

CHARACTERISTICS OF JEEPNEY OPERATION AND DEMAND IN METRO MANILA, THE PHILIPPINE

By Takeshi KUROKAWA Shizuo IWATA***

This paper presents the first comprehensive information on the characteristics of the urban public transport operation and demand in the Metropolitan Manila areas wherein a paratransit mode peculiar to the Philippines called "Jeepney" is focused. The analysis is made on the basis of various field surveys extensively conducted.

1. INTRODUCTION

Metroplitan areas in developing countries suffer from various urban transportation problems such as traffic congestions, traffic accidents, environmental pollution, decreasing service level of public transport and increasing travel costs, etc. These problems appear similar to each other among different urban areas of different countries. However, the causes are not the same nor simple but always relate to a number of both physical and nonphysical factors peculiar to the areas interacting with each other. Without careful investigations on them, any countermeasure, such as the introduction of mass transit system which seems to be a common solution in many urban areas would bring about completely unexpected impact to the existing transportation and urban systems.

The urban public transport system in Metro Manila is particularly one most unusual even in the developling world. A dominant portion of its urban travel demand is accommodated by jeepneys. Jeepneys originated by converting jeeps used by US military during the World War II into passenger transport vehicles after the War. Buses were not sufficiently available, while trucks were for transporting goods.

With ingineous contrivances of modifying militay vehicles to colourful and convenient transport mode, jeepneys have spread quickly all over the country. Jeepneys, at present, are manufactured by assembling imported second-hand truck chassis and engines and locally-made bodies and accessories. In the entire Metro Manila Urban transportation system, jeepneys play significant roles not only in transporting passengers but also in providing employment opportunities for drivers and those involved in wide ranges of related industries. The reasons why jeepneys have become the most popular transport mode are attributed that all concerning bodies are benefited from jeepneys; passengers can enjoy relatively high level of

* Member of JSCE, Dr. Eng., Asso. Prof., Univ. of Tsukuba

** Member of JSCE, ALMEC Corporation

services with a reasonable amount of fare, investors can enter the industry with relatively small capital and running cost and can expect an attractive return under the current fare structure. Government authorities do not have to provide any subsidies to the jeepneys which are totally operated by private sectors. However, the actual conditions of the system and operation have never been properly surveyed.

In order to cope with the ever-increasing traffic congestion in Metro Manila, the Government has intended to strengthen bus transport and develop a mass transit system. 1 400 units of new buses were purchased and are currently in operation, while the first 14 km section of a elevated light rail system (LRT) is now under construction. In order for the Government to resume the effectivity of the policy, particularly, to guarantee sound operation of the LRT, and at the same time, to minimize the adverse impact on the existing bus and jeepney transport, a strong need arose to prepare plans for rerouting buses and jeepneys.

To meet this objective, a study was designed and undertaken under the Ministry of Transportation and Communications (MOTC) of the Philippines through the assistance of Japan International Cooperation Agency (JICA). As is commonly experienced in the developing countries, reliable statistics are not readily prepared, nor the available data and information in the Government agencies reflect the actual situation. Therefore, a series of different surveys were conducted extensively in the study. As the result of the detailed analyses of the data collected in the above JICA Study, various new facts and findings were obtained regarding the characteristics of the public transport, particularly those of jeepneys, which had never been explained clearly. This paper aims at reporting those results of the analyses made and survey method prepared which are believed to provide useful information for the transport planning in developing countries.

2. METRO MANILA PROFILE

(1) Physical Setting and Urban Growth

Metro Manila, also called the National Capital Region, is an area comprising of 4 cities and 13 municipalities. It extends to 50 kms from north to south, 26 kms from east to west and covers 636 kms².

Metro Manila is inhabited by about six million people of a population that has been expanding still at a considerable rate. The actual metropolitan area, therefore, has been growing towards the adjoining areas in the north, east, and south beyond the present jurisdiction. Middle and high income housing have tended to move to the periphery, while a sizeable number of urban poor penetrated into possible urban areas.

(2) Demography

The population of Metro Manila was 4 million in 1970 that has grown to 5 million by 1975 and 5.9 million by 1980. Average annual growth rates are 4.6 % between 1970 and 1975 and 3.6 % thereafter. Average household size is 5.4 members per household in 1980, while it was 6.0 in 1975.

According to the 1980 census, of the total population, working age group (those between 15 and 60 years old) shares 60.4 % or about 3.6 million. Number of gainful workers is 2.0 million (or 33.9 % of the total population), while the students in the secondary level and above, those who are in primary level, and housewives are 0.80 million (13.4%), 0.75 million (12.7 %) and 0.73 million (12.3 %), respectively. Jobless and others excluding those below 7 years old are 0.53 million or 8.9 % of the total population.

Although an average population density is 94 persons per ha, it varies from more than 400 in the central areas to less than 30 in the outskirts. Daytime populations are concentrated rather in a limited area. High density is seen in the areas along the coastline, particularly in the urban core and along the transport corridors where the the LRT is currently constructed. However, the areas where the gainful workers share relatively high percentage in the total daytime population are distributed along C-4 and the South Super Highway. On the other hand, school attendance is extremely concentrated in the

university belt located in the CBD.

(3) Income Distribution and Car-ownership

Data on income are different from each other depending upon the data sources as is shown in Table 1. Official data provided by National Census and Statistics Office (NCSO) is considerably different from that obtained based on the analysis of the samples collected under the Household Interview Surveys (HIS) conducted in 1980 and 1983. The latter was conducted in the JICA study. Further analysis of the HIS data shows that the higher income areas are noted to be along the C-4 and in the southern outskirts.

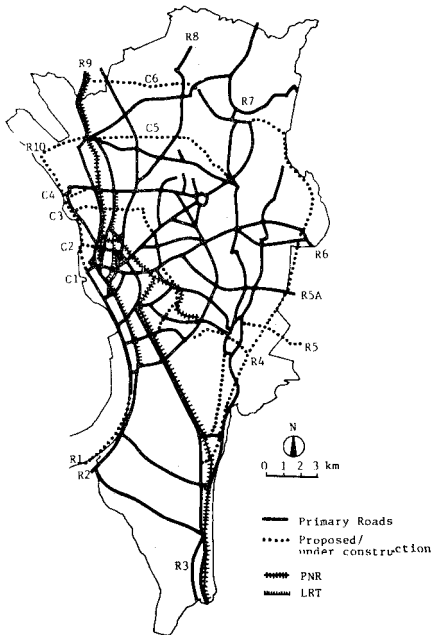


Fig. 1 Transport Network of Metro Manila.

Table 1 Household Income Distribution.

Household Income Level (P/month)	1980 HIS		1980	1983
	No. of Household	% ^{1/}	NCSO %	HIS ^{2/}
1,000 and Less	637,493	61.7	35.8	43.5
1,001 ~ 2,500	322,910	31.3	41.1	41.7
2,501 ~ 4,000	52,037	5.0	11.5	8.7
4,000 and Above	19,745	2.0	11.6	6.1
Unknown	62,646	-	-	-
Total	1,094,831	100.0	100.0	100.0
Average (P/month)		1,152	2,284	1,601

Source: (A) 1980 HIS figures are calculated based on the analysis of 25,000 household samples covered in 1980 Household Interview Survey conducted under MUTIP study of MOTC.

(B) 1980 NCSO figures are official data provided by National Census and Statistics Office (based on 3,300 household samples).

(C) 1983 HIS figures are calculated based on the analysis of 3,300 household samples covered in 1983 Household Interview Survey conducted under the JICA assisted study.

^{1/} % is calculated excluding unknown.

Table 2 Carownership by Income Level, 1980.

Household Income Level (P/month)	Car-owning Household		
	Number	% to Total Household	Ave. No. of Cars Owned
1,000 and Less	19,543	3.1	1.0
1,001 ~ 2,500	49,090	15.2	1.1
2,501 ~ 4,000	19,365	37.2	1.4
4,001 and Above	13,308	67.4	2.1
Total	104,479 ^{1/}	9.5	1.4

Source: Analysis of the HIS data

^{1/} including No. of households whose income level are unknown.

According to the record of the Bureau of Land Transportation (BLT), the number of motor vehicles (excluding motorcycles and tricycles) registered in Metro Manila was approximately 432, 200 in 1982. Its composition by vehicle type is as follow : passenger cars and jeeps ; 265 000 (61.3 % of the total), taxis ; 6 150 (1.4 %), jeepneys or public utility jeepney ; 27 900 (6.5 %), buses 4 400 (1.0 %) and trucks ; 128 800 (29.8 %).

Table 2 shows the car-ownership by income level. An average car-ownership ratio is about one for every ten household who owns an average of 1.4 cars. However, car-ownership varies significantly by income level. Only 3 % of the households who belong to the lowest income group own a car per household, while 67 % of those who belong to the upper income group own more than 2 cars per household.

(4) Urban Transportation Characteristics

Urban travel demand of Metro Manila residents was analyzed based on the 1980 HIS data. As is shown in Table 3, a level of the total demand is 10.6 million trips per day. Public mode shares significantly some 75 % of the total demand, while the private mode the remaining 25 %. Jeepneys

Table 3 Urban Travel Demand Travel and Modal-Split, 1980.

Mode	No. of Linked Trips (000)	% to Total	No. of Linked Trips made by Persons of: (000)	
			Car Owning Household	no-car Owning Household
Public:				
Train	10	0.1	0	10
Bus	1,674	15.7	150	1,524
Jeepney	5,797	54.5	571	5,226
Tricycle	430	4.1	49	381
S. Total	7,911	74.4	770	7,141
Private:				
Car	1,694	15.9	1,267	427
Taxi	168	1.6	38	130
Truck/Others	860	8.1	332	528
S. Total	2,722	25.6	1,637	1,085
TOTAL	10,633	100.0	2,407	8,226

Source: Analysis results of the HIS data

Table 4 Urban Travel Demand by Income Level, 1980.

Household Income Level (P/month)	No. of Linked Trips/Day			
	Public Mode 000 (%)	Private Mode 000 (%)	Total 000 (%)	
500 and Less	902 (11.4) (95.0%)	68 (2.5) (7.0%)	970 (9.1) (100%)	
501 ~ 1,000	2,421 (30.6) (83.6%)	476 (17.5) (16.4%)	2,897 (27.3) (100%)	
1,001 ~ 2,500	3,789 (47.9) (77.1%)	1,124 (41.3) (22.9%)	4,913 (46.2) (100%)	
2,501 ~ 4,000	641 (8.1) (54.8%)	528 (19.4) (45.2%)	1,169 (11.0) (100%)	
4,001 and Over	158 (2.0) (23.1%)	526 (19.3) (76.9%)	684 (6.4) (100%)	
Total	7,911 (100.0)	2,722 (100.0)	10,633 (100.0)	

Source: Analysis of the HIS data

2 500 peso per month, public transport plays a vital role. while high income level households earning more than 4 000 peso per month depends mainly on private mode. For the middle income households of 2 500-4 000 peso per month, both public and private modes are equally utilized. Nearly 87 percent of public transport users belong to the income level of 500-2 500 peso per month

3. CONDUCT OF PUBLIC TRANSPORT SURVEYS

(1) Profile of metro Manila Urban Public Transport System

Urban public transport in Metro Manila is almost entirely road based wherein major passenger transport modes are buses, jeepneys and tricycles. They are in private operation except the publicly-owned Metro Manila Transit Corporation (MMTC) which operates about 700 buses. The routes or operating areas and the vehicles to be operated by the private operators/companies are subject to permit by the Board of Transportation (BOT) which also sets public transport fares. Government intervention is little and no direct subsidies are provided to the private operators/companies.

1) Bus :

Until the mid-1970 s, the operation of buses was totally in the hands of the private sector which comprises some 120 companies of different sizes. MMTC was formed in 1974 to lessen the financial problems of private bus companies and the 120 companies were merged into 13 groups.

As is shown in Table 5 various types of services of different types of buses are currently provided for the metropolitan area. Buses are operated on the fixed routes. Although there are on time tables, departure and arrival time to and from the garage and the number of trips to be made are normally controlled daily by dispatchers of the companies. Buses stop mostly at or near the designated stops such as bus stops, intersections or landmarks

accommodate more than half of the total demand or 73 % of the public transport demand. Buses and tricycles share the remaining. Philippine National Railways (PNR) carry only negligible volume within Metro Manila. Of the private mode, cars share 16 % of the total demand or 62 % of the private transport demand. Trucks are still considered as fairly significant mode in passenger transport modes.

Table 3 also indicates that 77 % of the total trips are made by non car-owning household members, and of which 87 % are by public transport mode.

On the other hand, 32 % of the trips made by car-owning household members are by public transport modes. Of the use of private transport modes, almost 40 % of the trips are made by non car-owning household members. Although 75 % of car trips are made by car-owning household members, 77 % of taxi trips and 61 % of trips are made by non-car-owning household members.

As is shown in Table 4, modal-split between public and private in Metro Manila strong relation with household income. it is clearly shown that the modal choice between private and public relate with income level. For lower income household of less than

2) Jeepney :

Jeepney is a very unique public transport mode not only in its vehicle type but also in the ways it is operated and utilized by passengers. There are different types and sizes. The capacity is usually 14 to 16 seats without any space for standees. They are mostly operated by individual drivers who rent the vehicle on a baily basis from independent jeepney owners. Jeepneys are insured at a premium paid by operators. Many of the jeepneys are organized into informal route cooperatives which control new entry and operations along particular routes and manage joint repair and maintenance arrangements for the individual owners.

The number of jeepneys actually operating is considered to be far more than those officially registered. In addition, many of the existing routes are different from those in the BOT list. This implies the following : Many jeepneys are not offically registered at the Bureau of Land Transporation (BLT). Instead, fake number plates are placed which are hard to identify from the way they look like. Many jeepneys, whether or not they are registered, operate on the routes which are different from those franchised or from those which are not shown in the BOT list. These vehicles which operate as if they have permits are called "colorum" (illegal vehicles or illegally operated vehicles). Unlike buses, jeepneys stop anywhere along the route for boarding and alighting passengers. Reliable and comprehensive information are scarcely available on their routes and vehicle inventory, operation and passenger characteristics.

3) Tricycles

This is a motorized small 3-wheeled hooded passenger vehicle assembled locally using imported 100 to 125 cc motorcycle engines and other parts imported or locally manufactured. Tricycles need also to be licensed by the BOT. They are operated by the licensed owner himself or the driver leased from the owner under a daily or weekly rental basis. Present regulation prohibits the use of tricycles on main roads in Metro Manila. They operate, therefore, mainly on local roads, serving local trips and providing ideal feeder services to main bus and jeepney routes.

(2) Outline of the Surveys Conducted

Under of the various restrictons, a series of comprehensive surveys were designed and conducted for the first time in Metro Manila, in order to identify the characteristics of the existing public transport with a particular emphasis on jeepney transport. The outline of each survey is as follows :

1) Route Reconnaissance Survey : This intended to identify the existing routes because it was found out that the official route list, particularly that of jeepney, was largely different from the actual situation. The survey covered 120 areas where actual jeepneys routes were observed from their panels which show actual locations of destinations. Based on this survey, location of survey stations for the Service Frequency survey were precisely determined.

2) Service Frequency Survey : One-way service frequency of all existing bus and jeepney routes

Table 5 Roadased Public Transport Modes.

Mode	Passenger Seating Capacity 1/	Fare: as of Feb. 1983
Bus		
Standard Bus	60 (80)	65¢ first 5km + 14¢/km
Double Decker	100 (120)	65¢ first 5km + 14¢/km
Limited Bus	60	₱2.5 flat
Love Bus	60	₱4.0 flat
Mini-Bus	30	56¢ first 5km + 14¢/km
Provincial Bus	60	65¢ first 5km + 14¢/km
Jeepney	14 ~ 16	65¢ first 5km + 14¢/km
Tricycle	2 ~ 5	50¢ within local sub-division, 10¢/km beyond

Source: MRTC

1/ figures in parenthesis include standees.



was counted by route and by hour between 6 a.m. and 10 p.m. during a week-day at 50 survey stations for jeepneys and 18 for buses. The survey stations were set in such locations as road-sides near terminals where all existing routes can be covered. Moreover, in order to cross-check the results and to ensure that the jeepneys operate all along the routes, additional 17 stations were selected where the frequency of both directions was counted by route and by hour for the same period of time.

3) Operation Characteristics Survey : This intended to determine travel time, number of boarding and alighting passengers, load factor of bus and jeepney by route and by road section for three different periods of hours of a week-day ; morning (7 and 10 a.m.), afternoon (12-3 p.m.) and evening (4-7 p.m.). A total of 468 jeepney and 72 bus routes were covered out of the total existing 744 jeepney and 197 bus routes that had been identified by the Service Frequency Survey. The survey was conducted by a surveyor on board a jeepney who recorded the number of passengers, the time and location for every stop for boarding and alighting of passengers and at predetermined intersections. A total of 3800 and 240 round trips were covered for jeepneys and buses, respectively. The number of round trips to be made was determined depending upon the level of frequency of the route. Sampling was made in such a way that the samples can be properly expanded for the surveyed routes and at the same time, the above data can be estimated for the routes not surveyed.

4) Terminal Survey ; This intended to clarify the existing of bus and jeepney terminals where passengers are loaded and unloaded, vehicles turn-around and wait. At present, "terminal" is not a concentrated terminology. Passengers board and alight in any places. It is, therefore, defined that "terminal" is a location or an area where existing routes start or end, and relatively heavy passenger traffic is generated. The survey was made based on field reconnaissance and interviews with relevant personnel in the respective terminal areas. The items surveyed for all existing terminals are location, type of facilities, terminal fee, traffic control method in terminal area, waiting conditions of the vehicles, interface between other public transport modes and any other particulars in the area.

5) Jeepney Fare Survey : This intended to know whether passengers pay and drivers charge fare according to authorized tariff. 5 representative routes were selected and a total of 347 passengers were interviewed or observed by a surveyor on board a jeepney.

6) Jeepney Units Utilization Survey : This intended to know the percentage of actual operating time in a week based on interviews with several selected operators. A total of 151 units was surveyed to check their one week's operation record.

7) Jeepney Passenger Walking Distance Survey : This intended to know the range of walking distance between origin or destination and boarding or alighting place by way of asking passengers to pinpoint the locations on a map and measuring the distance thereafter on the actual road network. A total of 919 passengers was surveyed at three representative major terminal areas.

8) Jeepney Driver Interview Survey : This intended to know the approximate financial viability of operation covering revenue and expenses by item based on interviews with a total of 943 drivers from 147 different routes.

9) Tricycle Operation Survey : This intended to identify the service and collect operation data by way of field reconnaissance and interviews with 5 drivers from each of all existing terminals.

10) Bus/Jeepney Operating Cost Survey : This intended to estimate the operating cost of bus and jeepney for different speeds in economic and financial terms. The survey was made by inquiring at relevant agencies and their personnel of the prices and conditions of individual cost items.

11) Preliminary Survey on "Colorum" Jeepneys : This intended to estimate the approximate percentage of "colorum" jeepneys. Plate numbers of 3200 jeepneys from different routes were collected to identify them in the official BOT record.

4. CHARACTERISTICS OF JEEPNEY TRANSPORT

The findings noted and the facts made clear based on the analysis of the data collected in the surveys explained in 3.2 are as follows ;

(1) Jeepney vs Bus

The routes of buses and jeepneys were configured in fairly complex manner with 744 jeepney and 197 bus routes which covered 650 kms of Metro Manila roads. Their services are not limited to within Metro Manila alone but extend to the adjoining areas that are practically considered as the same metropolitan area. Although approximately 290 kms or 88 % of the bus coverage also served by jeepneys, the current basic route structure of bus and jeepney is considered rather complementary to each other, mainly due to the fact that the Government bans the operation of jeepneys along several major roads where only buses are allowed. However, along the roads where both modes exist, they are in fierce competition. On the other hand, tricycles are mostly in complementary relations with bus and jeepney and provide good feeder services in many locations.

Comparative figures on bus and jeepney operations obtained from the analysis of the Service Frequency survey and Operation Characteristics survey are summarized in Table 6.

(2) Route and Operation

Out of the 744 jeepney routes that are actually operated presently, 669 of them are identical with those in the BOT list and 75 routes are considered illegal. The BOT list, however, indicates that franchise were granted to some 1200 routes. This implies that some 458 routes are currently not operated at all. The number of actually existing jeepney is estimated to be 41 800 units (number of actually operating units of 35 500 divided by average vehicle utilization ration of 0.85) as against the number of registered jeepneys of some 28 000 only. The result of Preliminary Colorum Jeepney survey indicates approximately 30 % of the samples are not shown in the BOT list. The number of operating jeepneys along the major thoroughfares where the demand is large often much more than the number of authorized units. Out of the above 75 illegal routes, 62 routes are partly or wholly located along the roads where the LRT is currently under construction.

Jeepney routes are relatively short. Average route length is about one half of a bus route. Table 7

Table 6 Systems and Operation of Bus and Jeepney in the Metropolitan Area (As of January, 1983).

Item	Intracity Route			Intercity Route			Total		
	Jeep- ney	Bus	Total	Jeep- ney	Bus	Total	Jeep- ney	Bus	Total
Route:									
(1) No. of Routes	640	149	789	104	48	152	744	197	941
(2) Road Coverage (kms)	571	287	608	195	172	255	610	327	650
(3) Ave Route Length(kms)	10.4	21.1	-	24.6	40.5	-	12.4	25.8	-
Fleet Capacity/16 Hrs.									
(1) Estd.No.of Unites(00)	292	44	336	63	15	78	355	59	414
(2) Total Vehicle-kms (000)	3,154	506	3,660	1,043	237	1,280	4,197	744	4,941
(3) Total Seat-kms (million)	49.0	29.5	78.5	16.1	12.7	28.8	65.1	42.2	107.3
Passenger Traffic/16 Hrs.									
(1) Total No.of Passen- gers Carried (million)	6.9	2.0	8.9	0.95	0.45	1.4	7.9	2.4	10.3
(2) Total Pass-kms (million)	26.5	16.9	43.4	8.4	6.8	15.2	34.9	23.7	58.6
(3) Ave Trip Length (kms)	3.8	8.5	4.9	8.9	15.6	11.0	4.4	9.8	5.7
Operation Index/16 Hrs									
(1) Ave kms Run	108	116	-	167	154	-	118	126	-
(2) Ave No.of Turn- Around Trips	5.2	2.7	-	3.4	1.9	-	4.8	2.4	-
(3) Ave No.of Passengers Carried/Vehicle	237	456	-	151	283	-	222	411	-
(4) Ave Load Factor (%)	54.1	57.2	-	52.0	53.7	-	53.5	56.1	-

Source: Service Frequency Survey and Operation Characteristic Survey, 1983

Table 7 Distribution of Route Length of Bus and Jeepney.

Route Length Classification	Jeepney		Bus	
	No.	% to Total	No.	% to Total
0.1 ~ 5.0 kms	154	(20.7)	2	(1.0)
5.1 ~ 10.0	156	(21.0)	15	(7.6)
10.1 ~ 20.0	344	(46.2)	61	(31.0)
20.1 ~ 30.0	56	(7.5)	62	(31.5)
30.1 and Over	34	(4.6)	57	(28.9)
Total	744	(100.0)	197	(100.0)

Source: Route Reconnaissance Survey, 1983

Table 8 Average Travel Speed of Bus and Jeepney by Area Period.

Mode	Time Period	Ave. Travel Speed by Area (KPH) ^{1/}			
		Within C-2	Between C-2/C-4	Outside C-4	Outside M.Manila
Jeepney	Morning (7-10 a.m.)	7.0	13.4	16.9	30.0
	Afternoon (12-3 p.m.)	9.3	12.4	16.0	25.0
	Evening (4-7p.m.)	8.9	12.1	17.3	25.1
Bus	Morning (7-9 a.m.)	12.0	17.1	19.2	26.9
	Afternoon (12-3 p.m.)	13.1	16.2	22.7	26.2
	Evening (4-7 p.m.)	13.4	16.6	21.0	22.8

Source: Operation Characteristic Survey, 1983

^{1/} Average of Both Directions

Table 9 Load Factor of Jeepneys.

Item	Intracity Route	Intercity Route	Total
Area:			
Within	58.7%	59.4%	58.7%
Between C2 and C4	57.3	59.7	57.4
Outside C4	49.8	65.2	53.9
Outside M.Manila	53.4	42.6	44.1
Hourly Period:			
Morning (7-10 am)	55.3	51.4	54.3
Afternoon (12-3 pm)	52.0	49.3	51.3
Evening (4-7)	54.1	52.0	53.5
Daily Average	54.1	52.0	53.5
Route Length (kms):			
2.5 and Less	-	-	39.1
2.6 ~ 5.0	-	-	45.9
5.1 ~ 7.5	-	-	50.6
7.6 ~ 35.0	-	-	54.2~72.6
35.1 and Above	-	-	52.1

Source: Operation Characteristics Survey, 1983

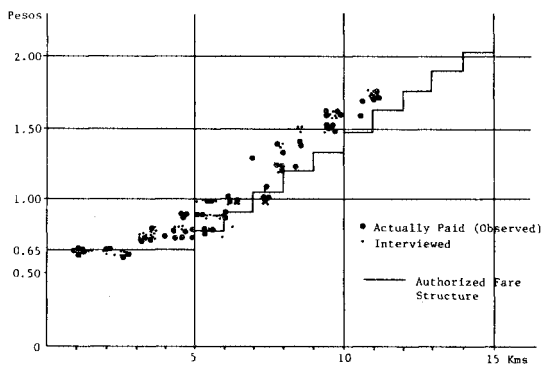
Table 10 Financial Profile Jeepney Operation.

Item	Route Length Range (kms)									
	2.5 & Less	2.6-5.0	5.1-7.5	7.6-10.0	10.1-15.0	15.1-20.0	20.1-25.0	25.1-30.0	30.1-35.0	35.0+
Survey Coverage:										
1. No. of Routes	11	24	12	13	49	29	3	2	3	
2. No. of Samples	80	184	74	81	302	162	20	15	20	
Operating Conditions										
1. Ave. Kms. Run/Day	90	87	125	87	93	172	181	208	229	
2. Working Hours/Day	16	12	13	12	13	12	15	15	14	
3. Working Days/Week	5	4	4	4	4	4	4	4	4	
4. No of Drivers Assigned/Vehicle/Week	2	2	2	2	2	2	2	2	2	
Financial Index (P)										
1. Ave Revenue/Day	193	210	246	235	261	271	284	261	242	
2. Ave Expense/Day	154	164	177	186	196	203	217	242	200	
1) Boundary	85	89	87	93	99	98	110	114	95	
2) Fuel/Oil	45	50	64	66	74	74	84	107	88	
3) Miscellaneous ^y	24	25	26	27	23	31	23	21	27	
3. Ave Takehome Income/Day ^y	57	57	58	67	68	76	66	59	50	

Source: Jeepney Drivers Interview Survey, 1983

^y : Including cigarettes, coffee, snacks, parking fee etc spent during operation.

^z : As interviewed (not calculated)



Source: Jeepney Fare Survey, 1983

Fig. 2 Comparison of Authorized Fare and Actually Paid Fair along A Jeepney Route (Blumentritt-Baclaran via Cruz/Mabini).

Table 11 Distribution of Jeepney Passengers.

Area	No of Terminals	No of Boarding/Alighting Passengers/16hrs (000)	% of Passengers generate in Terminals	
Within C2	21	4,138	1,439	34.8
Between C2 and C4	79	6,873	3,035	44.2
Outside C4	83	5,135	1,946	37.9
Whole Metro Manila	183	16,146	6,420	39.8

Source: Operation Characteristics Survey and Jeepney Terminal Survey, 1983.

shows that 154 routes or 20.7 % of the total shorter than 5 kms which is the minimum flat fare section of 65 c per trip.

Average travel speed of jeepney, as is shown in Table 8, is fairly lower than that of bus for any period of time and any place in Metro Manila. This closely relates to the difference in operation attitudes in loading and unloading passengers. Jeepneys stop anywhere to serve passengers, while buses do so at much larger intervals. Another factor is that jeepneys drivers' take-home income is derived from the fare revenue, while bus drivers are paid partly on the basis of the number of trips they made a day.

Load factors of jeepneys shown in Table 9 indicate that they do not vary much by area nor hourly period but by route length. This relates the current fare structure that the fare per trip is the same within the first 5 kms. It is considered that there is a tendency that jeepney units are distributed in such a way that the income per vehicle would be fairly equal. This is also seen in Table 10. Jeepneys considerably operate flexibly in place and in time. Services are available throughout the day as long as a car-load of passengers are more or less available. Although jeepneys usually operate along the fixed routes, they sometimes alter their routes or cut short trips as to avoid traffic congestions. Also, fares are not always paid or charged as they are supposed to be as is shown in Figure 2. In one of the busiest route located along the LRT route, the amount actually paid by passengers are mostly more than the authorized one beyond 3 kms.

183 jeepney terminals were identified by the field survey within Metro Manila. Normally, there are

no fixed facilities but rather only designated on-road spaces, off-road vacant lots or portions of gas stations used as terminals. Terminal where passenger traffic is heavy is considered as an extent of area which comprises several locations where jeepneys park to pick up passengers and a set of roads where jeepneys can turn-around. As is shown in Table 11, about 40 % of total boarding and alighting passengers generate in terminals, while the remaining 60 % are on roads outside terminals. Due to the nature of the terminals, traffic congestions are chaotic in many of the major terminals that handle 200 to 400 thousand boarding and alighting passengers mainly on road spaces. Of the total 183 terminals, 145 are linked with other public transport modes (PNR, bus, tricycle).

(3) Passenger Travel Characteristics

According to the analysis of the results of 1980 Household Interview Survey, socio-economic profile of bus and jeepney passengers is not much different with the possible exception that jeepneys are relatively frequently used by students, while buses are by administrative/professional persons, and tricycles are by pupils and housewives.

Table 12 Distribution of Number of Passengers and Passenger-kms by Trip Length.

Trip Length (kms)	Intracity Route				Intercity Route			
	Passengers		Pass-kms		Passengers		Pass-kms	
	000	%	000	%	000	%	000	%
0.1- 1.5	876.3 (12.6)		701.0 (2.6)		25.7 (2.7)		20.5 (0.3)	
1.6- 2.5	1,342.6 (19.4)		2,685.2 (10.0)		14.2 (1.5)		28.4 (0.3)	
2.6- 5.0	2,818.0 (40.7)		10,708.4 (40.1)		72.8 (7.7)		276.6 (3.4)	
5.1- 7.5	1,658.1 (23.9)		10,446.0 (39.0)		223.8 (23.6)		1,409.9 (17.1)	
7.6-10.0	222.7 (3.2)		1,959.8 (7.3)		405.0 (42.7)		3,564.0 (43.3)	
10.1-15.0	9.3 (0.1)		116.3 (0.4)		155.9 (16.5)		1,948.8 (23.7)	
15.1-20.0	7.6 (0.1)		133.0 (0.5)		34.8 (3.7)		609.0 (7.4)	
20.1-25.0	0.0 (0.0)		0.0 (0.0)		6.6 (0.7)		148.5 (1.8)	
25.1-30.0	0.6 (0.0)		16.5 (0.1)		8.2 (0.9)		225.5 (2.7)	
30.1 and Over	0.0 (0.0)		0.0 (0.0)		0.1 (0.0)		3.5 (0.0)	
Total	6,932.5(100.0)		26,766.0(100.0)		947.2(100.0)		8,234.8(100.0)	

Source: Operation Characteristics Survey, 1983

As is shown in Table 12, trip length of jeepney passengers is quite different between intra-city and inter-city routes. 99.8 % the passengers of intra-city routes have trip length of less than 10 kms and cover 91.6 % of the passenger-kms. 72.7 % of the passengerstravel less than 5 kms. On the other hand, passengers of inter-city routes travel much longer. 90.5 % of them fall into the range of trip length between 5 and 15 kms.

As is shown in Table 13, average walking distance of jeepny passengers is 252 meters between the locations where they board or alight the jeepney and their origin or destination. The survey was conducted in major terminal areas. According to the similar surveys conducted under MOTC in 1980 at about 20 different locations in the other areas than terminais, the average walking distance is only approximately 100 meters. This is largely due to the fact that terminals are normally simple on-road spaces, therefore, the boarding and alighting places spread to wider areas in major terminals.

Regarding the waiting of passengers, an extensive survey was conducted under MOTC in 1980. Average waiting time is 3.3 to 7.2 minutes depending upon areas and time as is shown in Table 14. About 17 000 passengers from 87 representative routes were interviewed. Passengers wait for jeepneys at the nearest locations to/from their destinations along the route. Passengers even wait on the traffic island or median strip where jeepney traffic is heavy and curbside spaces are limited.

Table 13 Distribution of Walking Distance of Jeepney Passengers in Selected Major Terminal Areas.

Distance (m)	No. of Passengers	% to Total
50 and Less	22	2.4
51 - 100	95	10.3
101 - 150	142	15.5
151 - 200	123	13.4
201 - 250	146	15.9
251 - 300	102	11.1
301 - 350	89	9.7
351 - 400	65	7.1
401 - 450	46	5.0
451 - 500	17	1.9
501 - 600	48	5.2
601 and more	24	2.5
Total	919	100.0

Source: Jeepney Passenger Walking Distance Survey, 1983

Table 14 Average Waiting Time of Jeepney Passengers by Area and Time.

Area	Morning 7 - 10 a.m.	Afternoon 12 - 3 p.m.	Evening 4 - 7 p.m.
Within C2	3.6	3.3	3.8
Between C2 and C4	6.4	5.5	5.9
Outside C4	7.2	6.4	6.8
Metro Manila Average	3.8	3.6	4.1

Source: MMUTIP Jeepney Operation and Passenger Survey 1983, MOTC

(4) Control by the Government

The Government has little intervened the operation of jeepneys. The control on registration and franchise of vehicles and routes had been weak. The introduction of vehicle is not always correctly charged as it is supposed to be. Associations of jeepney operators which are considered to have more control on the operation along the particular route and area, are rather informal. Enforcement of traffic rules and regulations is not so strong that jeepneys are allowed to operate flexibly which, on the other hand, amplify the traffic congestion in many locations.

5. CONCLUSIONS

On the basis of the results of the analysis and findings made, the following can be concluded; The urban public transport system in Metro Manila provides relatively high level of services for a nation at the Philippines' level of economy; good system coverage, high frequency of services, good availability of seats, reasonable waiting time and travel speed in most locations, reasonable walking distance, good affordability to the majority of people etc. This is largely due to the existence of widely developed and spread jeepneys which do not receive any subsidy from the Government. It is to be noted that the effectiveness and efficiency of jeepneys have been achieved not only by their flexible operation but also due to flexible utilization attitudes of passengers and flexible or loose enforcement of regulations and control by the public sector.

However, the advantages of jeepney transport are becoming less and the efficiency of the entire urban transport system is reduced due to the varied reasons. Limited road space has been saturated by the increasing number of vehicles wherein jeepneys contribute considerably to the traffic congestions on many sections of the roads. Along some major roads, jeepneys share 80-90% of the total daily traffic and can travel only at a speed of 5-10 kms/hr. Congestions at many major terminal areas are so serious that they affect the capacity of the road network extensively. Lack of proper vehicle inspection and maintenance system causes serious air pollution where jeepney traffic is heavy and also causes frequent breakdown of vehicles. Therefore, it is considered that an excessive existence of jeepneys starts to offset the benefits of jeepneys in certain areas.

Government policy is directed towards the expansion of existing mass transit system such as buses, PNR and LRT. In order to maintain the advantage of the jeepneys under these situation, it is time to duly consider what is the advantage, if not optimum, level of supply and role of jeepneys in the total urban transport system with a limited road capacity and to identify a way to introduce proper regulation to jeepney vehicles and their operation in the problem areas.

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