Udaipur district, which is located at an altitude of 1962 feet from mean sea level and in the centre of a saucer-shaped valley basin and is surrounded by the Aravalli hills. It is located at longitude 24.58°N and latitude 73.68°E. It is directly linked to major cities of India like New Delhi, Jaipur, Ahmedabad, and Mumbai through roads, railways, and air routes. It also has the distinction of being the only city in the country to have both the East-West and North-South Corridors of the Golden Quadrilateral Highway Project passing through it. It has location advantage in the country and in the state. Udaipur city like other cities of country is facing the increased population pressure on resources and infrastructural systems. The population of Udaipur city and its census towns are increasing at a very fast rate which results in sprawling of city in the pattern of ribbon spread development. Due to rapid increase in population, there is an enormous increase in pressure on PT and IPT system, which resulting in terms of degradation of service quality. The PT and IPT scenario of udaipur city is in jeopardy. Hence, there is urgent need to address the issue of service quality of PT and IPT.

Existing PT and IPT of Udaipur City

After discussions with various authorities in udaipur city and by initial study of the PT and IPT system, it was found out that the main public transport system in the city is limited standard buses run by Udaipur City Transport Services Limited (UCTSL), a company formed by Udaipur Municipal Corporation (UMC). The limited PT are supported by large supply of IPT (Tempos: 3-Wheeler and 7-Seater) on fixed route allotted by Regional Transport Office (RTO), Udaipur and privately owned auto rickshaws (3-Wheeler and 4-Seater) at dedicated stops allotted by UMC. The details of the PT and IPT are listed in the following table 2.

Table 2 Details of the PT and IPT system

S.No.	Mode	Operator	Remark
1.	Standard bus	UCTSL	8 buses operate with an estimated ridership of about 4800 passengers per day
2.	Tempo	Private	1993 tempos operate with an estimated ridership of about 1,22,041 passengers per day
3.	Auto rickshaw	Private	4991 auto rickshaws operate with an estimated ridership of about 90,420 passengers per day

Standard bus service operated by UCTSL

The supply of standard bus is operated and managed by Udaipur City Transport Services Limited (UCTSL), a company formed by Udaipur Municipal Corporation (UMC). Initially, the city bus service was operated along five routes. But due to lack of profitability currently, they are operating along only two routes with the fleet size of 8 buses in Udaipur urban control area (UUCA). It is operating on the total route length of 47 km. with seating capacity of 22 passengers and maximum capacity to 32 with standees. There are only 2 buses per lakh of population within the city. From the primary survey, it has been found that the average no. of trip performed by each bus everyday is 4 and average passenger travelling per bus per day is 250. The routes identified pass through the important areas of the city including core like as chetak circle, Suraj pole, Delhi gate, Udaipole and Udaipur railway junction. These PT routes are plying on the main arterial road along west to east and south direction because of growing profile of city. These arterial roads are the busiest corridor. Bus service starts as 7:00 in the morning and ends at 8:00 in the night. The average journey speed of city bus is 16 km per hour with an average frequency of 50 minutes. The existing route details of city buses are given in table 3.

Table 3 Details of PT route

Routes No.	Routes Name	No. of Buses	Routes Length (Km.)	%
1.	Bujra-Titrdi	04	17	50
2.	Nai-Dabok	04	30	50
Total No. of Buses		08		100

Tempos

The absence of a robust public transport system in the city has paved the way for intermediate public transport. At present, intermediate public transportation is based on prime supply of tempos.

The IPT system consist tempos on fixed designated route. At present, 1993 tempos (as of December 2016) are operating on 10 routes. Approximately 650 tempos are operated in UIT area without any fixed route. There are approx. 500 Atul auto are also operating in UIT area without any permit. Tempos are operating on the total route length of 110 km. with seating capacity of 7 passengers and maximum capacity to 8. There are approx. 440 tempos and 1100 auto rickshaws per lakh of population within the city. From the primary survey, it has been found that the average no. of trip performed by each tempo everyday is between 6-10 and average passenger travelling per tempo per day is 150 approx.

IPT service starts at 6:30 in the morning and ends at 8:30 in the night. The poor management and unplanned route leads to unreliability, lack of accessibility in holistic manner, poor service quality have forced people to private and personalized modes of transport. The average journey speed of IPT modes is 13.87 km per hour with an average frequency of 5-6 minutes. The existing route details of tempos are given in 4.

Auto rickshaw

In Udaipur city, there are about 4991 Auto Rickshaws running on flexible route and area wise permit basis by urban improvement trust (UIT) and available on 82 auto stand allotted by UMC. The average number of passenger transport by Auto is estimated at 80/day. The operation characteristics are as follows:

- Average Trips length 5.5 Kms.
- Average Travel Time 30 Min.
- Average Trips costs Rs 50 Rs/-

Most of the Auto users are non-regular passengers. There are no fare meters for the Auto Rickshaws in Udaipur. The passengers are expected to bargain and settle the fare payable. Such a system is prone to be abused by the drivers of Auto Rickshaws, as the new comers to city cannot be expected to bargain, as they are not aware of the rout or distance.

Route Rationalization

The rationalization process is done for both PT and IPT route. Before the calculation of service quality indicator routes are analyzed in details.

PT (standard bus) routes**:** -In udaipur city, there are only two public transportation routes. The detailed analysis and calculation of service quality of both routes are shown in table 5 and 6 respectively.

IPT (tempo) routes: -In udaipur city, there are 10 intermediate public transportation routes. The detailed analysis and calculation of service quality of all IPT routes are shown in table 7 and 8 respectively.

Assessment of PT & IPT

After, calculating the service quality indicators of public and intermediate public transportation by statistical methods, they are compared with service level benchmark. The comparison shows either level of sufficiency or level of deficiency in service quality. The comparison of PT and IPT service quality indicators with benchmarks are shown in table 9,10 and 11,12 respectively.

Table 4 Details of IPT route (Tempos)

Routes No.	Routes Name		No. of Tempos	Routes Length (Km.)		%
	Allotted	Running		Allotted	Running	
1.	Railway station- Mallatalai (01)		263	9.5		13.20
2.	Govardhan Vilas-Dudhiya Ganeshji (02)	Govardhan Vilas-Chetak Circle	407	13	9.5	20.42
3.	Hiran Magri-Dewali (04)	Hiran Magri-Chetak Circle	187	12.5	07	9.38
4.	Railway station- Amberi (07)		128	13		6.42
5.	Chetak Circle- Savina (09)		338	06		16.96
6.	Railway station- Reliance Mill (19)	Shastri Circle- Reliance Mill	128	10		6.42
7.	Kirshi Mandi- Bedla (20)	Chetak Circle- Bedla	112	12	08	5.62
8.	Railway station- Badgaon (22)	Delhi Gate- Badgaon	89	11.3	6.5	4.47
9.	Kirshi Mandi- Dewali (23)	Chetak Circle- Kirshi Mandi	128	9.5	06	6.42
10.	Jawahar Nagar- Pratap Nagar (25)	Court Chauraha-Pratap Nagar	213	13	12	10.64
11.	Total No. of Buses		1993			100

Table 5 Detalied characteristics of PT route

S.No.	Characteristics		Routes-1	Routes-2
1	Route length (Km.)		17	30
2	No. of stops		30	43
	Avg. trip length (feeder) (Km.)		1.9	1.5
3	Within UMC		0.5	0.5
	Outside UMC		3.0	2.8
4	ATL main line (Km.)		6.8	6.1
5	Mode		Walk and Tempo	Walk and Tempo
6	Trip purpose		Work and Education	Work and Education
	Total passenger per day		568	600
7	Peak	Passenger (up)	42	38
		Passenger (down)	37	44
	Off-peak	Passenger (up)	30	33
		Passenger (down)	33	35
8	Load factor (%)		125	134
9	Headway (Min.)		50	50
	Avg. stopping distance (M.)		570	700
10	Within UMC		380	400
	Outside UMC		760	1000
11	Avg. dwell time (Min.)		15	15

Table 6 Calculation of service quality indicators of PT route

S.No.	Routes No. / Service Quality Indicators/ Routes	1 Bujra to Titrdi	2 Nai to Dabok
1	No. of Buses Provided	4	4
2	No. of Buses Running	4	4
3	Route Length (In Km.)	17	30
4	No. of Trips/Bus	4	4
5	No. of Stops	30	43
6	Avg. Distance B/W Stops (In M.)	570	700
7	Avg. Density/Route (In PPH)	124	119
	Physical Performance (%)		
8	Fleet Utilization	100.00	100.00
9	Vehicle Utilization Per Bus (On Road)	68.00	120.00
10	Vehicle Utilization Per Bus (Veh. Held)	68	120
	Utilization of Carrying Capacity		
11	Avg. Seating Capacity Per Bus	25.86	26.31
12	Total Passenger	568	600
13	Peak Passenger Demand	1136	1200
14	Total Passenger Km.	9656	18000
15	Total Seat Km.	7034	12629
16	Occupation Ratio (%)	137.28	142.53
17	Avg. Carrying Capacity Per Bus	28.37	27.97
18	Total Capacity Km.	7717	13426
	Load Factor (%)		
19	Average	125	134
20	Peak	138.87	146.58
21	Off Peak	111.02	121.56
	Trip Time		
22	Peak (In Min.)	66	95
23	Off Peak (In Min.)	75	110
24	Headway Peak (In Min.)	50	50
25	Headway Off-peak (In Min.)	60-65	60-65
26	Avg. Dwelling Time/Stop (In Min.)	-----	-----
27	Speed (In Kmph)	14.5	17.5
28	Fare (In Rs. /-)	7	7
	Financial Performance		
29	Earning Per Km. (Rs. /-)	6.35	8.6
30	Earning Per Seat Km. (Rs. /-)	0.25	0.33
31	Earning Per Bus Per Day (Rs. /-)	864	2064
32	Earning Per Passenger Km. (Rs. /-)	0.35	0.46
33	Vehicle Km.	272	480

Major Findings and Issues in PT & IPT

Issues in PT: From above detailed analysis the major issues in PT are given as following: -

- Currently, PT are inadequate to provide service.
- Headway is very large due to inadequacy of PT.
- PT are regular in both (trip & Km.) but not punctual.
- Load factor is very large, which affects the comfort of passenger and also indicate for increase the supply of PT.
- Full fleet utilization but less no. of trips leads to poor vehicle utilization.

Issues in IPT: From above detailed analysis the major issues in IPT are given as following: -

- Most of the IPT routes has very high adequacy index, which indicates oversupply of tempos.
- Most of the IPT routes has very low headway, which indicates accumulation of a large no. tempo because of oversupply.
- Most of the IPT routes has low regularity index, which indicates tempos are not running at allotted trip no. and full route length.
- Most of the IPT routes meet with load factor benchmark but in case of 100% fleet efficiency the load factor reduces at large extent.
- No IPT routes has 100% fleet utilization.

RESULTS AND SUGGESTION

After the assessment of service quality indicators of PT and IPT, it is clear that Udaipur city has an inadequate PT service. The inadequacy of PT leads to dilapidation of service quality in holistic manner. Therefore, to improve the overall service quality of PT; adequate, robust and efficient system is required with proper institutional arrangement and management. On the other hand, oversupply of tempos (IPT) in Udaipur city affects the service quality adversely and makes it poor. This situation become more complex in the absence of management and schedule. Hence, to improve the service level of IPT; restructuring and restrengthening is required with the provision of governing bodies for its proper functioning.

CONCLUSION

The vital role of public and intermediate public transportation to the physical, economic, social and cultural development to any city is very well documented. The development of any city, primarily depends on the quality of both. But the hasty growth in population of cities, results in increase pressure on the PT and IPT system and affects their service quality adversely. The PT and IPT scenario of udaipur city is in jeopardy which mainly is due to rapid increase in transport demand due to swift growth in the population. Therefore, to assess the service quality and address the issues related to PT and IPT, rationalization of routes are implemented. From the assessment of service quality of PT and IPT, it is observed that udaipur city has an inadequate PT service which leads to dilapidation of service quality in holistic manner.

Table 7 Detalied characteristics of PT route

S.No.	Routes/Characteristics		R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	R-10
1	Route length (Km.)		9.5	9.5	07	13	06	10	08	6.5	06	12
2	No. of stops		15	16	14	20	16	14	17	14	12	14
3	Avg. trip length (feeder) (Km.)		0.35	0.43	0.29	1.0	0.58	0.75	0.78	1.0	0.52	0.85
4	ATL main line (Km.)		3.6	3.1	2.2	5.6	3.8	5.1	4.5	4.0	2.5	6.4
5	Mode		Walk and Tempo									
6	Trip purpose		Work and Education									
7	Total passenger per day		23184	37822	10032	4482	19206	4830	4380	4655	3798	9652
	Peak	Passenger (up)	15	11	8	9	7	8	12	11	7	13
		Passenger (down)	9	10	9	8	11	13	11	12	9	10
	Off-peak	Passenger (up)	10	8	10	6	6	5	7	6	9	7
		Passenger (down)	12	12	6	11	9	9	10	9	6	9
8	Load factor (%)		121	108	87	89	87	92	105	100	82	103
9	Headway (Min.)		2.5	1.5	3.5	3.0	3.5	2.5	4.0	3.0	3.5	3.5
10	Avg. stopping distance (M.)		600	590	500	650	375	720	470	465	500	857

Table 8 Calculation of service quality indicators of IPT route

S.No.	Performance indicators/ Routes No.	1	2	3	4	5	6	7	8	9	10
1	No. of Tempo Provided	263	407	187	128	338	128	112	89	128	213
2	No. of Tempo Running	224	369	152	88	291	92	73	70	70	165
3	Route Length (In Km.)	9.5	9.5	7	13	6	10	8	6.5	6	12
4	No. of Trips/Tempo	9	10	8	6	8	6	6	7	7	6
5	No. of Stops	15	16	14	20	16	14	17	14	12	14
6	Avg. Distance B/W Stops (In M.)	633	594	500	650	375	714	471	464	500	857
7	Avg. Density/Route (In PPH)	240	245	106	172	168	126	77	253	74	85
	Physical Performance (%)										
8	Fleet Utilization	85.17	90.66	81.28	68.75	86.09	71.88	65.18	78.65	54.69	77.46
9	Vehicle Utilization Per Tempo (On Road)	72.82	86.13	45.52	53.63	41.33	43.13	31.29	35.79	22.97	55.77
10	Vehicle Utilization Per Tempo (Veh. Held)	85.5	95	56	78	48	60	48	45.5	42	72
	Utilization of Carrying Capacity										
11	Avg. Seating Capacity Per Tempo	7.2	7.5	7.2	7	7.5	7	7	7	7	7
12	Total Passenger	23184	37822	10032	4482	19206	4830	4380	4655	3798	9652
14	Total Passenger Km.	220248	359309	70224	58266	115236	48300	35040	30257.5	22788	115824
15	Total Seat Km.	137894	262913	61286	48048	104760	38640	24528	22295	20580	83160
16	Occupation Ratio (%)	159.72	136.66	114.58	121.27	110.00	125.00	142.86	135.71	110.73	139.28
17	Avg. Carrying Capacity Per Tempo	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
18	Total Capacity Km.	181944	333023	80864	65208	132696	52440	33288	30258	27930	112860
	Load Factor (%)										
19	Average	121	108	87	89	87	92	105	100	82	103
20	Peak	126.32	110.53	89.47	89.47	94.74	110.53	121.05	121.05	84.21	121.05
21	Off Peak	115.79	105.26	84.21	89.47	78.95	73.68	89.47	78.95	78.95	84.21
	Trip Time										
22	Peak (In Min.)	35	28	30	45	30	38	30	26	25	38
23	Off Peak (In Min.)	40	32	38	54	38	52	40	34	31	48
24	Headway Peak (In Min.)	2	2	3	5	3	6	6	7	5	6
25	Headway Off-peak (In Min.)	3	3	4	6	4	8	8	8	6	8
26	Avg. Dwelling Time/Stop (In Min.)	----	----	----	----	----	----	----	----	----	----
27	Speed (In Kmph)	15.2	19	12.4	12.2	10.6	13.3	13.7	13	12.6	16.7
28	Fare (In Rs. /-)	5	5	5	5	5	7	5	5	5	7
	Financial Performance										
29	Earning Per Km. (Rs. /-)	5.8	6.4	5.2	4.8	6.2	4	3.9	4.3	5	3.8
30	Earning Per Seat Km. (Rs. /-)	0.83	0.91	0.74	0.69	0.89	0.57	0.56	0.61	0.71	0.54
31	Earning Per Bus Per Day (Rs. /-)	1020	1303	599	749	638	480	374	391	420	547
32	Earning Per Passenger Km. (Rs. /-)	1.03	1.33	1.29	1.12	1.6	0.91	0.78	0.9	1.3	0.78
33	Vehicle Km.	19152	35055	8512	6864	13968	5520	3504	3185	2940	11880

Table 9 Comparison b/w service quality indicators of PT with benchmark

Routes No.	Accessibility to PT services	Adequacy of service	Headway (in Min.)	Regularity		Punctuality of service	Load factor
				Trip based	KM. based		
BM		0.65<X<1	5<X<10	0.92<X<1	0.92<X<1	0.92<X<1	0.95<X<1
1.	97,500	0.54	50	1	1	0.78	1.25
2.	1,04,000	0.43	50	1	1	0.80	1.34

Table 10 Comparison b/w physical performance indicators of PT with benchmark

Route No.	Resource Utilization				Avg. Speed (KMPH)
	Fleet Utilization	Vehicle Utilization Per Bus (On Road)	Vehicle Utilization Per Bus (Veh. Held)	Capacity Utilization	
BM	0.92<X<1	>=92%	=220	>=0.75	>=17.5
1.	100	68	68	0.65	14.5
2.	100	120	120	1.14	17.5

Table 11 Comparison b/w service quality indicators of IPT with benchmark

Route No.	Accessibility to PT services	Adequacy of service	Headway (in Min.)	Regularity		Punctuality of service	Comfort
				Trip based	KM. based		Load factor
BM		0.65<X<1	5<X<10	0.92<X<1	0.92<X<1	0.92<X<1	0.95<X<1
1.	82,406	1.34	2.5	0.92	1	----	1.21
2.	53,410	1.15	1.5	1	0.73	----	1.08
3.	58,742	2.42	3.5	0.8	0.58	----	0.87
4.	60,319	1.25	3.0	0.6	1	----	0.89
5.	30,013	1.08	3.5	0.8	1	----	0.87
6.	25,520	3.36	2.5	0.6	1	----	0.92
7.	36,983	1.52	4.0	0.6	0.66	----	1.05
8.	40,912	1.39	3.0	0.7	0.57	----	1.00
9.	36,996	1.42	3.5	0.7	0.63	----	0.82
10.	49,420	1.59	3.5	0.6	0.89	----	1.03

Table 12 Comparison b/w physical quality parameters of IPT with benchmark

Route No.	Physical Quality Parameters			
	Resource Utilization		Avg. Speed (KMPH)	Load factor when 100% Fleet Utilization
	Fleet Utilization	Vehicle Utilization Per Tempos (Veh. Held)		
BM	0.92<X<1	=100	>=17.5	0.95<X<1
1.	85.17	85.5	15.2	1
2.	90.66	95	19	0.95
3.	81.28	56	12.4	0.71
4.	68.75	78	12.2	0.61
5.	86.09	48	10.6	0.75
6.	71.88	60	13.3	0.66
7.	65.18	48	13.7	0.69
8.	78.65	46	13	0.75
9.	54.69	42	12.6	0.45
10.	77.46	72	16.7	0.76

Note: - Green and red color are indicating that the performance indicatorsmeet with benchmark level or not respectively.

On the other hand, oversupply of tempos (IPT) affects the service quality adversely. Poor service of PT and IPT force the people to opt for personal mode of transportation. Therefore, to improve the overall service quality PT and IPT; adequate, robust and efficient system required with proper institutional arrangement & management, also restructuring and restrengthening of IPT is required with provision of governing bodies respectively.

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