Title of Paper: OPERATIONAL CHARACTERISTICS OF PARATRANSIT IN DEVELOPING COUNTRIES OF ASIA

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ABSTRACT
Paratransit modes play a significant role in the urban transport sectors of developing countries. In many cities, more than half of the total public transport demand are carried by them. Rapid increase in urban population, per capita income, along with inadequate existing transport infrastructures have stimulated their usage as inexpensive and convenient public transport modes. This paper aims a comparative study of their operational characteristics in order to provide a basic data for discussion of urban transport issues in developing countries. Some future directions are given to increase their efficiency and thus to improve urban mobility.

1. INTRODUCTION

Paratransit or the informal public transport modes have been developed to fill the gaps left among private cars, buses and fixed track systems. There are a number of definitions of paratransit based on different criteria. The functional definition of paratransit states "Paratransit is urban passenger transportation service usually in highway vehicles operated on public streets and highways in mixed traffic; It is provided by private or public operators and it is available to certain groups of users or to the general public, but adaptable in its routing and scheduling to individual user's desires in varying degrees"(1). The concept of paratransit, however, differs in developed and developing countries. In developed countries, paratransit is often used for demand responsive systems such as shared-ride taxis, dial-a-ride and subscription buses. In developing countries, the lower standard of living, high population density, availability of cheap labor force etc., have together provided a bewildering array of transport modes bridging the gap between public bus and private automobiles.

Although various forms of paratransit modes exist in developing countries ranging from simple non-motorized human or animal powered vehicles to motorized mini buses, the motorized paratransit modes are dominant in all cities of developing countries. As for example, 70% of the total public transport demand in Metro Manila (Philippines), 50% in Jakarta (Indonesia), 40% in Kuala Lumpur (Malaysia), and 21% in Bangkok (Thailand) are carried by motorized paratransit modes(2). They provide a flexible and frequent services to small settlements and through narrow streets, where no other services are available at a relatively low fare. In addition, the urban paratransit sector generates a considerable number of employment opportunities, as much as 10%-20% of the total employment in some cities(2).

In different cities, various studies were done on paratransit system, but most of them were limited to only specific systems. This paper summarizes the operational characteristics of different paratransit modes in the cities of developing countries in comparative form, in order to provide a basic data for discussion of urban transport issues in developing and developed countries. Section 2 begins with outlining the paratransit modes in urban transportation system. Their operational characteristics that include vehicle ownership, fare structure, operating cost etc. are described in section 3. Section 4 describes their effect on urban transportation system, while section 5 deals with their administrative characteristics. The paper concludes with a discussion on future direction of paratransit with their importance in the urban transport system for cities in developing countries.

2. CLASSIFICATION OF PARATRANSIT IN URBAN TRANSPORTATION SYSTEM

Although the characteristics of paratransit modes are different based on their function in different cities, these modes are the usual means of movement among low income people and have some common characteristics such as cheap fares, low energy requirements, higher labor intensity, and small area of coverage. Generally, paratransit systems can be broadly clas sified into two types; non-motorized and motorized. The non-motorized paratransit includes animal powered and human powered. The human powered is mainly hand drawn or pedal driven. Both motorized and non-motorized systems have again been subclassified into 3 groups, ie. individual type (seating capacity < 4), shared type (seating capacity 5-10) and collective type (seating capacity > 11). Table 1 shows the classification system of paratransit modes in developing countries. All non-motorized paratransits are of individual type with seating capacity 2, except hand rickshaw (seating capacity 1)(1) in India, and tonga (seating capacity 2-4) in Pakistan. On the other hand, seating capacity of motorized paratransit ranges widely from 2 to 18. Sometimes, however, passengers of 2-3 times of capacity ride on.

There are differences in the functional characteristics and service patterns of the paratransit modes which have been classified into 3 separate groups. The "individual" type paratransits provide door to door service. For the "shared" and "collective" types, the routes are generally fixed but vehicles often and marginally deviate from the route on passengers demand. The collective type paratransit sometimes cut routes to pick up opposite direction passengers.

Recently, the non-motorized paratransit has been restricted in some cities' CBD area. In Dhaka, rickshaw is banned to enter into some major streets. In Indonesia and Philippine, its use is limited to some cities, although more than half of the public transport passengers in some Indian cities and Dhaka are carried by this non-motorized paratransit mode.

3. OPERATIONAL CHARACTERISTICS OF PARATRANSIT

3.1 Service Condition

Table 2 shows the operational/service characteristics of paratransit modes in different countries. Daily travel distance of "individual" type paratransit ranges from 20 Km by Indonesian becak to 116 Km by auto rickshaw in India. Normally non-motorized vehicles make shorter trips than motorized ones, which is supported by the range of passengers journey length 1.9 Km by cycle rickshaws to 10 Km by bemo. These paratransit vehicles carry 23 to 273 passengers/day. The number of trips varies from 13 to 40. As a summary, non-motorized vehicles travel daily less than 30 km, the passenger journey length is less than 5 Km and daily passenger handling is less than 25. On the other hand, motorized vehicles travel daily more than 70 Km, the passengers journey length is more than 3 Km and daily passengers handling is more than 40. The average number of passengers per trip varies from 1.1 for hired motorcycle in Bangkok to 19.5 for jeepney in Manila.

In Metro Manila, modal shares of passengers with trip distance are shown in Table 3. Most of the public transport passenger trips occur within the distance of 2.5 Km to 7.5 Km and the jeepney captures about 85% of the demand of this distance. The majority of bus passengers (31%) trip distance is 7.6-10 Km, against 2.6-5 Km by jeepney passengers (38%), indicating that average trip distance made by bus is longer than jeepney. The bus and jeepney are directly competitive in the trip length of 7.6-10 Km. The higher competitive power of the jeepney in the shorter trip distances is certainly attributed to its high frequency which gave 3.5 times higher than the bus even on average (Table 4). The hourly passenger capacity (passenger capacity* hourly frequency) carried by jeepney and bus is almost the same for a short distance (< 5 Km). But above this range, hourly capacity of bus is almost twice larger than jeepney.

Considering the average journey speed of the paratransit vehicles in India, it is depicted from the Table 5 that, average journey speed including waiting time of cycle rickshaw is almost the same as the bus and mini bus, although in vehicle speed differs among bus, mini bus and cycle rickshaw. This is due to much shorter access and waiting time for cycle rickshaw than for mini bus or bus. For shorter trip distance, the shorter access and waiting time reduce the total journey time significantly. Thus paratransit looks convenient for short distance as compared to bus.

Comparison of passengers handling capacities in terms of daily passengers carried and passengers kilometers of paratransit vehicles with conventional buses in Bangkok and India are shown in Table 6. In India, the daily passengers carried by auto rickshaw are 2 times larger than that of cycle rickshaw due to the speed differences. Although a vast difference is observed in passengers handling capacities, the individual output of paratransit along with their large numbers has made a significant role in urban public transport.

Finally, unlike conventional bus service, the paratransit modes have no obligation to provide a service on those routes where demands are low. The operator provides service only where and when it is profitable for him. Often to achieve more profitability, the "shared" and "collective" types paratransit modes do not leave the terminal until the vehicles are full and this leads to higher passengers waiting time.

3.2 Vehicle Ownership

Almost all the paratransit industry is owned and operated by the private enterprises. Private individuals and cooperatives own the vehicles used for paratransit. Some survey results in different countries indicate that drivers rent the vehicles from small scale enterprises and very few drivers own their vehicles. For example, only 9% of the jeepney drivers in Manila, 18% and 13% of becak drivers in Bandung and Jakarta, 1% of samlor drivers in Bangk ok, are estimated to own their vehicles. In India, the percent is relatively higher and is 20% and 34% for cycle rickshaw and auto rickshaws respectively (Table 7). The only exception is found for silor in Chiang Mai where about 75% drivers own their vehicles.

The majority of owners have only small fleets. For example, in Manila and Malang, 55% and 79% jeepney and bemo owners have only one vehicle (Table 8). Conversely, only 19% of jeepney operators own more than 5 units. In Bandung, becak's owner fleet size is a little larger, which shows 41% own 3-9 units.

3.3 Fare System

In general, fares of urban public transport modes vary widely. Bus is the cheapest and taxi is the most expensive modes of public transport in all cities. The fares of paratransit modes are higher than conventional bus because it provides a convenient means of travel with a high frequency of service. The fare systems are classified into 3 groups; fixed, metered and decided through negotiation. Mostly, the fares of "individual" types paratransit modes are decided through negotiation between passengers and drivers. In some countries like India and Nepal, they have metered auto rickshaw. But in case of "shared" or "collective" types paratransit, fixed fares are received from passengers. The jeepney in Manila has the same fare system as that of conventional bus. Table 9 shows the examples of fare system in different cities.

In India, fare rates on cycle rickshaws and autorickshaws are prescribed for typical journeys by the local authority. But in practice all rates are decided by bargaining, even though auto rickshaws carry a meter. The fares per passenger kilometer of these two modes do not differ much but the total fare paid per trip is higher on auto rickshaws (Table 10). This is because of the longer journey distance covered by the auto rickshaws.

The results of a 1990 survey of samlor users in Bangkok shows that passenger believe the current fare bargaining system is not favorable to them. More than half of the samlor passengers interviewed opted for a change in the current fare bargaining system and prefer a meter system of fare collection or fare fixed by government(3). Recent introduction of metered taxi may reflect this view.

3.4 Operating Cost and Profitability

The exact level of earning of paratransit drivers is difficult to determine and very few studies estimate the operating cost, including fuel, rent and repair, and revenues. Operating cost of paratransit in Bangkok is summarized in Table 11. The average operating revenue per day for samlor is the highest and hired motorcycle is the lowest. But their operating income, excluding personnel expenses, is almost the same. The fuel consumption of these paratransits is relatively low. For example, approximately 15 liters of fuel is required per shift (12 hours) for samlor(3). The significantly low fuel consumption is due to the small size and less weight of vehicles (450 Kg for samlor)(4). Furthermore, comparing the average net pay, a driver earns the minimum labor wage of 90 Baht in a shift(3). On average, paratransit drivers in Bangkok are better paid than laborers.

The average daily fare revenue of the jeepney driver in Manila was 397 Pesos ($17.68). Daily expenses were 302 Pesos ($13.45). Fuel/oil cost accounted for 53% of total daily expenses, while boundary fee (rent, repair, etc.) at 44% and others (parking fee, dispatchers' fee, etc.) at 3% of total expenses(5). The financial profile of the jeepney in Metro Manila is shown in Table 12.

4. EFFECTS OF PARATRANSIT

Each transport mode has its positive and negative effect. Employment generation is the positive effect of paratransit and the effect on speed or capacity of road traffic including accident is its negative impact.

4.1 Positive Effect

In the urban area, the transport sector including storage and/or communication provides a great number of job opportunities which accounts for 2% to 20% of the total labor force at the national level. In India and Bangladesh the share of transport sector is remarkably high, 12% in India and 12.9% in Bangladesh, due to the labor intensive cycle rickshaw. About 10% of the total labor force in Manila was involved in the jeepney services. This percent was more in case of Chiang Mai (Bangkok), about 13-20%, in the minibus and samlor services(2).

In Dhaka, Bangladesh, about 380,000 people are directly employed as rickshaw pullers, and another 80,000 are employed in ancillary services related to rickshaws, together accounting for nearly one fourth of all employment in metropolitan Dhaka. Motorized and non-motorized public transport services together provided direct employment to 28,000 people in Patna, India, in the mid-1980s(6). Table 13 compares the employment generation by different modes in Patna, India, which shows that, 100,000 rupees (US$4,167) investment in a conventional bus system was estimated to produce 3 new direct jobs. If it is invested in the auto rickshaw system, 6 direct jobs were created. The same sum was estimated to create 75 jobs if invested in cycle rickshaw. Thus, paratransit accounts for the large share in providing employmen t for unskilled low income workers.

4.2 Negative Effect

The accident rate of paratransit modes which may be considered as its negative effect is often claimed to be excessive in developing countries. Very little information has been obtained regarding the accident data of paratransit modes. In Ankara (Turkey) 54% of all urban accidents involve a typical paratransit called "dolmus"(7). Results of the passengers survey (1990) in Bangkok reveals that almost a quarter of the total 727 respondents had experienced accidents while riding on the hired motor cycles. Moreover, the traffic accidents studies conducted in Thailand by the Department of Highways (1990) indicates that ratio of number of accidents by hired motor cycles ranked highest, 25.6% and 21.8% in 1987 and 1988, respectively(8). Many of accidents involving the paratransit modes occur as a result of sudden stops made carelessly and incautiously to pick up or set down passengers in the outside lane of carriageway. Intense competition for passengers often gives rise to aggressive driving behavior, which in turn often leads to high accident rates.

The traffic mix of slow and fast moving vehicles are also another reason for accidents. In Dhaka (Bangladesh), it was reported that rickshaw contributed to only 2.3 % traffic accidents as against the motorized modes such as cars (45.5%), buses (21.5%), trucks (18.6%), auto rickshaws (5.9%) and motorcycles (5.5%)(9). But the actual figure of accidents involving rickshaw was unreported because of illegal status of rickshaw themselves and lack of insurance claims.

The excessive working hours of paratransit drivers might be one reason for accidents. Controls on drivers' working hours are nonexistent or poorly enforced. For example, the average driver's working hours for samlors, silors and hired motorcycles in Bangkok are 10.7, 13.3 and 13.7 hours per day(10). In some cases drivers have to work even more than 15 hours a day in order to make a living and/or to keep his employment.

Other negative effects due to excessive numbers of small motorized paratransit vehicles are reduction of the vehicle speed and decrease of the capacity of road which can cause appreciable congestion, thereby hindering conventional bus services. Their indiscriminate stopping and starting may hamper the normal flow of the traffic. In Jakarta, opelet routes overlapped with city bus routes results in an adverse effect on the free flow of traffic. In terms of road space utilization per passenger, it is estimated that a microbus is 4-5 times more inefficient than a conventional bus and 2-3 times than a mini bus. The bajaj or bemo was 10-13 times more inefficient than a bus(1). Another significant effect of paratransit was obtained on speed/flow relationship for Jakarta. The result showed that for low quality dual carriageway (width <10 meter), when the proportion of mikrolets increases from 10% to 25 %, the peak hour traffic speed reduces from 16.2 Kmph to 6.7 Kmph for peak hour traffic volume of 1500 pcu/hr/lane. The Istanbul speed/flow relationship with dolmus also obtained the same results as Jakarta speed/flow relationship with opelet(11).

5. ADMINISTRATIVE CHARACTERISTICS OF PARATRANSIT

In order to overcome the negative impact by paratransit, the authorities in certain countries have imposed certain controls and regulations over the paratransit industry. These controls and regulations are mainly for maintaining smooth traffic flow and recently for environmental protection. Typical regulations by local authorities include restrictive controls on entry of new operators, restriction of paratransit operation in certain areas, control over financial liability requirements and licensing of drivers. Recently in Nepal, the Government banned the import of diesel engine tempos for protecting the environment from polluted gases emitted by the tempo.

Restrictions on the total number of paratransit vehicles are usually imposed to protect conventional bus operators, or to keep overcrowding at terminals and on the roads to reasonable levels. For example, the Department of Land Transport (DLT) in Bangkok has set limits for the number of registered units of samlor and silor which are 7,500 and 8,000 respectively(10). In Karachi, auto rickshaws were subjected to restrictions on new registrations from 1986 onwards(6). In a number of cities in India, Indonesia, and Bangladesh, restrictions have been placed on the number of cycle rickshaw registrations that will be permitted, often freezing registrations at a fixed level for many years. As a consequence of the license restrictions, it is believed that a quite large number of illegal paratransits are in operation in these cities.

In recent years, authorities of some developing countries have restricted the operation of non-motorized paratransit in several areas of city. In Manila, the tricycles have been banned from main roads, and now operate mostly on smaller roads as feeder service. In Bangkok, samlor and silor are not permitted to use expressways. The reason for these restrictions is that these slow vehicles impede the flow of traffic and disrupt the smooth flow of more efficient mode of transport.

In some cities without formal controls, paratransit operators' associations sometimes adopt a self-regulatory role to ensure that supply and demand are kept in balance. There are no regulations in any of the developing cities regarding the stoppage, usage of lanes and fare structures of paratransit modes.

6. FUTURE OF PARATRANSIT

In the future, urban rail systems may relieve the transport and traffic congestion problems of developing countries. But this needs a huge amount of capital investment which is almost impossible for most of the developing countries. In such circumstances, paratransit modes will continue its dominant role in the urban transport system. So it is necessary to undertake a number of actions which will result in more effective use of paratransit and improved urban mobility. It will not be possible to withdraw non-motorized transport from certain cities in the near future, because of economical and political reasons due to its large employment generation effect. For such cities, it is necessary to segregate non-motorized traffic from high speed motorized transport flows, and this segregation can be achieved by making physical barrier on the road surface or providing individual lanes for non-motorized transport such as becak lanes in Indonesia, or cycle rickshaw lanes in India and Bangladesh. It is better if these non-motorized modes could be restricted to feeder service only.

As long as motorized paratransit operates in mixed traffic, it cannot offer a higher level of service than private car; it is subject to the same congestion, delays, safety hazards, and so on, as private cars. So priority treatment such as separate or special lanes for motorized paratransit should be provided where this is feasible. Alternately, its service may be confined to feeder roads only.

Recently, metering system taxi has been introduced in Bangkok. For "individual" type of paratransit, it is better to introduce the metering system. Reasonable and controlled fares for the rest of the paratransit modes should be provided. Furthermore, stands or terminals for paratransit would be useful to reduce hailing and stopping from nearly all points along the streets which create not only delays to the queue vehicles but also is possible cause of accidents. Finally, in order to ensure the passengers' safety, comfort and good appearance of vehicles, it is better to prepare certain minimum specified design standards which include shorter body for easier maneuvering in traffic and parking, engine types other than diesel powered, seating standards, and so on.

7. CONCLUSIONS

The significant features of paratransit system in the cities of developing countries are their flexibility and door to door service. Their popularity as public transport cannot be neglected as shown by that in Metro Manila; it carries two thirds of public transport passengers. Certain physical and technical differences have been found in terms of their passengers capacity, operating ranges, service pattern and regulatory frame works. As a private business, the paratransit vehicles are managed and operated by typical small scale independent enterprises, where mostly vehicles are rented on a daily basis. In some cities it generates considerable employment opportunity and also does not require significant public resources which are a major attraction in many cities of developing countries with shortage of funds.

Even in the future, the role of paratransit as a transport mode cannot be underestimated in the cities of developing countries, but unfortunately, there is no sufficient data in this field in many countries. So future joint survey and research will be important and each country government may provide a wide range of public transport modes with special emphasis on paratransit system in order to provide an appropriate transportation service.

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TABLE 1 EXAMPLE OF CLASSIFICATION SYSTEM OF PARATRANSIT MODES IN DEVELOPING COUNTRIES

	Non-motorized	Motorized		
Country	Individual	Individual	Shared type	Collective type
Bangladesh	R(2) Misuk(2)	Auto R(2-3)	Auto tempo(6-10)	-
India	Tonga(2) CR(2) Hand R(1)	T scooter R(2) MCR(4)	Trekker(9)	Tempo(14)
Indonesia	Dokar(2) Delman(2) Becak(2)	Bajaj(2-3) Ojek(2) Helicak(2)	Bemo(3 wheel)(7) Bemo(4 wheel)(10) Opelet(7-9)	Opelet(Large)(17)
Malaysia	Trishaw(2)	-	-	Bus mini(16)
Nepal	CR(2)	Meter tempo(2)	Tempo(6-7)	-
Pakistan	Tonga(2-4)	MR(2)	-	-
Philippine	Calesa(2) Pedal T(2)	T(2)	-	Jeepney(14-18)
Sri lanka	-	Auto(2-3)	-	-
Thailand	R(2) T(2)	Samlor(2-3) Hired MC(1)	Silor(6-8)	Pickup(14)
Vietnam	Xiclos(2)	Selam(4-5)	-	-

Notes: The values in the parenthesis indicate the capacity (person) of each paratransit modes
R = Rickshaw, M = Motor,T = Tricycle,C = Cycle,- = Not exist
Source: (2)

TABLE 2 OPERATIONAL CHARACTERISTICS OF PARATRANSIT MODES IN DIFFERENT COUNTRIES

City/ Country	Modes	Daily Travel Km/Day	Avg.Pax Km	No Pax /Day	Trips /Day	Pax. /Trip	Load Factor
Bangkok	Samlor	-	-	60	23.2	2.6	-
	Silor	-	-	58.3	18.1	3.2	-
	Hired Motorcycle	-	-	35.5	33.8	1.1	-
Bangladesh	Rickshaw	-	3.0-6.0	26-35	30-40	-	-

	Auto rickshaw	-	8.0	-	-	-	-
India	Auto rickshaw	116	4.2	46	26	1.8	0.7
	Cycle rickshaw	30	1.9	23	13	1.8	0.8
Indonesia	Becak	20	1.5-2.5	-	-	-	-
	Bajaj	70	3.0-5.0	-	-	-	-
	Bemo	70	4.5-10.0	-	-	-	-
Philippines	Jeepney	166.3	5.8	273	14	19.5	0.6

Note: - = Data not available
Sources: (5), (9), (10), (12), (13)

TABLE 3 MODAL SHARE OF PASSENGERS WITH TRIP DISTANCE IN MANILA

Trip Distance (Km)	No of Passengers* (in '000) and Percent					
	Jeepney	%	Bus	%	Jeepney+Bus	%
0.0- 1.5	902	11	0	0	902	9
1.6- 2.5	1357	17	20	1	1377	13
2.6- 5.0	2891	38	192	8	3083	30
5.1- 7.5	1882	27	656	27	2538	25
7.6-10.0	628	8	753	31	1381	13
10.1-15.0	165	2	511	21	676	7
> 15	59	1	297	12	356	3

* Exclude taxi and tricycle
Source: (14)

TABLE 4 FREQUENCY OF BUS AND JEEPNEY IN MANILA

	Average hourly frequency (one way) by route length (Km)					
Mode	<5	5-10	10-20	20-30	>30	Avg.
Jeepney	78	44	24	26	18	38
Bus	18	7	9	10	10	11

Source: (14)

TABLE 5 SERVICE CHARACTERISTICS OF INDIAN PARATRANSIT

Modes	Avg. Waiting Time (Min)	Avg. Journey Time (Min)	Avg. Journey Speed (Km/Hr)	Avg. In-Vehicle Speed (Km/hr)
Cycle rickshaw(1)	3.7	15.8	8.9	12.6
Auto rickshaw(2)	3.0	13.1	17.4	27.0
Tonga	-	16.9	9.9	-
Mini bus(3)	11.7	36.3	12.5	17.9
Bus	12.5	46.1	12.0	16.3

Notes : - = Data not available
(1) = Average values of 3 cities; (2) = Average values of 2 cities; (3) = Average values of 3 cities in India
Source: (12)

TABLE 6 PASSENGERS HANDLING CAPACITY OF PARATRANSIT MODES AND BUSES

Country/City	Modes	Passengers Carried Daily	Passengers Kms Daily

Bangkok	Samlor	60	-
	Silor	58.3	-
	Hired Motor cycle	35.5	-
	Bus(Reg.+Air.con)	1300	7800
	Minibus	521	1719
India	Cycle rickshaw	23	46
	Auto rickshaw	46	193
	Bus	1340	9400
Manila	Jeepney	273	1584

- = Data not available
Sources: (5), (10), (15)

TABLE 7 PERCENT OF VEHICLE OWNERSHIP IN DIFFERENT CITIES

Mode/ (City)	Owned by Driver	Rented by Driver	Others*
Auto rickshaw (India)#	34	51	15
Becak (Bandung)	18	82	0
Becak (Jakarta)	13	83	4
Cycle rickshaw (India)#	20	79	1
Jeepney (Manila)	9.4	71	19.6
Silor (Chiang Mai)	75	25	0
Samlor (Bangkok)	1	99	0

Notes: * = Drivers relatives,friends or employee-driven or cooperatives
= The average values of 7 cities
Sources: (3), (5), (15), (16)

TABLE 8 DISTRIBUTION OF OWNERS' FLEET SIZE (%)

Mode (City)	1	2	3	4	5-9	10-29	30+
Becak (Bandung)	0	0	----41-----			50	9
Bemo (Malang)	79	13	4	2	2	---Neg.--	
Jeepney (Manila)	55	15	7	4	-------19-----		

Source: (2)

TABLE 9 EXAMPLES OF FARE SYSTEM IN DIFFERENT CITIES

City	Mode	Fare System	Fares/Trip/ Person
Bandung	Becak	B	Rp 50-100(3-6)
Bangkok	Silor	B	Baht 7(29)
	Samlor	B	Baht 10(41)
	Hired-Motor cycle	B	Baht 6.5(27)
	Pickup	F	Baht 2-7(8-29)
Chiang Mai	Samlor	B	Baht 2-3(8-12)
Dhaka	Auto rickshaw	B	-
	Auto tempo	F	-
	Misuk	B	-
	Rickshaws	B	-
Delhi	Auto rickshaw	B	-
	Cycle rickshaw	B	-
	Tonga	B	-
Jakarta	Becak	B	Rp 76(4)
	Bemo	F	
	Bajaj	B	
	Opelet	F	

Karachi	Motor rickshaw	B	-
	Tonga	B	-
Nepal	Cycle rickshaw	B	-
	Tempos	F	-
	Meter tempo	B	-
Manila	Jeepney	F	Pesos 0.25(1.2) 1st 5 Km, 0.05 Pesos(0.22) additional Km.

Notes: Exchange rate: US1$ = Baht 24.25 = Indonesian Rupiah 1865.38 = Indian Rupee 24 = Pesos 22.45
( ) = The equivalents US Cent; B = Bargained,
F = Fixed; - = Data not available
Sources: (2), (10), (16)

TABLE 10 FARE STRUCTURES OF PARATRANSIT MODES IN INDIA

Mode	Fare/ Pax.Km (Paise)	Avg. Distance (Km)	Avg. Pax./ Trip	Avg. Fare/ Trip (Paise)
Auto-rickshaw	45	4.0	1.9	342 (Cent 14.25)
Cycle-rickshaw	46	1.95	1.7	153 (Cent 6.50)

Source: (15)

TABLE 11 FINANCIAL CONDITIONS OF PARATRANSIT MODES IN BANGKOK (Baht)

Items	Samlor	Silor	Hired-Motor cycle
Avg. Operating Revenue/Day	475.9	342.7	250.8
Ave. Operating Expenses/Day	319.8	194.1	112.3
Fuel Expenses	85.3	96.6	52.3
Others(Rental, Repair etc)	217.4	137.3	66.0
Operating Income (Excluding Personnel Expenses)	138.1 ($5.69)	148.6 ($6.13)	138.5 ($5.7)

Source: (10)

TABLE 12 FINANCIAL PROFILE OF JEEPNEY DRIVER AND OPERATOR IN METRO MANILA

Items	Driver	Operator
Daily Avg. Revenue (Pesos)	397	133
Daily Avg. Expenses (Pesos)	302	46
Daily Net Income (Pesos)	95 ($4.23)	87 ($3.87)

Source: (5)

TABLE 13 COMPARISON OF EMPLOYMENT GENERATION BY DIFFERENT MODES IN INDIA

Items	Public bus	Mini-bus	Auto-rickshaw	Cycle-rickshaw

No employees per Rs 10,000 investment	0.3	0.2	0.6	7.5
No employees per '000 pax. Kms daily output	1.3-3.3	0.8-1.3	13-14	40-60

Source: (7)