NATIONAL TRANSPORT RESEARCH CENTRE

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TAXI INDUSTRY IN RAWALPINDI AND ISLAMABAD VOLUME II

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7. PASSENGERS

7.1 Introduction

In this chapter we present the results of the interview survey carried out with the taxi passengers. The purpose of this section of the study was to try and arrive at an understanding of how taxis are used, and to a limited extent, of what categories of passengers were using them.

From the data obtained it has been possible to build up a picture of essential parameters such as the average trip length, the distribution of journey lengths, fares paid, how often people use taxis and the origin-destination pattern of the journies being made.

In analysing the results for this section of the study one consideration has been to investigate possible differences in patterns of behaviour between Islamabad and Rawalpindi, which have marked contrasts in city layout and function as well as in the socio-economic characteristics of their populations.

7.2 The number and distribution of taxi journies

As has been explained in chapter 3, one of the objectives underlying the structure of the passenger survey was to enable us to estimate the pattern of journies being made by taxi on an average working day.

By systematically sampling every taxi stand in the study area we have been able to construct an origin-destination matrix for daily taxi journies which should be relatively free from any spatial biases or distortions. The only reservation which should be made is that since the survey did not explicitly cover journies made by passengers who hailed a cruising cab, we cannot be certain that these journies would have had the same characteristics as those originating from stands. However, as the stands are fairly uniformly spread throughout the urban area and are spaced closely

together, there is no reason to assume that those journies made with a cruising taxi would be any different, either in terms of their clientele or in their spatial pattern. Nevertheless, the origin destination matrices which have been derived relate only to those journies which commenced at stands. Table 7.1 shows various estimates of daily taxi journies made within the study area.

Table 7.1

NUMBER OF DAILY JOURNIES

	ISLAMABAD	RAWALPINDI	STUDY AREA
USEABLE INTERVIEWS	785	1469	2254
TOTAL TAXI JOURNIES FROM STANDS	1249	3482	4731
TOTAL TAXI JOURNIES (MINIMUM ESTIMATE)	4460	12430	16890
TOTAL TAXI JOURNIES (MAXIMUM ESTMATE)	8580	23920	32500

Two estimates, an upper and lower bound, are given for the total daily taxi journies. The minimal figure is based on an expansion by a factor of 3.57 of the journies originating at taxi stands (based on the finding that only 28% of journies started from taxi stands). The maximum figure is based on the assumption that each of the 3250 taxis perform an average of 10 journies per day (see Chapter 11). However it is unlikely that all taxis would be operating on a typical day and a figure of 70% of the maximum could be a more realistic estimate of the number of daily journies.

An analysis of the variation in the number of journies over the day is given in Table 7.2. Here we see a distribution typical for trip making in urban areas, with demand building up rapidly in the morning, remaining fairly constant during much of the working day but with some peaking and then fading away more gradually into the late evening. In Rawalpindi the highest demand,

with 10.9% of daily journies, occurs between midday and one pm, with another peak occuring between 4:00 and 5:00 pm. The pattern in Islamabad differs somewhat, with a slightly heavier demand in the three hours between 9:00 am and midday. The peak hour, with 10.6% of daily demand, occurs between 9:00 and 10:00 am. The afternoon peak, not as pronounced as that in Rawalpindi, occurs between 3:00 and 5:00 pm.

Table 7.2

DISTRIBUTION OF TAXI JOURNIES BY TIME OF DAY

(Column percentage)

T I M E	ISLAMABAD	RAWALPINDI	STUDY AREA
07 - 08	2.0	0.7	1.2
08 - 09	6.6	7.9	7.4
09 - 10	10.6	8.8	9.4
10 - 11	9.5	8.6	8.9
11 - 12	10.3	9.2	9.6
12 - 13	8.2	10.9	10.0
13 - 14	7.7	7.4	7.5
14 - 15	6.5	7.1	6.9
15 - 16	8.9	8.3	8.5
16 - 17	8.5	9.4	9.1
17 - 18	6.4	6.9	6.7
18 - 19	4.9	5.1	5.0
19 - 20	3.2	4.5	4.0
20 - 21	3.1	3.3	3.2
21 - 22	3.6	1.8	2.5
22 - 23	0.0	0.1	0.0
23 - 24	0.0	0.1	0.1
TOTAL JOURNIES	802	1474	2276

Table 7.3 summarises the origin destination data by 3 groups of origins and destinations: Islamabad, northern Rawalpindi (zones RI-30) and southern Rawalpindi (zones R31-60). This level of aggregation shows that only 303 (6.55% of all trips) journies

were made crossing between Islamabad and Rawalpindi or vice versa, thus reinforcing the finding that the great bulk of journies are made over very short distances. We can also observe that the total number of origins is reasonably balanced with the number of destinations in each region, indicating that the sampling process has been relatively free of geographical bias.

Table 7.3
SECTORAL TRIP INTERCHANGES

(Daily journies from taxi stands))

ORIGIN	DESTINATION			TOTAL
	RAWALPINDI		ISLAMABAD	
	ZONES 1 - 30	ZONES 31 - 60	ZONES 101 - 160	
I1 - I30	88	29	1127	1244
R1 - R30	1376	713	173	2262
R31 - R60	287	821	13	1121
TOTAL	1751	1563	1313	4627

Consonant with the taxi's particular door to door function within the spectrum of public tranport modes, the pattern of origin destination movements revealed by the survey is very diffuse. The full origin destination matrices for taxi journies starting from taxi stands are included in the supplementary volume, where it can be seen that just a few zones stand out as particular foci in the pattern of trip making throughout the area. For example, in Rawalpindi the two destination zones with the highest number of trips were zones 28 (Raja Bazar) and 40 (Saddar) with 302 and 575 journies respectively. In Islamabad, zones 128 (Zafar Chowk) with 84 journies and zone 109 (Aabpara) with 104 were the most popular destinations. Thus Saddar is the destination of some 10% of the daily journies in the entire study area, reflecting the dominance of this zone in the economic and commercial structure of the city. In order to illustrate more clearly the origin destination pattern, those zonal interchanges with more then 10

journies have been abstracted from the full matrices (Table 7.4) and presented in the form of a desire line diagram (Figure 7.1).

Table 7.4

ABSTRACT FROM ORIGIN-DESTINATION MATRIX - TRIP INTERCHANGES WITH 10 OR MORE TRIPS

a) Rawalpindi (Origins 1-30) (Daily journies starting from taxi stands)

ORIGIN \ DESTINATION ZONE	3	4	9	10	13	14	16	19	20	21	26	28	29	30	39	40	155
R 1	12				10												
R 2				25													
R 3	18		13	22													
R 6	12	12	12				10			19		14					
R 7	13															12	
R 10									10								
R 11												12				10	
R 17	26				11												
R 18												21			11	16	
R 19											11					14	
R 20										14		12					
R 21												23	14		14	17	
R 23			12				16	12				20				20	
R 24															12	27	16
R 26						13						15		11		30	
R 27												12			12	32	
R 28																24	

Table 7.4 (continued)

ABSTRACT FROM ORIGIN-DESTINATION MATRIX - TRIP INTERCHANGES WITH 10 OR MORE TRIPS

b) Rawalpindi (Origins 31-60)

(Daily journeies starting from taxi stands)

ORIGIN \ DESTINATION ZONE	28	29	35	39	40	47	54	57	58	TOTAL
R 31					12					
R 34	11	11			22					
R 35				10		10			13	
R 36	13		11		19					
R 40					11		23			
R 45					14					
R 46					31					
R 47	10			14	14					
R 48	10				34					
R 51					19					
R 52					20			10		
R 53					19					
R 55					16					
R 56				10						
R 58					12					

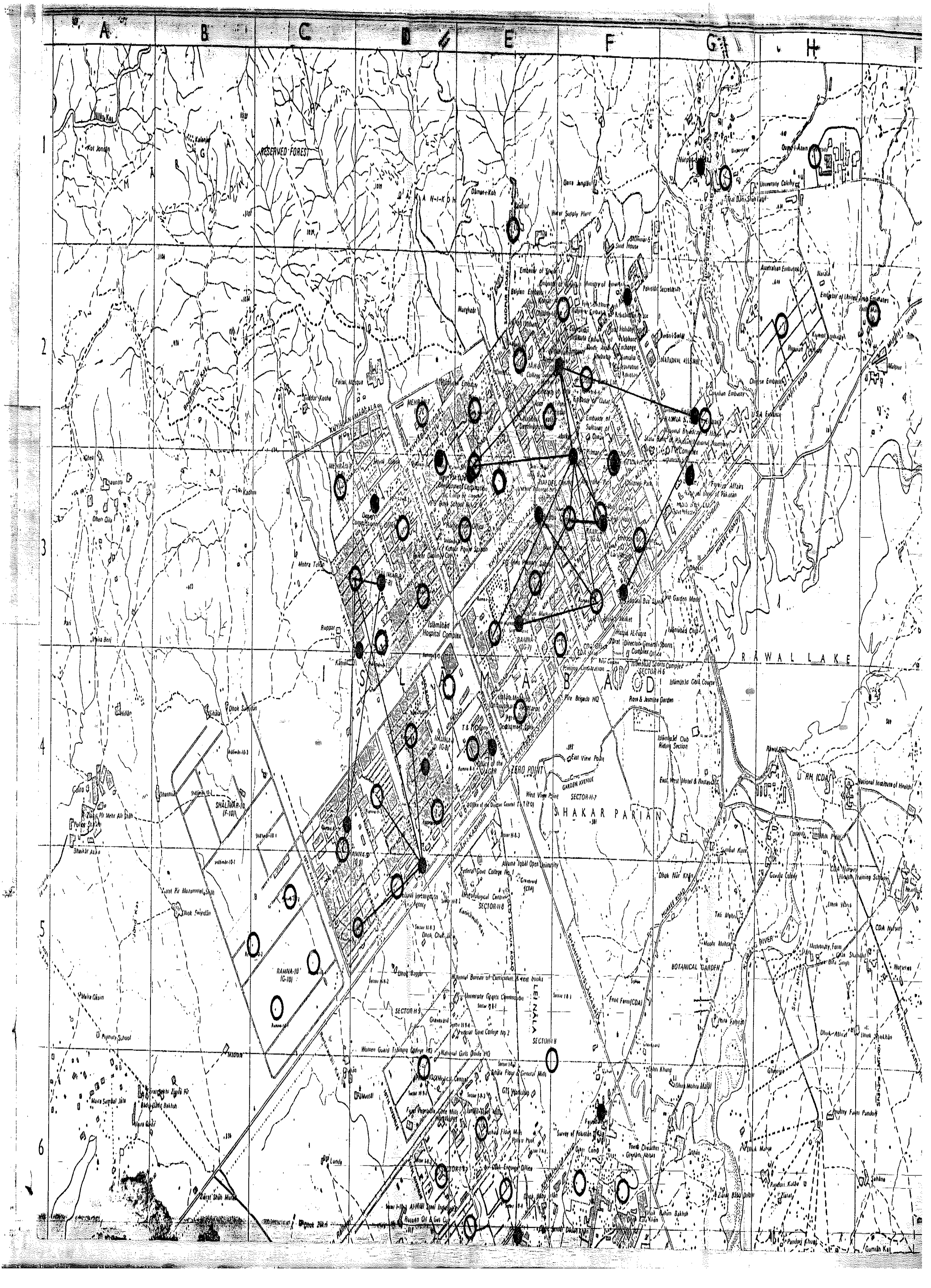
Table 7.4 (continued)

ABSTRACT FROM ORIGIN-DESTINATION MATRIX - TRIP INTER-CHANGES ETC.

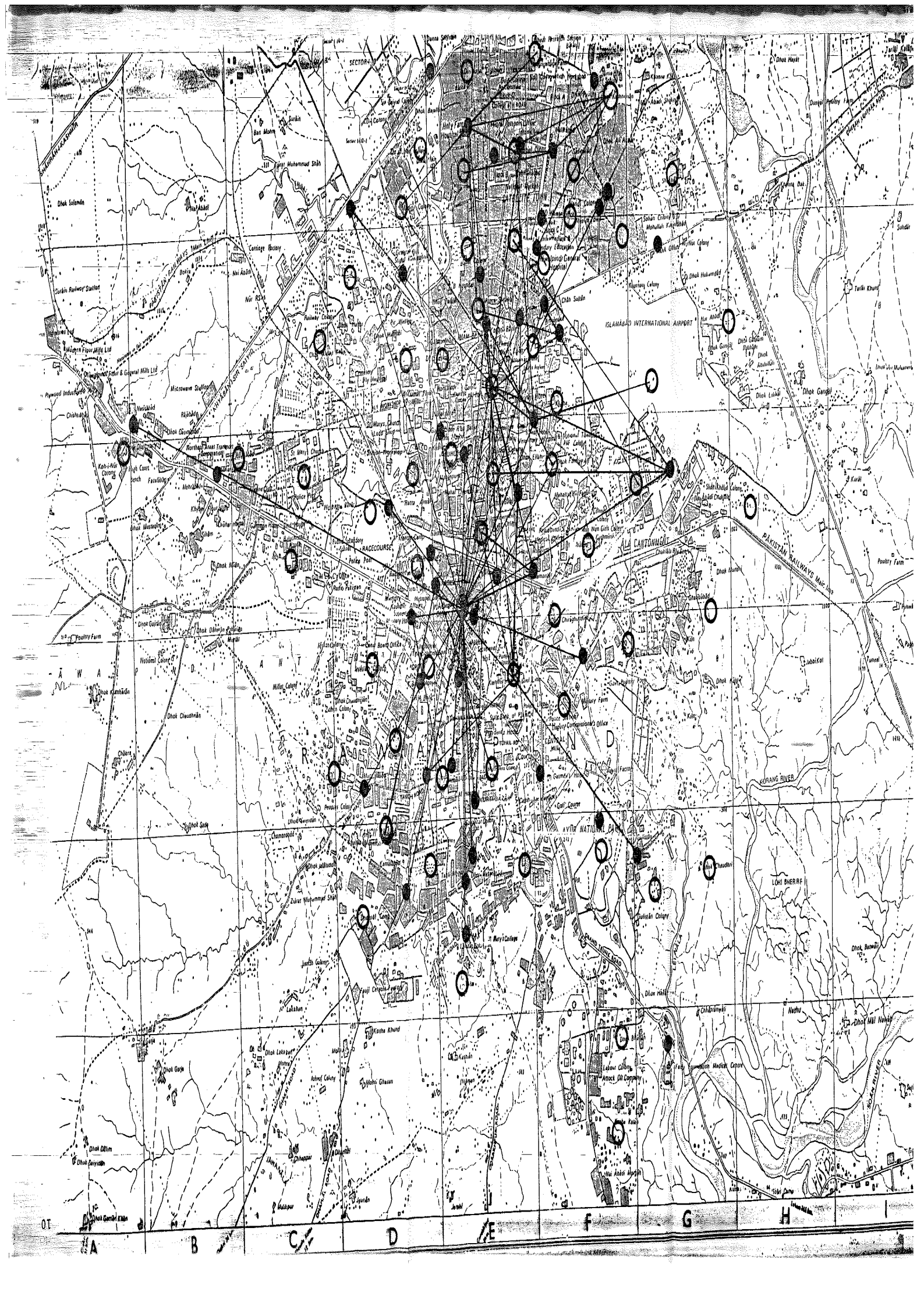
c) Islamabad (Origins 1-30)

(Daily journies starting from taxi stands)

DESTINATION ZONE / ORIGIN	105	108	109	116	124	128	132	134	135	149	150	154
I 5		11		17						10	12	
I 6	17		10							10	12	
I 10		12										
I 11	20											
I 12			11									
I 13						14		12				
I 15		12	14									
I 22						11						23
I 23					23	16	12		20			



A
B
C
D
E
F
G
H
1
2
3
4
5
6
RESERVED FOREST
Daman-i-Koh
Water Supply Plant
Faisal Mosque
Islamabad Hospital Complex
I S L A M A B A D
RAWAL LAKE
ZERO POINT
SHAKAR PARIAN
GARDEN AVENUE
SECTOR H-7
SECTOR H-8
SECTOR H-9
SHALIMAR-10 (F-10)
RAMNA-10 (G-10)
Allama Iqbal Open University
BOTANICAL GARDEN
LEI NALA
MURREE ROAD
National Institute of Health
Rawal Dam
Survey of Pakistan
Pir Sohawa Road


ISLAMABAD INTERNATIONAL AIRPORT
CANTONMENT
RACECOURSE
PAKISTAN RAILWAYS Main line
KORANG RIVER
LOHI BHERR
SOAN RIVER
A
B
C
D
E
F
G
H

7.3 Passenger type

Whilst it would have been interesting and perhaps illuminating to have undertaken a comprehensive investigation of the socio-economic characteristics of taxi users, practical considerations limited the nature and extent of the information which could be sought during this survey. The principal constraint was that of the time taken to conduct the interview with the passengers and for this reason it was considered inadvisable even to attempt to obtain socio-economic indicators and consequently the scope of the investigation of passenger attributes was perforce of a very limited nature.

Two question were asked, designed to give some knowledge as to the type of person using taxis and the extent to which they did so. Both questions had to be formulated in a manner which was easily comprehensible for the respondent and structured so as to provide unambiguous answers. The first, asked the passenger to signify to which of five categories he belonged. These were defined as:

- Permanent residents of the study area
- Temporary residents

  Due to the special nature of Islamabad in housing a relatively large expatriate population attached to foreign missions and international development agencies and who by and large have different life styles to those of the permanent residents, it was thought necessary to separately identify this group.

- Visitors on business

  Again the concentration of Federal Government Departments and agencies generate trips on official business which are a potential market for taxi services, people on business generally value their time more highly, and time saving in travel are important.

- Visitors for recreation

  This category include tourists who are traditionally regarded as being highly dependent on taxis.

. Visitors for other purposes

The second question was designed to established how frequently the respondents used taxi services. Here, four categories were employed:

. At least once a day
. At least once a week, but not necessarily every day
. More than once in the last month, but not every week
. Infrequent use - defined as less than once a month over the last six months

The responses to these questions (Figure 7.2 and 7.3) show that of the 2278 persons interviewed, 69% were permanent residents, 18% temporary residents, whilst the remaining 13% of taxi trips were accounted for by visitors. It is pertinent to point out that only 2.5% of all taxi trips were made by tourists. Also, somewhat surprisingly it was revealed that nearly one quarter (23.5%) of passengers interviewed used taxis at least once a day, with a further 28% reporting use at least once a week.

Both the high proportion of resident's use, and the high frequency of use overall suggest that the taxi service provides an essential part of the regular public transport service in the urban area rather than functioning more as a premium guality adjunct to it. This hypothesis is strengthened by other findings referred to in the next chapter.

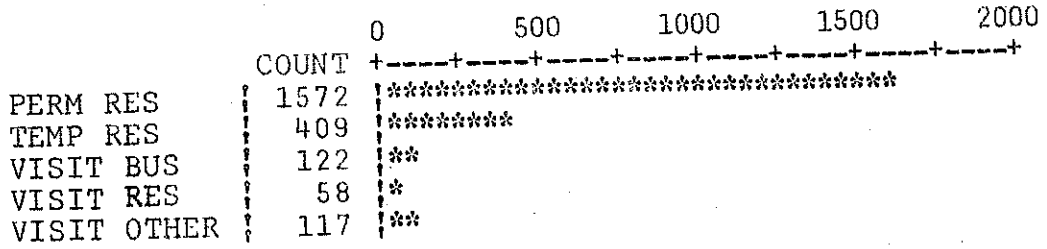


Figure 7.2
DISTRIBUTION OF TAXI PASSENGERS BY PASSENGER TYPE

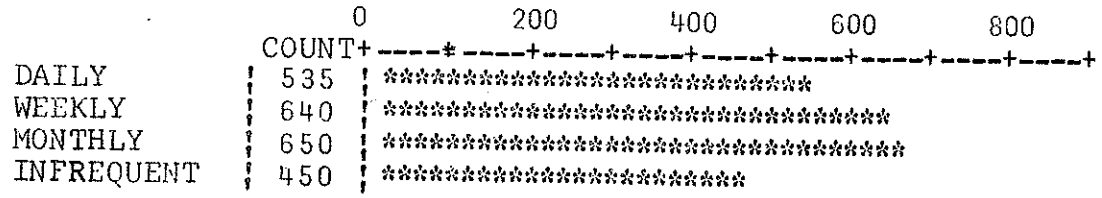


Figure 7.3

DISTRIBUTION OF TAXI PASSENGERS BY FREQUENCY OF USE

Turning now to a more detailed breakdown of these data, Table 7.5 shows only marginal differences in the distribution of passenger categories on a geographical basis: in Rawalpindi 49.9% of respondents falling within the two categories of more frequent taxi use whilst in Islamabad, with higher per capita incomes, the percentage was somewhat higher at 54.9%. This difference was to be expected although its magnitude is rather small. Given that the sampling rates of the survey were of the same order of magnitude in the two areas it can be estimated that the rate of daily taxi trips is roughly of the same order in each city.

Table 7.5

FREQUENCY OF TAXI USE

a) Absolute values

FREQUENCY OF USE	ISLAMABAD	RAWALPINDI	TOTALS
DAILY	202	332	534
WEEKLY	237	403	640
MONTHLY	207	442	649
INFREQUENT	154	296	450
TOTALS	800	1473	2273

b) Column percentage

FREQUENCY OF USE	ISLAMABAD	RAWALPINDI	TOTAL
DAILY	25.3	22.5	23.5
WEEKLY	29.6	27.4	28.2
MONTHLY	25.9	30.0	28.6
INFREQUENT	19.3	20.1	19.8
TOTALS	800	1473	2273

There are more discernable differences with respect to passenger type, Table 7.6 shows that visitors make 19.4% of the total taxi journies in Islamabad against only 9.4% in Rawalpindi. In interpreting the differences between permanent and temporary resident for the two cities, it must be remembered that the latter represent a much higher proportion of the residention population in Islamabad.

Table 7.6
PASSENGER TYPE
a) Absolute values

PASSENGER TYPE	ISLAMABAD	RAWALPINDI	TOTALS
PERM RES	491	1080	1571
TEMP RES	154	255	409
VISIT BUS	80	42	122
VISIT REC	42	15	57
VISIT OTHER	34	83	117
TOTALS	801	1475	2276

b) Column percentage

PASSENGER TYPE	ISLAMABAD	RAWALPINDI	TOTALS
PERM RES	61.3	73.2	69.0
TEMP RES	19.2	17.3	18.0
VISIT BUS	10.0	2.8	5.4
VISIT REC	5.2	1.0	2.5
VISIT OTHER	4.2	5.6	5.1
TOTALS	801	1475	2276

Cross-tabulating frequency of use with passenger type (Table 7.7) shows that for the study area as a whole Permanent Residents are the most habitual taxi users; 57% of those using taxis do so at least once a week, compared with 44.9% for temporary residents and 24.7% for Business Visitors. Over 57% of regular users are Permanent Residents.

Table 7.7

PASSENGER TYPE BY FREQUENCY OF USE

a) Absolute values

FREQUENCY OF USE	PASSENGER TYPE					
	PERM RES	TEMP RES	VISIT REC	VISIT REC	VISIT OTHER	TOTAL
DAILY	415	84	23	10	3	535
WEEKLY	491	99	29	12	9	640
MONTHLY	444	138	35	19	13	649
INFREQUENT	221	87	35	16	90	449
TOTALS	1571	408	122	57	115	2273

b) Column percentage

FREQUENCY OF USE	PASSENGER TYPE					
	PERM RES	TEMP RES	VISIT BUS	VISIT REC	VISIT OTHER	TTOTAL
DAILY	26.4	20.6	18.9	17.5	2.6	23.5
WEEKLY	31.3	24.3	23.8	21.1	7.8	28.2
MONTHLY	28.3	33.8	28.7	33.3	11.3	28.6
INFREQUENT	14.1	21.3	28.7	28.1	78.3	19.8
TOTALS	1571	408	122	57	115	2273

c) Row percentage

FREQUENCY OF USE	PASSENGER TYPE					
	PERM RES	TEMP RES	VISIT BUS	VISIT REC	VISIT OTHER	TOTAL
DAILY	77.6	15.7	4.3	1.9	0.6	535
WEEKLY	76.7	15.5	4.5	1.9	1.4	640
MONTHLY	68.4	21.3	5.4	2.9	2.0	649
FREQUENT	49.2	19.4	7.8	3.6	20.0	449
TOTALS	69.1	17.9	5.4	2.5	5.1	2273

7.4 Vehicle occupancy

At the same time as the interviews were being conducted the interviewer noted how many passengers were travelling in each taxi. Very young children being carried by an adult were not counted as separate passengers. Table 7.8 and Figure 7.4 show the distribution of vehicle occupancies observed. Islamabad gave a higher proportion of single passenger journies, and consequently the average value of 1.85 passengers per vehicle in Islamabad is lower than the value of 2.1 passengers per vehicle in Rawalpindi. The average for the study area as whole is 2.01. The trip rates by taxi are therefore very high by international stands at approximately one taxi trip per day per 25 inhabitants.

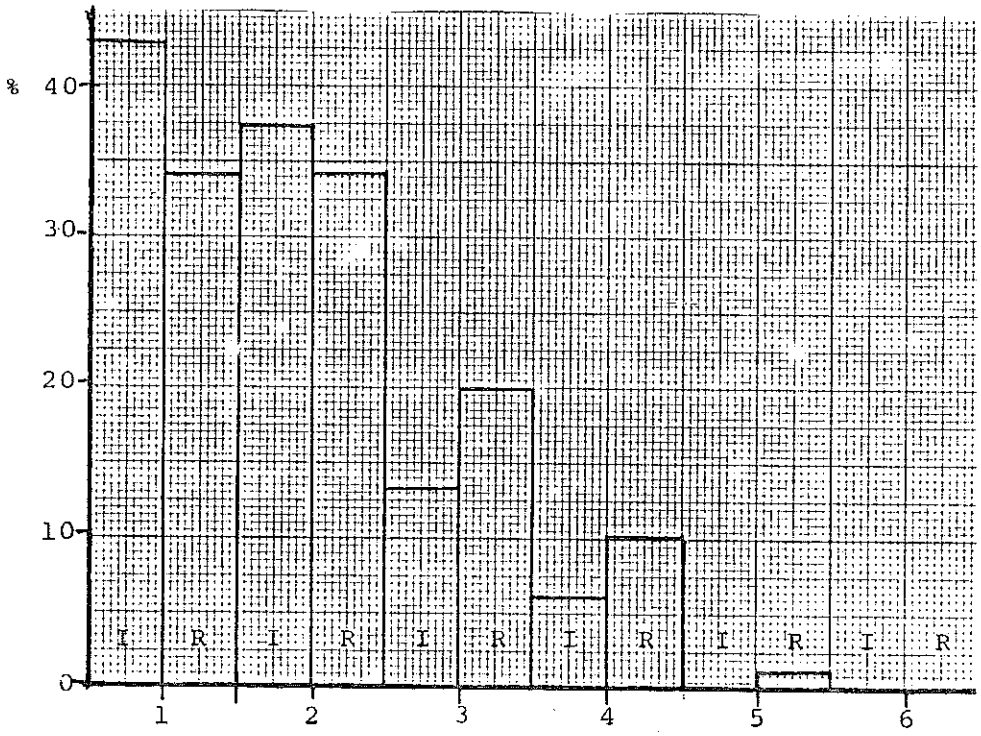


FIgure 7.4

DISTRIBUTION OF VEHICLE OCCUPANCIES

Table 7.8

DISTRIBUTION OF VEHICLE OCCUPANCIES

(Column percentage)

NO. PASSENGERS	ISLAMABAD	RAWALPINDI	TOTALS
1	42.2	34.2	37.0
2	37.4	34.3	35.4
3	13.4	20.0	17.7
4	6.3	10.2	8.8
5	0.5	1.2	0.9
6	0.1	0.1	0.1
7	0.0	0.0	0.0
8	0.0	0.0	0.0
9	0.0	0.0	0.0
TOTALS	791	1477	2268

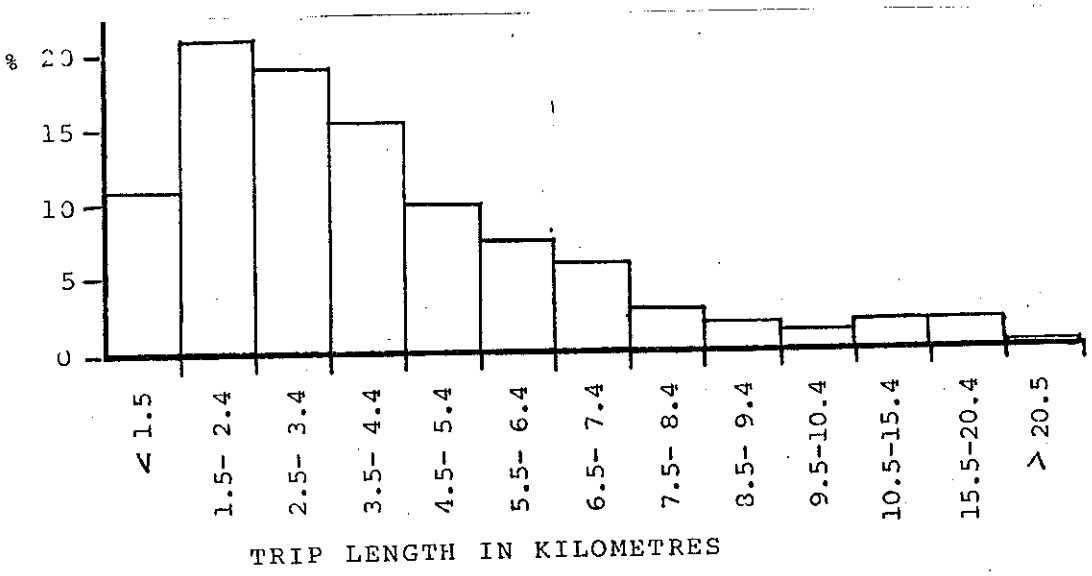
7.5 Trip length

One important parameter of system performance is the distance over which journies are being made. This is essential for computing industry costs, establishing fare rates as well as providing a description of the transport service or output being performed by the industry. At a more technical level, trip length distributions are used by transport planners for modelling travel behaviour and forecasting future travel demand.

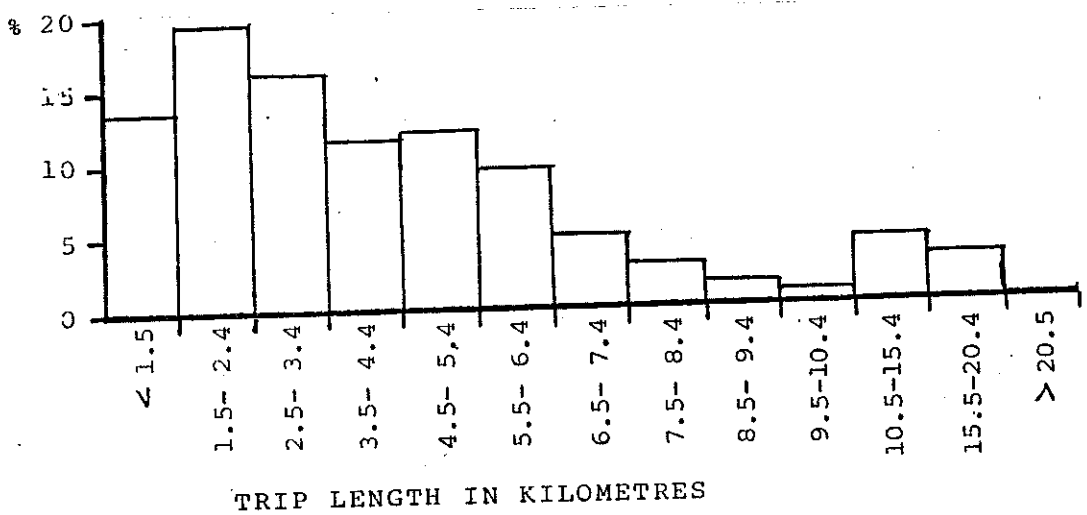
In this study, data on journey length has had to be derived from other data collected in the survey, since we could not expect a passenger to know the exact distance of the journey he was making, nor could we use the vehicle odometers, since the majority were not in a working condition.

The procedure adopted was to divide the study area into 85 zones and having asked the passenger for the destination of his current journey the origins and destinations were subsequently coded with the corresponding zone number. A table of interzonal distances (skim tree) was prepared using shortest distance minimum paths over the highway network between each taxi stand and the centre (zone centroid) of each destination zone (Appendix 7.1).

The highway network, showing link lengths from which the interzonal distances were calculated is shown in Figures 7.5 and 7.6. The distribution of journey lengths (in kms) determined for all taxi journies is shown in Figure 7.5. The form of the distribution corresponds well with that generally found for urban travel: an assymetric distribution skewed in favour of the shorter distances. The mean trip length of 4.44 kms is comparatively short given the extent of the study area; Islamabad has a slightly higher mean trip length at 4.68 kms per trip compared to Rawalpindi at 4.32 kms. The number of trips in each category of trip length shows that over 50% of all journies are over distances of under 3.4 kms, and that over 90% of journies are less than 8.4 kms in length. Both Islamabad and Rawalpindi exhibit similar characteristics in this respect.



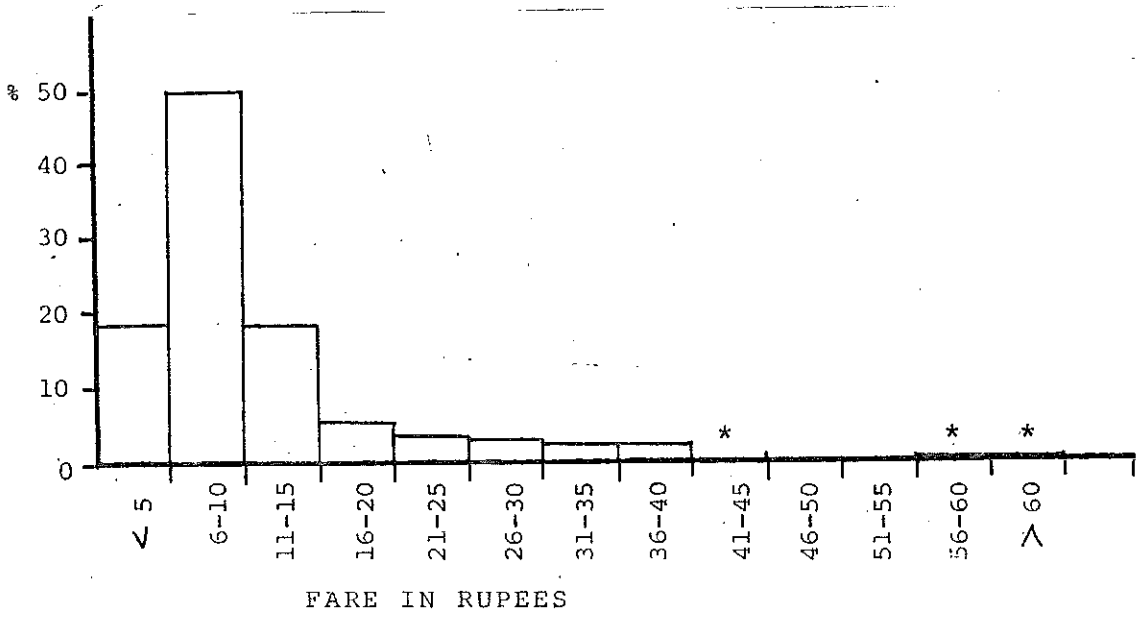
a) RAWALPINDI



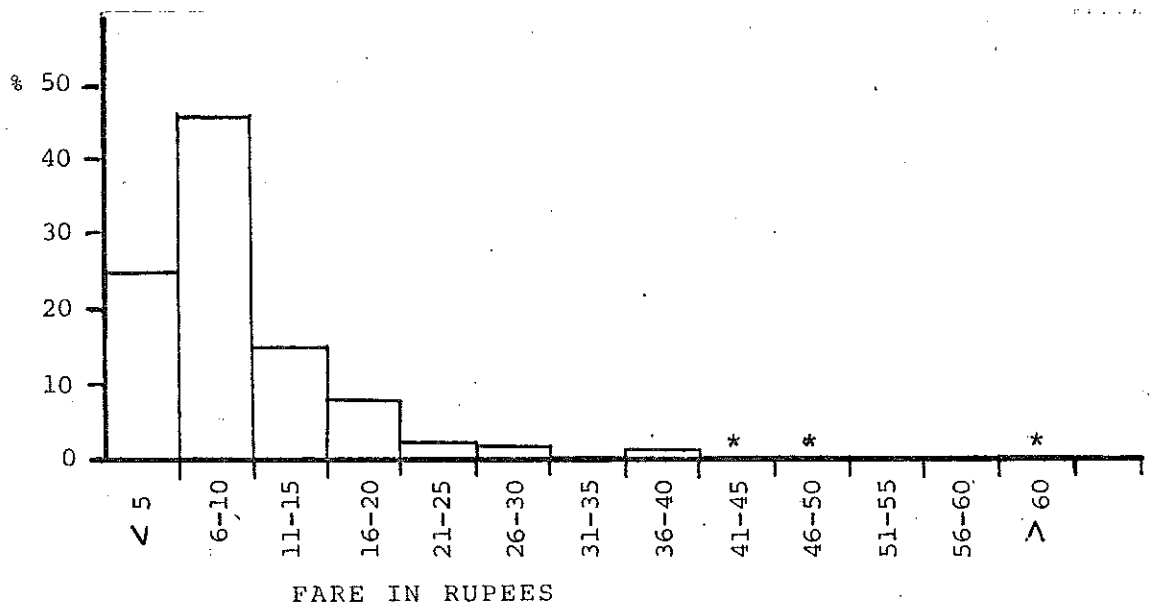
b) ISLAMABAD

Figure 7.5

DISTRIBUTION OF JOURNEY LENGTHS



a) ISLAMABAD



b) RAWALPINDI

Figure 7.6 * = < 1%

DISTRIBUTION OF FARES PAID

7.6 Fares

One of the important factors which determines the use made of any transport system is the fare structure and the level of fares charged in relation to the disposable income of the potential users of the system. Fare revenue is also obviously of vital concern to the operator and to the regulatory agency whose responsibility it is to set fare levels.

At the time that the passenger survey was conducted (September December, 1985) the authorized fare had remained unchanged for several years at Rs. 2.00 per km for taxi and Rs. 1.75 per km for rickshaws. However, preliminary investigations revealed that the predominant practice was for the fare to be bargained between passenger and driver before the taxi was hired. Taxi meters, when fitted, were by and large either distrusted by the passenger or simply did not work.

Thus in order to determine real fare rates (those actually paid rather than those authorized by the Regional Transport Authority) it was necessary to ask the passenger what fare he had agreed to pay the driver. In the few cases where the passenger had not previously agreed a fare, then the driver was asked what fare he would charge. If the response to this was that the fare would be charged according to the meter, then the appropriate fare for the journey was subsequently calculated using the authorized rates over the distance for that journey.

The first result of note is that only 10.9% of passengers made journeys using the taxi meter and the meter was used on only 10.2% of the vehicles plying for hire. Analysing for different vehicle types (Table 7.9) shows little significant variation in the use of the meter and figures in Table 7.10 show that there are also no real differences evident when meter use is tabulated against journey length; the percentage of metered journies for each trip length corresponding fairly closely with the percentage number of trips in that category.

Overall, the average fare paid for the average journey was found to be Rs. 11.28: in Islamabad fares were marginally higher with an average of Rs. 11.60 as against Rs. 11.11 in Rawalpindi (Table 7.11). Converting these figures to the equivalent rate per km we see that the fares actually paid for journies over this distance are some 25% higher than the official rate.

Table 7.9
USE OF TAXI METER BY VEHICLE TYPE

	DATSUN	MORRIS	SUZUKI	MAZDA	TOYOTA	OTHER TAXIS	RICKSHAW
VEHICLES USING TAXI METER	101	65	6	0	1	0	2
NUMBER OF VEHICLES IN SAMPLE	840	684	46	3	4	3	19
% USING THE METER	12.02	9.5	13.04	0	25.0	0	10.53

Table 7.10
USE OF TAXI METER BY JOURNEY LENGTH

JOURNEY LENGTH (kms)	PERCENTAGE ALL JOURNIES	PERCENTAGE USING METER
<1.5	12.0	9.1
1.1 - 2.4	20.5	19.4
2.5 - 3.4	17.9	19.4
3.5 - 4.4	14.2	11.6
4.5 - 5.4	10.6	10.8
5.5 - 6.4	8.1	10.8
6.5 - 7.4	5.5	6.0
7.5 - 8.4	2.8	3.9
8.5 - 9.4	1.5	0.9
9.5 -10.4	1.1	2.2
10.5-11.4	1.0	0.4
11.5-12.4	0.4	0.4
>12.5	4.0	5.3
TOTAL OBSERVATIONS	2277	232

Table 7.11

FARES PAID FOR JOURNIES OF THE AVERAGE TRIP LENGTH

	AVERAGE TRIP LENGTH (kms)	AVERAGE FARES (Rs)	AVERAGE FARE/KM (Rs/km)	AVERAGE FARE PER PASSENGER KM. (Rs/km)
STUDY AREA	4.44	11.28	2.54	1.22
ISLAMABAD	4.68	11.60	2.48	1.29
RAWALPINDI	4.32	11.11	2.57	1.19

For an average taxi journey the fare per km in Rawalpindi is higher than for Islamabad but due to the higher vehicle occupancy rates in Rawalpindi the fare per passenger km is actual slightly lower than in Islamabad.

The data in Table 7.11 illustrate fares paid for journies made over the average journey length. However, a certain amount of caution must be exercised in extrapolating these findings. Two factors serve to complicate the analysis. The first is that there is in effect a minimum fare, which is charged irrespective of journey length. This is Rs. 5.00 for taxicabs, and generally Rs. 4.00 for rickshaws. The second factor is that, as has already been observed, the distribution of Journey lengths is highly skewed in favour of shorter journies. If we analyse the average fare paid for each category of journey distance a rather different picture emerges (Table 7.12).

For very short journies the fare per km is very much higher than that for the longer journies, and indeed for the shortest journies actual fare rates are over two and half times the authorized rate.

Table 7.12

AVERAGE FARES BY TRIP LENGTH - ALL VEHICLES

(Rupees)

JOURNEY LENGTH (kms)	ISLAMABAD		RAWALPINDI		STUDY AREA	
	AVERAGE FARE PAID	AVERAGE FARE PER KM	AVERAGE FARE PAID	AVERAGE FARE PER KM	AVERAGE FARE PAID	AVERAGE FARE PER KM
* <1.5	6.70	6.70	5.88	5.88	6.37	6.37
1.5-2.4	7.50	3.76	6.39	3.20	6.97	3.48
2.5-3.4	8.35	2.78	7.54	2.51	8.85	2.95
3.5-4.4	9.72	2.43	8.55	2.14	9.13	2.28
4.5-5.4	10.60	2.12	11.54	2.31	11.13	2.22
5.5-6.4	11.92	1.99	14.42	2.40	13.70	2.28
6.5-7.4	12.74	1.82	13.96	1.99	13.92	1.98
7.5-8.4	16.81	2.10	15.51	1.94	16.23	2.03
8.5-9.4	18.00	2.00	18.40	2.04	18.62	2.06
9.5-10.4	20.14	2.01	15.92	1.59	17.38	1.73
10.5-11.4	21.00	1.91	16.25	1.48	19.90	1.80
11.5-12.4	35.50	2.96	13.50	1.13	23.55	1.96
12.5-13.4	30.86	2.37	17.50	1.35	29.25	2.25
13.5-14.4	35.50	2.54	33.50	2.39	34.66	2.47
14.5-15.4	30.73	2.05	61.25	4.08	41.64	2.77
15.5-16.4	72.00	4.50	38.21	2.39	52.58	3.28
16.5-17.4	33.50	1.97	61.50	3.62	38.41	2.25
17.5-18.4	31.00	1.72	31.25	1.73	33.33	1.74
18.5-19.4	39.67	2.09	43.06	2.26	42.58	2.24
19.5-20.4	28.00	1.40	47.50	2.37	41.33	2.06
20.5-25.0	36.30	1.61	37.50	3.66	37.50	1.66
25.0-30.0	-	-	-	-	-	-
30.1-40.0	68.00	1.94	-	-	68.00	1.94
40.1-50.0	-	-	-	-	-	-
>50.0	-	-	143.75	2.87	144.00	2.88
OVERALL AVERAGE PER KM.	-	3.16	-	2.87	-	3.09

* Minimum distance 1.00 km and minimum fare of Rs. 5.00

The average fare per km weighted by distance is Rs. 3.16 per km in Islamabad and Rs. 2.87 in Rawalpindi, some 50% higher than that authorized, but corresponding very closely to the rate of Rs. 3.00 per km which came into operation early in 1986. The corresponding average rates per passenger km are Rs. 1.71 and Rs. 1.37.

There is a clear trend observable in the distribution of average fares per km, with the rate decreasing as journey length increases. There is however, an outlier of higher rates in the 13.5-17.5 km distance bands, much of which can be accounted for by the higher fares charged for journies starting at Rawalpindi Airport.

Whilst short journies are charged at high rates, the middle distance journies are more economical; a journey of 10 km providing the best value for money from the passenger's view-point. The erratic variation shown in fare per km for the longer distances is probably attributable to the small number of journies of this length included in the sample (sample variation).

A separate analysis for rickshaws (Table 7.13) shows an average (over all distances) of Rs. 2.86 per km, again with the rate per km increasing as journey length decreases.

Table 7.13
AVERAGE FARE BY TRIP LENGTH - RICKSHAWS

(Rupees)

JOURNEY LENGTH	AVERAGE FARE PAID	AVERAGE FARE PER KM
* 1.5	4.80	4.80
1.5 - 2.4	5.60	2.80
2.5 - 3.4	6.40	2.13
3.5 - 4.4	8.00	2.00
4.5 - 5.4	-	-
5.5 - 6.4	8.00	1.30
6.5 - 7.4	8.00	1.14
OVERALL AVERAGE FARE PER KM	-	2.86

* Minimum distance 1.00 kms and minimum fare of Rs. 4.00

With the preponderance of shorter journies in the journey length distribution coupled with the higher rates charged for such journies it is clear that the bulk of the operator's revenue is derived from short distance traffic; 69% of revenue is obtained from fares of Rs. 10,00 and below and 85% from fares upto Rs.15.00

A further analysis to test for any geographical differences in fare charging practices was carried out using the trip length data sets. Journies originating at three separate localities were selected. The localities were chosen so that passengers might be expected to have differing socio-economic characteristics; Jinnah Market (F-7) in Islamabad, Deri in Rawalpindi, and theInternational Airport in Rawalpindi (Table 7.14).

This analysis shows that exeept for the shortest distance category, the fares charged for journies starting at the Jinnah Market in Islamabad are higher than those from Deri, but in each case the average fare per km is not very different from the overall average for Islamabad on the one hand and Rawalpindi on the other. In the case of the Airport however, there is clear evidence of much higher rates being charged. The weighted average per km is some 12% higher than for Rawalpindi in general, and over the shorter distances are some 50 - 100% higher.

One further analysis of fare rate variation was undertaken; to test for differences in fares being paid by different categories of traveller (Table 7.15). Again this test proved positive, showing that visitors (of all categories) paid significantly higher fares per km travelled than residents. The average fare per km at Rs. 3.33 is some 15% higher than the study area average and smme 20% higher than that paid by permanent residents

Table 7.14

AVERAGE FARES BY TRIP LENGTH - SPECIFIC LOCATIONS

(Rupees)

JOURNEY LENGTH (kms)	JINNAH SUPER MARKET		RAWALPINDI AIRPORT		DEHRI	
	AVERAGE FARE	AVERAGE FARE PER KM	AVERAGE FARE	AVERAGE FARE PER KM	AVERAGE FARE	AVERAGE FARE PER KM
1.5 KMS	5.50	5.50	-	-	6.50	6.50
1.5 - 2.4 KMS	8.18	4.09	-	-	8.00	4.00
2.5 - 3.4 KMS	8.26	2.75	15.50	5.16	7.40	2.46
3.5 - 4.4 KMS	10.67	2.67	16.46	4.11	-	-
4.5 - 5.4 KMS	13.00	2.60	16.38	3.27	8.00	2.00
5.5 - 6.4 KMS	13.00	2.16	22.16	3.69	13.00	2.60
6.5 - 7.4 KMS	18.00	2.57	17.37	2.48	14.66	2.09
7.5 - 8.4 KMS	13.00	1.62	20.14	2.51	-	-
8.5 - 9.4 KMS	-	-	21.75	2.41	15.50	1.72
9.5 -10.4 KMS	-	-	-	-	5.00	0.50
10.5 -11.4 KMS	-	-	-	-	-	-
11.5 -12.4 KMS	-	-	-	-	-	-
12.5 -13.4 KMS	-	-	-	-	-	-
13.5 -14.4 KMS	-	-	48.00	3.42	-	-
14.5 -15.4 KMS	-	-	38.00	2.53	-	-
15.5 -16.4 KMS	48.0	3.00	40.00	2.53	-	-
16.5 -17.4 KMS	-	-	-	-	-	-
17.5 -18.4 KMS	-	-	38.00	2.11	38.00	2.11
18.5 -19.4 KMS	-	-	45.85	2.41	-	-
19.5 -20.4 KMS	28.0	1.40	48.00	2.40	-	-
20.5 -25.0 KMS	-	-	36.00	1.71	-	-
OVERALL AVERAGE FARE PER KM.	-	3.16	-	3.21	-	2.79

Table 7.15

AVERAGE FARES BY TRIP LENGTH - VISITORS

(Rupees)

JOURNEY LENGTH (kms)	AVERAGE FARE	AVERAGE FARE PER KM
<1.5	6.93	6.93
1.5 - 2.4	8.55	4.27
2.5 - 3.4	8.35	2.78
3.5 - 4.4	10.96	2.74
4.5 - 5.4	12.64	2.52
5.5 - 6.4	14.45	2.40
6.5 - 7.4	14.67	2.09
7.5 - 8.4	18.90	2.36
8.5 - 9.4	23.00	2.56
9.5 -10.4	13.00	1.30
10.5 -11.4	26.00	2.36
11.5 -12.4	28.00	2.33
12.5 -13.4	8.00	0.61
13.5 -14.4	43.00	3.07
14.5--15.4	102.33	6.82
15.5 -16.4	38.00	2.37
16.5 -17.4	49.67	2.92
17.5 -18.4	28.00	1.56
18.5 -19.4	38.00	2.00
19.5 -20.4	48.00	2.40
20.5 -25.0	39.67	1.76
25.1 -30.0	-	-
30.1 -40.0	-	-
40.1 -50.0	-	-
>50.0	276.00	5.52
OVERALL AVERAGE FARE PER KM.		3.33

8 LEVEL OF SERVICE AND PASSENGER ATTITUDES

8.1 Introduction

To some extent the demand for taxi services is conditioned by certain attributes of the supply. The more convenient and comfortable the service, the more people will use it. In particular, it is the ability of the taxi to provide a convenient service where journies can be accomplished in a short time that gives the taxi its competitive edge over convential stage-carriage services. Important in this respect is the role of access time i.e. the time spent walking to the nearest point where there is a reasonable expectation of encountering a taxi and the time spent waiting for a unengaged taxi to appear.

The shorter these access times are, relative to those of other public transport modes, the greater is the competitive advantage of the taxi. Access time, in its turn is determined by the number of vehicles in operation in relation to the size of the market, the proportion of time for which each vehicle is available for hire, and the geographical distribution of the unengaged vehicles.

In this respect it is relevant to note that in western countries the increasing adoption of despatched services using two-way radio, and the near universal availability of the telephone means that access time can be reduced to near zero with, in the majority of cases, a taxi waiting at the door at the time that it is required.

In this chapter we examine the performance of the Islamabad/ Rawalpindi taxi service with respect to its access times and also report on what the users thought of the service.

8.2 Physical access to taxi services

We have already commented on the fact that there are a large number of unofficial taxi stands spread throughout the urban area. Over the years the taxi operators have identified where the concentrations of passenger demand are to be found, and have

responded to the requirements of the market by themselves establishing stands in those locations.

This practice has benefitted both operator and user alike. Operating from a stand rather than cruising reduces the operator's costs by reducing the dead or empty kilometres involved. Provided that the stands are conveniently located and the supply of cabs matches the demand, the intending passenger is benefited by the elimination of the random waiting time inherent when cabs are cruising. There is also a further benefit to the public at large, in that the greater the proportion of empty cabs waiting at stands, the less there are cruising and the less the taxi contributes to problems of traffic congestion.

Not all taxi stands are permanently manned of course. For examply, those outside the embassies in Islamabad have taxi available only at consular office opening times. Taxis tend to be scarce in Islamabad after 9.00 pm, though the main commercial centres in F-6 and F-7 sector and at Aabpara generally have taxis available until late in the evening. At transport interchanges such as the Airport, Pirwadahi Bus Stand, Lahore Wagon Stand, and Railway Station there are taxis to be found throughout most of the 24 hour period.

Accessibility to taxi stands can be indicated by plotting isochrones (contours of time) to represent the time involved in walking to the nearest stand location. Figures 8.1 and 8.2 show the distribution of taxi stands in Islamabad and Rawalpindi with concentric circles drawn at 200,400 and 800 metre intervals. These represent walking times of approximately 2.5, 5 and 10 minutes at an assumed average walking speed of 1.3 metres per second.

The resulting pattern shows that there is a fairly comprehensive coverage of taxi stands over the whole built up area and only very few areas are more than 10 minutes walk from the nearest stand. We can conclude that in physical terms at least access to taxi services is no the whole extremely good compared with most cities

of a similar size. One major deficiency however is the virtual absence of any facilities enabling contact to be made with a taxi operator by telephone. The only possibility which exists for someone waiting to call a taxi by telephone is to book a private-hire car from one of the five-star Hotels or from the Airport and pay the considerably higher rates charged by these operators. It is understood that current regulations covering radio communications preclude the possibility of fitting mobile two way radio communication systems in civilian vehicles.

In order to assess the distances actually covered on foot by taxi users, passengers were asked how far they had to walk to get to the taxi they were sitting in at the time of the interview. Figure 8.3 shows that, overall less than 20% of all taxi users had to walk more than 100 metres in order to find a taxi and only a little over 10% had to walk more than 200 metres. The very small number of longer journies (over 1 km) are accounted for by people walking into Islamabad from the surrounding villages.

Table 8.1 shows the percentage distribution of distance covered in walking to each of the taxi stands in Islamabad. Bearing in mind that not everyone is consistent in estimating distances, the distribution shows that 95.5% of passengers reported that they had walked no further than 400 metres and only at the stands at Noor pur Shahan village, the Foreign Affairs Ministry, Aabpara and Lal quarter (stand numbers 1,3,11 and 12) did we find more than 8% of the passengers having walked more than 400 metres, with a maximum of 14.3% at the Ministry for Foreign Affairs. The meandistance walked was just 79 metres, which at speed of 1.3 metres per second is a time of one minute.

One good indication of level-of-service is to check for any variation in the availability of taxis over the day. If at times of peak demand, demand should begin to outstrip supply we would expect both waiting times and walking times to increase.

An intending passenger arriving at an empty stand, either has the choice of waiting at the stand for an unpredictable length of time or walking on to the next location where he would normally expect to find an empty taxi. In reality this decision will be determined by such considerations as knowledge of the area, whether or not he has baggage, whether it is raining, etc. Thus we can expect that an increase in either waiting time or walking time would be an indication of some measure of shortfall in the supply of taxi services.

However, Table 8.2 which shows the distance walked by passengers for each hour of the day, indicates that there is very little such variation. Except for the periods between 07.00 and 09.00 hours and 17.00-19.00 hours, less than 10% of passengers had to walk more than 200 metres, and even then the proportion only rose above 15% during the hour 07.00-08.00 when there were far fewer taxis in service. (We should not attribute much significance to the result for the period 22.00 hours to midnight due to the very small number of interviews taken at this time).

8.3 Waiting time

Paralleling the quality of service offered to the user in terms of physical access, we also find an extremely high level-of-service in terms of passenger time spent waiting at the taxi stand. Of over 2000 passengers interviewed only 5 reported that they had to wait more than 20 minutes for a taxi (2 in Islamabad, 3 in Rawalpindi)and over 95% of all passengers were able to engage a taxi within one minute of arriving at the nearest taxi stand (Figure 8.4).

The mean waiting time reported is computed at just 48 seconds - which indicates that in all but a few exceptional cases, there must always have been be at least one taxi at the stand when an intending passenger arrived.

The performance is the same for both Islamabad and Rawalpindi as the distributions in Figure 8.4 show and an analysis of how availability of taxis varied over the day (Table 8.3) reveals

a) Absolute values

VALUE	COUNT	0 500 1000 1500
< 50 M	1364	**********
51- 100 M	504	**********
101- 200 M	176	****
201- 400 M	153	***
401- 600 M	58	*
601- 800 M	13	
801-1000 M	0	
> 1000 M	6	

b) Percentage distribution

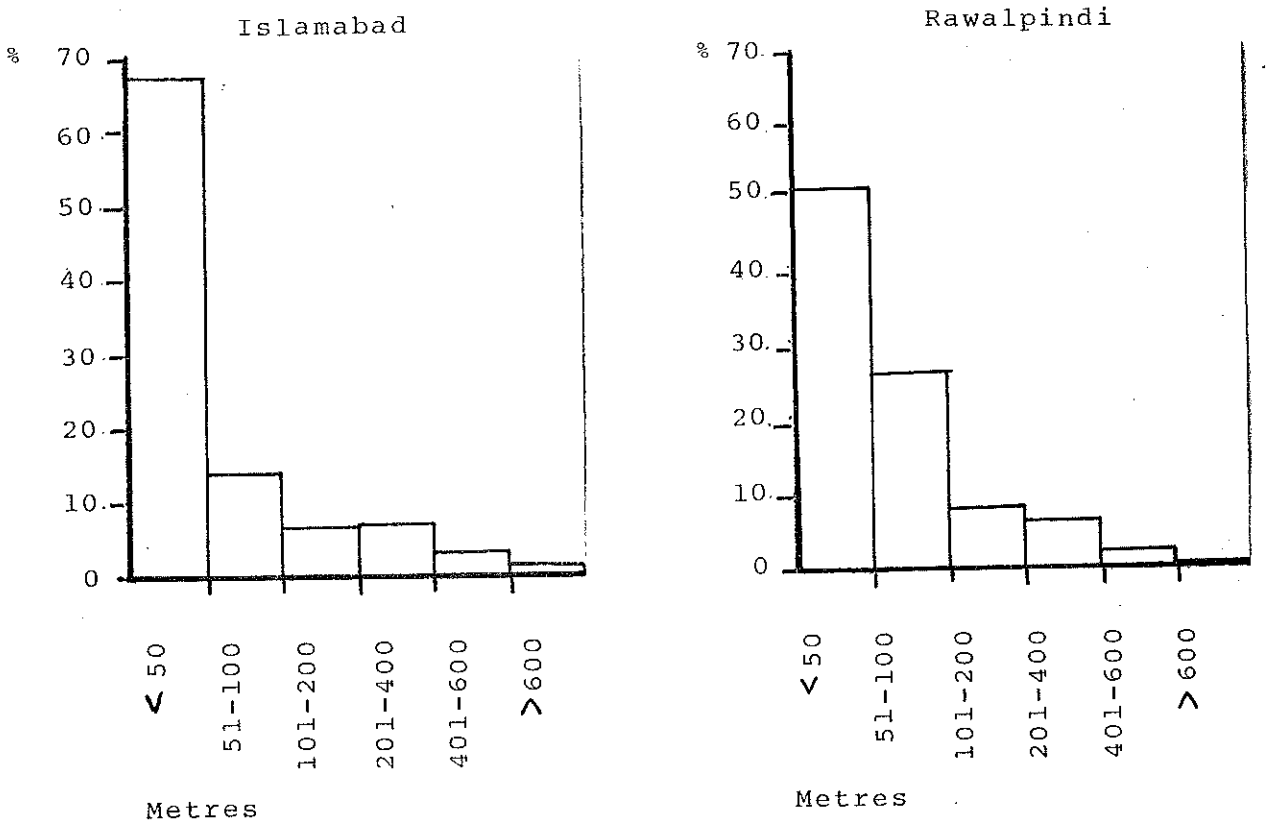


Figure 8.3

DISTRIBUTION OF WALKING DISTANCES TO TAXI STANDS

Table 8.1

DISTRIBUTION OF DISTANCES WALKED TO EACH TAXI STAND - ISLAMABAD

(Row percentage)

TAXI STAND	DISTANCE TO TAXI STAND IN METRES								
	50	51-100	101 -200	201 -400	401 -600	601 -800	801 -1000	1000	TOTALS
I.1	70.0	5.0	5.0	10.0	10.0	0.0	0.0	0.0	20
I.2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7
I.3	28.6	28.6	0.0	28.6	0.0	0.0	0.0	14.3	7
I.4	64.3	28.6	7.1	0.0	0.0	0.0	0.0	0.0	14
I.5	92.2	2.0	2.0	0.0	3.9	0.0	0.0	0.0	51
I.6	77.5	5.9	4.9	7.8	3.9	0.0	0.0	0.0	102
I.7	80.4	5.4	1.8	7.1	1.8	1.8	0.0	1.8	56
I.8	64.3	21.4	7.1	7.1	0.0	0.0	0.0	0.0	14
I.9	60.0	0.0	40.0	0.0	0.0	0.0	0.0	0.0	5
I.10	81.4	6.8	5.1	6.8	0.0	0.0	0.0	0.0	59
I.11	76.3	8.5	1.7	5.1	5.1	1.7	0.0	1.7	59
I.12	52.5	8.2	4.9	24.6	8.2	1.6	0.0	0.0	61
I.13	70.0	6.0	10.0	8.0	6.0	0.0	0.0	0.0	50
I.14	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16
I.15	54.9	21.0	15.7	2.0	2.0	3.9	0.0	0.0	51
I.19	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4
I.22	41.9	35.5	14.5	4.8	1.6	1.6	0.0	0.0	62
I.23	72.2	7.8	8.9	7.8	2.2	0.0	0.0	1.1	90
I.24	15.2	72.7	12.1	0.0	0.0	0.0	0.0	0.0	33
I.25	41.2	35.3	11.8	5.9	5.9	0.0	0.0	0.0	17
I.26	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2
TOTALS	67.7	13.7	7.1	7.1	3.2	0.8	0.0	0.5	780

Table 8.2

DISTANCE WALKED TO TAXI STANDS BY TIME OF DAY

(Part 1)

(Column percentage)

WALKED DISTANCE	07-08	08-09	09-10	10-11	11-12	12-13	13-14
(Metres)							
<50	59.3	49.1	60.3	62.6	59.8	59.9	57.6
51 - 100	18.5	21.3	26.2	24.6	24.7	27.8	25.9
101 - 200	3.7	13.6	6.5	7.9	5.0	4.0	6.5
201 - 400	11.1	10.7	4.2	3.9	6.4	4.8	7.6
401 - 600	7.4	3.6	2.8	1.0	3.7	2.6	1.8
601 - 800	0.0	0.0	0.0	0.0	0.5	0.9	0.0
801 - 1000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
>1000	0.0	1.8	0.0	0.0	0.0	0.0	0.6
TOTALS	27	169	214	203	219	227	170

(Part 2)

(Column percentage)

WALKED DISTANCE	14-15	15-16	16-17	17-18	18-19	19-20	20-21
<50	58.3	61.1	61.5	57.0	57.4	68.5	72.6
51 - 100	26.9	16.6	21.0	21.5	15.7	15.2	9.6
101 - 200	5.8	11.4	7.8	9.4	13.9	4.3	6.8
201 - 400	7.1	6.7	5.9	8.7	8.7	9.8	5.5
401 - 600	1.3	3.1	2.9	2.0	2.6	0.0	5.5
601 - 800	0.6	1.0	1.0	1.3	1.7	1.1	0.0
801 - 1000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
>1000	0.0	0.0	0.0	0.0	0.0	1.1	0.0
TOTALS	156	193	205	149	115	92	73

(Part 3)

WALKED DISTANCE	21-22	22-23	23-24	TOTALS
<50	71.4	0.0	0.0	60.0
51 - 100	10.7	0.0	50.0	22.1
101 - 200	7.1	100.0	0.0	7.7
201 - 400	8.9	0.0	0.0	6.7
401 - 600	0.0	0.0	50.0	2.6
601 - 800	0.0	0.0	0.0	0.6
801 - 1000	0.0	0.0	0.0	0.0
>1000	1.8	0.0	0.0	0.3
TOTALS	56	1	2	2271

consistently short waiting times at all times. For most of the day the number of passengers waiting more than one minute rarely exceeded 5% of the total and only in the evening between 9:00 and 10:00 p.m. did the proportion exceed 10%.

Hence, both from the point of view of walking distance to the nearest taxi stand and waiting time, the service would seem to be particularly good and it would be difficult to improve on the current level-of-service except by introducing innovations in the organization of the industry such as the use of modern communication systems.

a) Absolute values

VALUE	COUNT	0 500 1000 1500 2000 2500
< 1 MIN	2186	**********
1 - 5 MINS	45	*
6 -10 MINS	27	*
11 -15 MINS	7	
16 -20 MINS	5	
21 -25 MINS	0	
26 -30 MINS	1	
31 -60 MINS	4	
> 60 MINS	0	

b) Percentage distributions

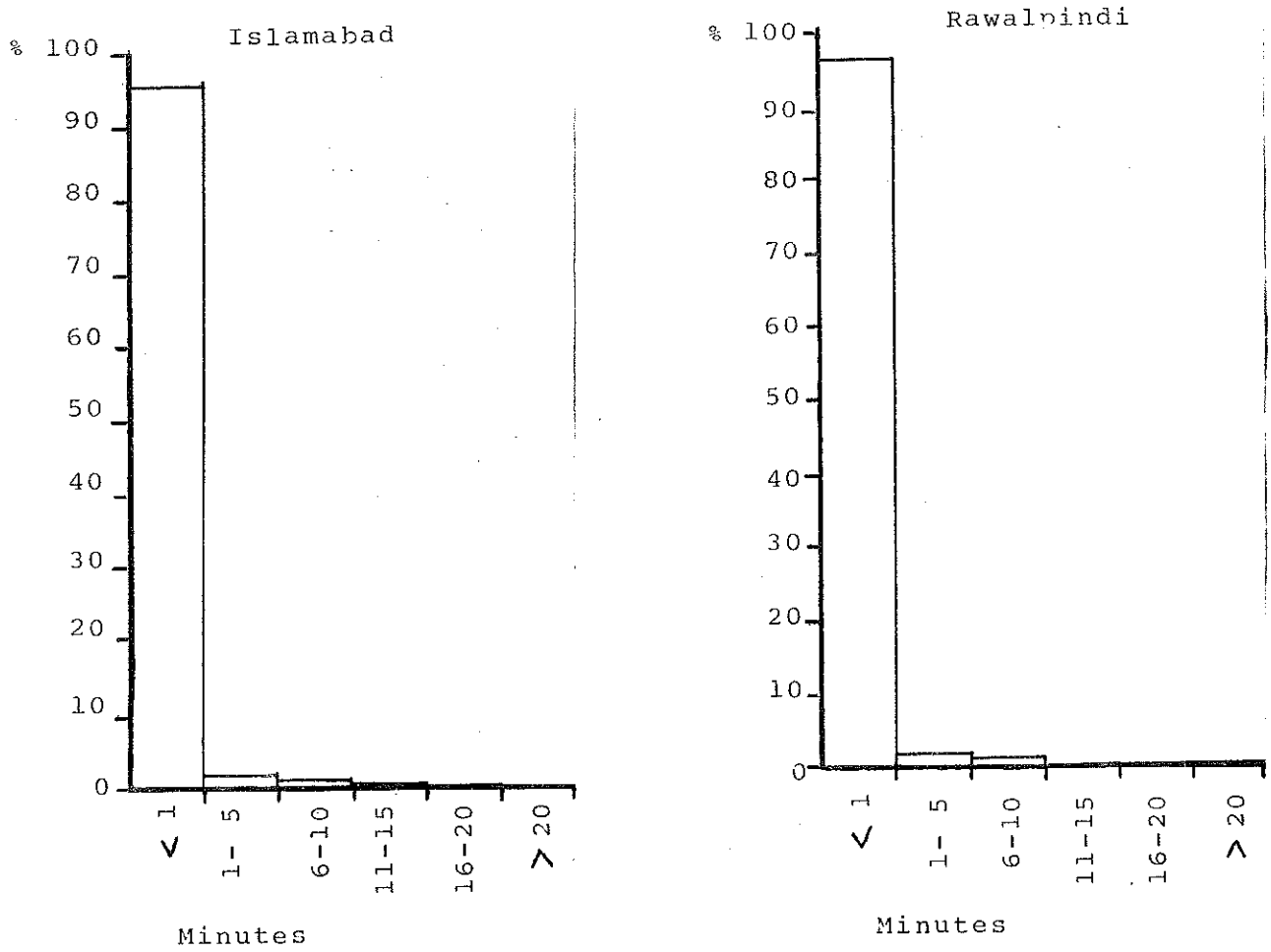


Figure 8.4

DISTRIBUTION OF PASSENGER WAITING TIMES AT TAXI STANDS

Table 8.3

DISTRIBUTION OF PASSENGER WAITING TIME BY TIME OF DAY

(Part 1) (Column percentage)

PASSENGER WAIT TIME	07-08	08-09	09-10	10-11	11-12
<1 MIN	100.0	96.4	97.2	98.0	97.7
1-5 MINS	0.0	1.2	1.4	1.0	2.3
6-10 MINS	0.0	0.6	0.9	0.0	0.0
11-15 MINS	0.0	0.6	0.0	0.5	0.0
16-20 MINS	0.0	0.0	0.5	0.0	0.0
21-25 MINS	0.0	0.0	0.0	0.0	0.0
26-30 MINS	0.0	0.6	0.0	0.0	0.0
31-60 MINS	0.0	0.6	0.0	0.5	0.0
>60 MINS	0.0	0.0	0.0	0.0	0.0
TOTALS	27	168	215	203	219

(Part 2) (Column percentage)

PASSENGER WAIT TIME	12-13	13-14	14-15	15-16	16-17	17-18
<1 MIN	96.9	94.7	95.5	95.9	97.1	93.4
1-5 MINS	2.2	3.5	2.6	2.1	1.5	3.3
6-10 MINS	0.4	1.2	1.3	0.5	1.0	2.6
11-15 MINS	0.0	0.0	0.0	1.5	0.5	0.0
16-20 MINS	0.4	0.0	0.6	0.0	0.0	0.7
21-25 MINS	0.0	0.0	0.0	0.0	0.0	0.0
26-30 MINS	0.0	0.0	0.0	0.0	0.0	0.0
31-60 MINS	0.0	0.6	0.0	0.0	0.0	0.0
>60 MINS	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	225	171	156	194	206	151

(Part 3) (Column percentage)

PASSENGER WAIT TIME	18-19	19-20	20-21	21-22	22-23	23-24	TOTALS
<1 MIN	93.9	95.7	97.3	87.0	100.0	50.0	96.1
1-5 MINS	0.9	2.2	0.0	3.7	0.0	50.0	2.0
6-10 MINS	3.5	2.2	2.7	7.4	0.0	0.0	1.2
11-15 MINS	0.9	0.0	0.0	0.0	0.0	0.0	0.3
16-20 MINS	0.9	0.0	0.0	0.0	0.0	0.0	0.2
21-25 MINS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26-30 MINS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31-60 MINS	0.0	0.0	0.0	1.9	0.0	0.0	0.2
>60 MINS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	115	92	73	54	1	2	2272

8.4 Attitude to fares

We have seen, in the preceding chapter that the fare levels in vogue at the time of the survey were well above the levels authorized by the administration. However, it should be pointed out that on most occasions, the fare actually paid is the result of a bargaining process between passenger and driver, and sincethere is usually more than one taxi at any stand at all times,the driver is not in a monopolistic position whereby he can impose a fare higher than that which the passenger is willing to pay.

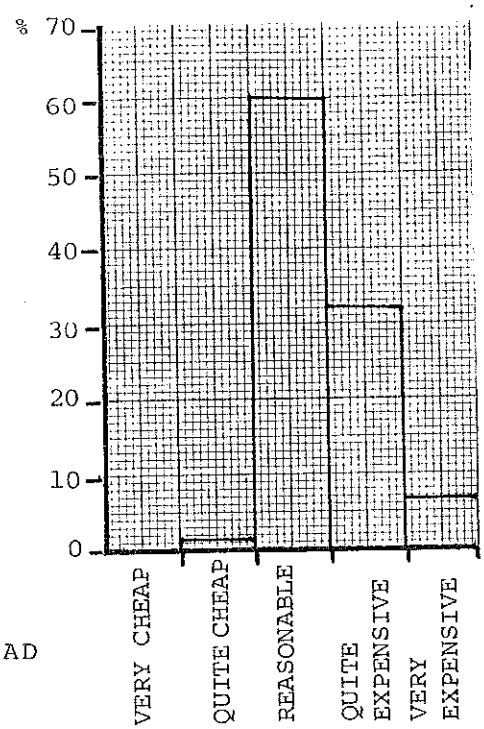
Nevertheless, since one of the objectives of this study is to examine the possibility of making changes in the system, we felt it important to gauge the users attitudes to the existing level of service and in particular to fare levels and vehicle quality.

Passengers were asked for their opinion on these two attributes by way of questions constructed using a five point semantic scale. In the case of the question on fare levels the respondent was asked to indicate which of five categories most closely corresponded with his opinion. The options given were:

- Very Expensive
- Quite Expensive
- Reasonable
- Quite Cheap
- Very Cheap

The distribution of responses is illustrated in Figure 8.5, which shows a surprisingly low proportion of disaffected passengers. In Rawalpindi we find just 30% of users judging that fares are expensive, with only 4% describing them as very expensive. In Islamabad, the proportion is slightly higher, perhaps reflecting the fact that fare rates are higher than in Rawalpindi, with 38.5% of the opinion that fare are expensive, but again only a low 6.5% citing them as very expensive.

a) ISLAMABAD



b) RAWALPINDI

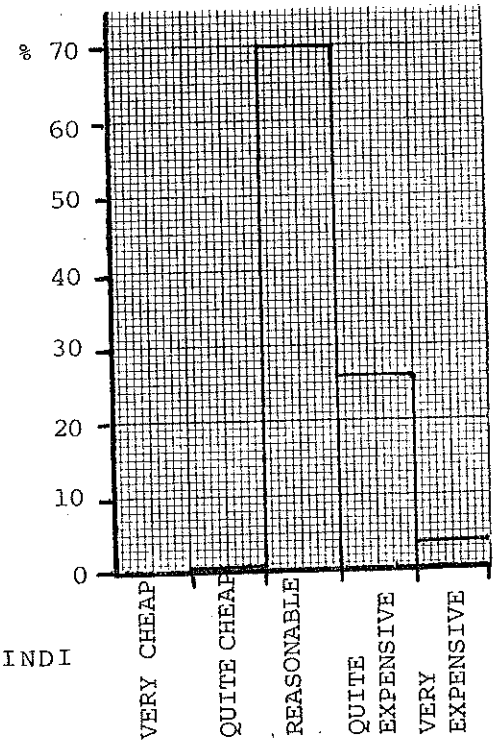


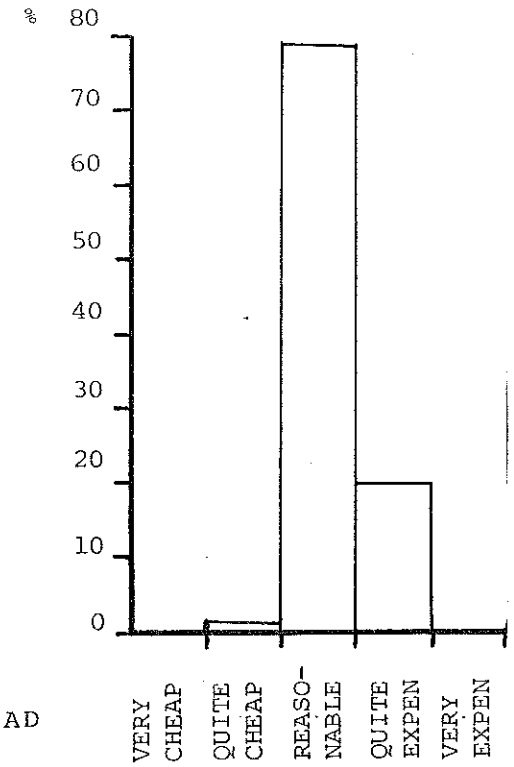
Figure 8.5

ATTITUDE TO FARES

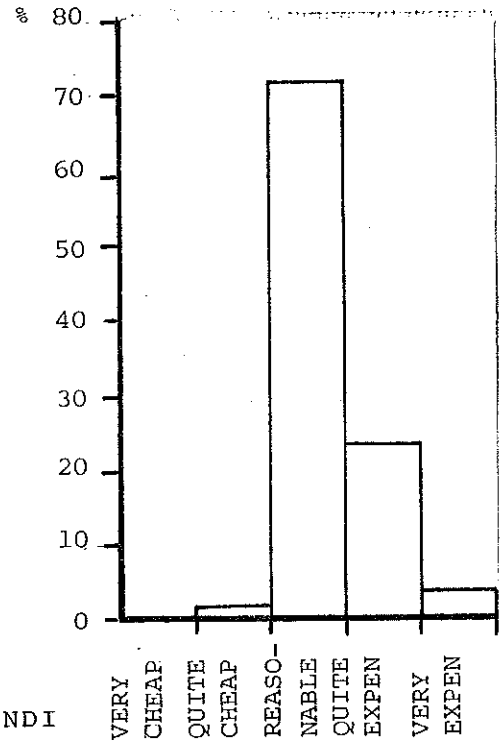
In order to get some feeling for how sensitive peoples attitudes to fares were in relation to the actual amounts paid, two separate analysis were undertaken. The first was for those journies recorded as being charged by the meter and which presumably were some 50% lower in absolute terms than the average. The distribution in Figure 8.6 shows a consistency in response, in that a smaller proportion of this category of respondents thought fares to be expensive: the proportions being 26.5% for Rawalpindi and 20% for Islamabad. It would appear on this evidence that Rawalpindi residents are less sensitive to changes in fare level than are those in Islamabad. In the second analysis we selected those passengers making short journies (less than 2.5 kms); journies for which the fare rate per km is significantly higher. The response of this category of users is shown in Figure 8.7. Here, however, the evidence goes counter to expectation in that overall there is a marginally higher satisfaction rate of 70.5% (fares either reasonable or cheap) compared with 67.2% for journies of all lengths. This suggests that either the passenger does not perceive correctly that he is paying a relatively higher fare or that the passenger is not so much preoccupied with the concept of 'value of money' in terms of rupees per kilometre, but more concerned with the absolute value of the fare. It would appear that there is some validity in this later hypothesis since a disaggregation of the same data by fare paid (Figure 8.8) shows that as the fare increases so the level of satisfaction decreases, although as we have already shown, the cost per km is also decreasing. The trend is as follows:

- Fare less than Rs. 10.00 - Level of satisfaction 69%
- Fare between Rs. 10.00-30.00 - Level of satisfaction 62%
- Fare over Rs. 30.00 - Level of satisfaction 58.6%

Finally, in this section we examine how attitude to fare varies as a function of passenger type and of whether the vehicle is a taxicab or rickshaw.



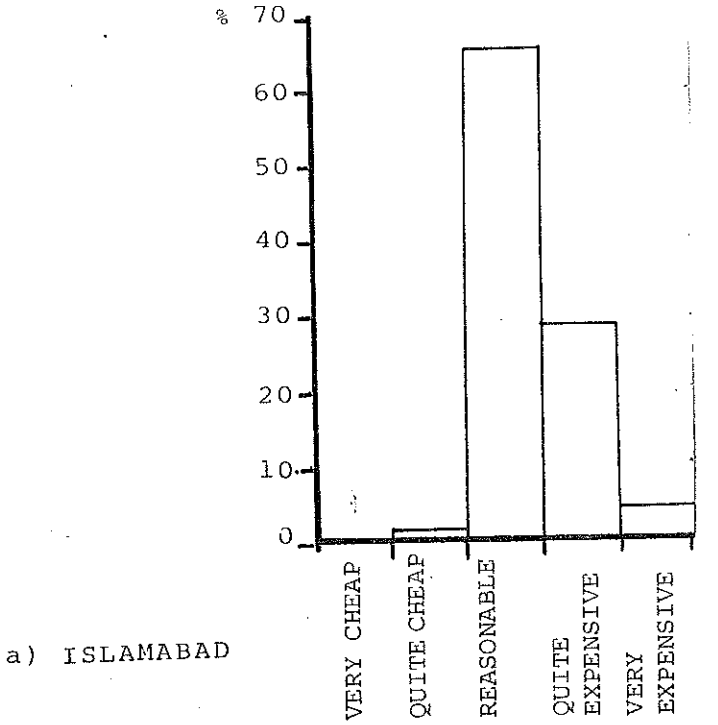
a) ISLAMABAD



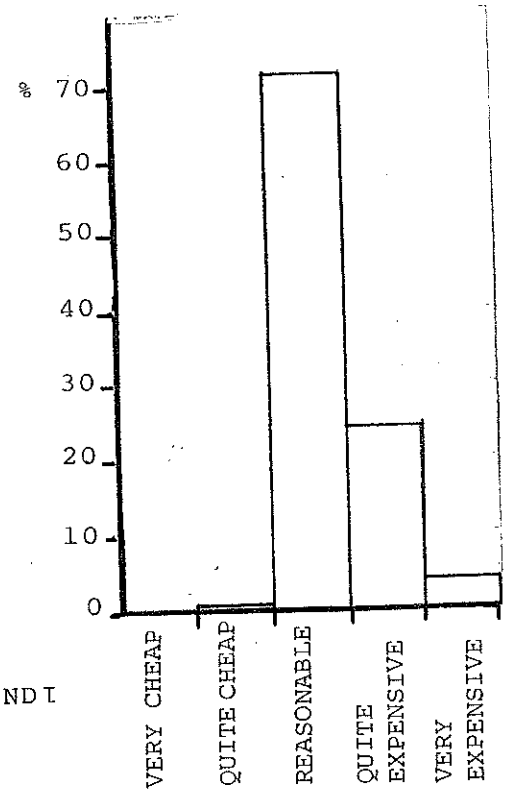
b) RAWALPINDI

Figure 8. 6

ATTITUDE TO FARES - FARE CHARGED ACCORDING TO TAXI METER.



a) ISLAMABAD

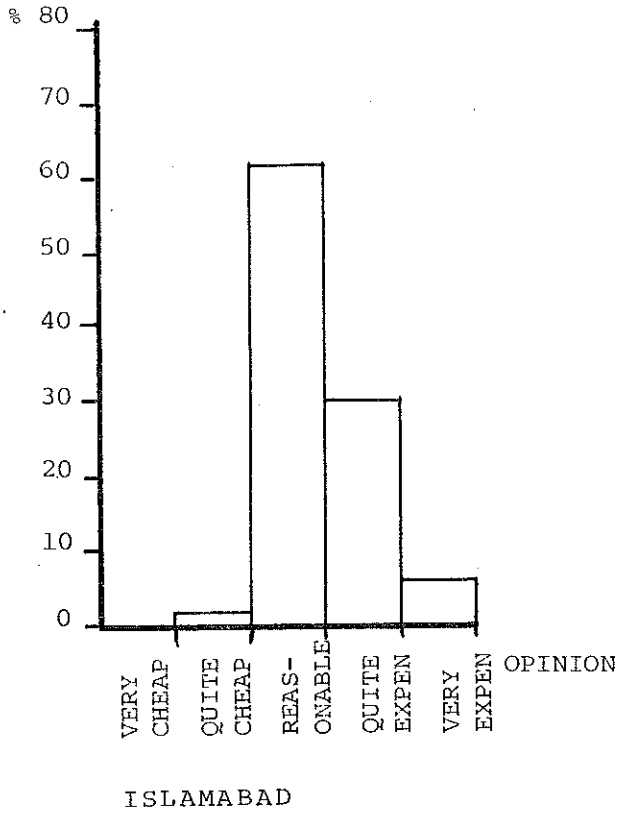


b) RAWALPINDI

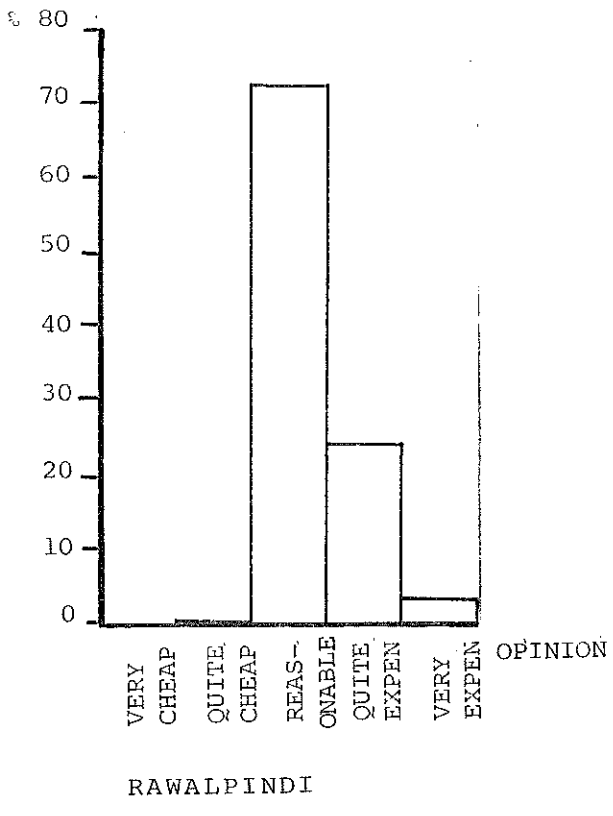
Figure 8.7

OPINION ON FARES - SHORT JOURNIES

Rs 5-10

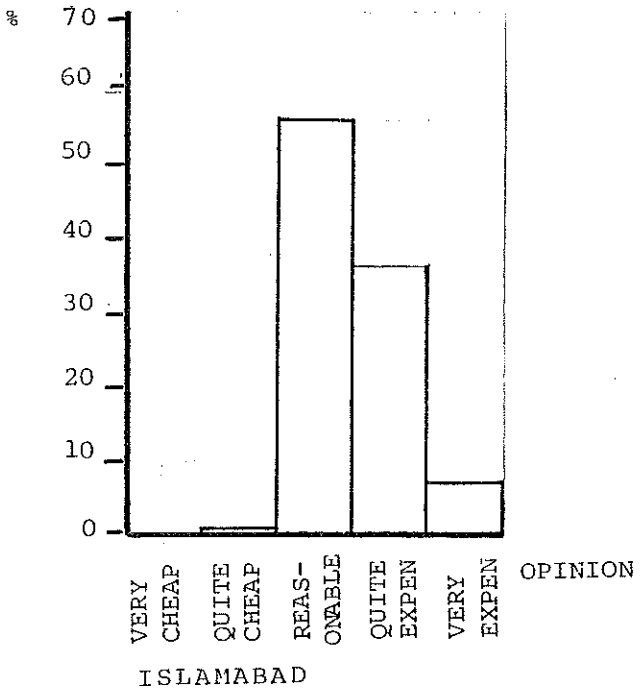


ISLAMABAD

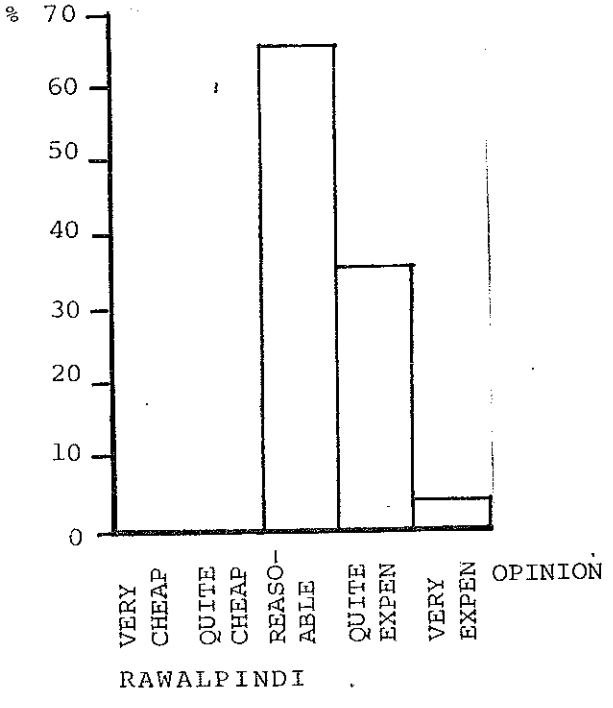


RAWALPINDI

Rs 10-30



ISLAMABAD



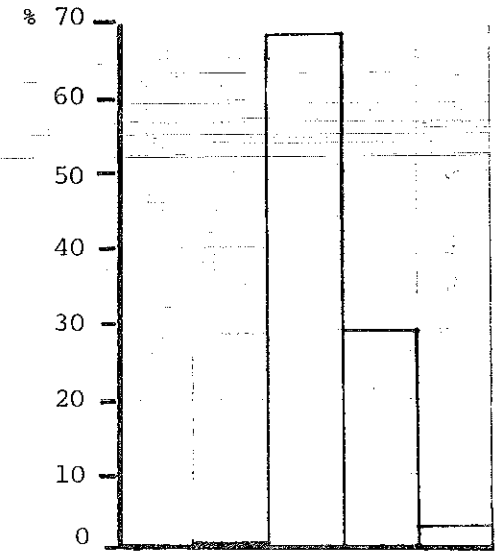
RAWALPINDI

Figure 8.8

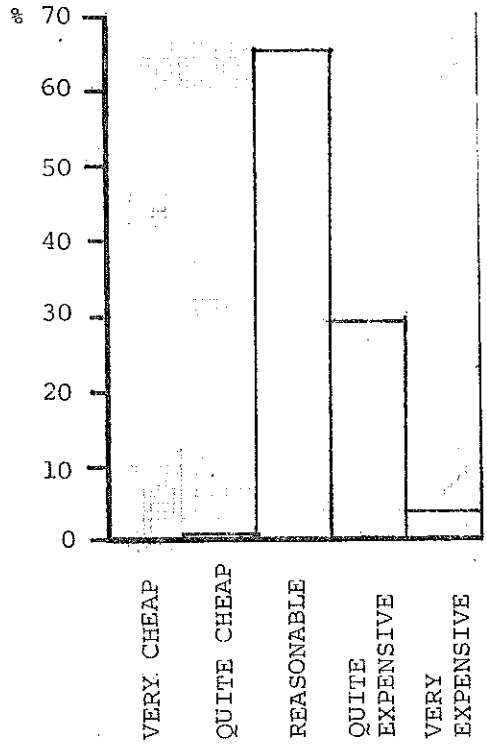
OPINION ON FARE.

Figure 8.9 shows the attitude expressed by passengers in taxicabs, categorised by person type, whilst Figure 8.10 relates to passengers travelling by rickshaws. Interestingly, it is the tourist who expresses least satisfaction with the level of taxicab fares with 42.9% indicating that fares are expensive but otherwise the data show little variation from the aggregate findings reported earlier.

The rickshaws are used almost exclusively by permanent residents of Rawalpindi and here we see a 66.7% satisfaction rate, some 3.7% points down on the overall response for journies by both modes combined in Rawalpindi.



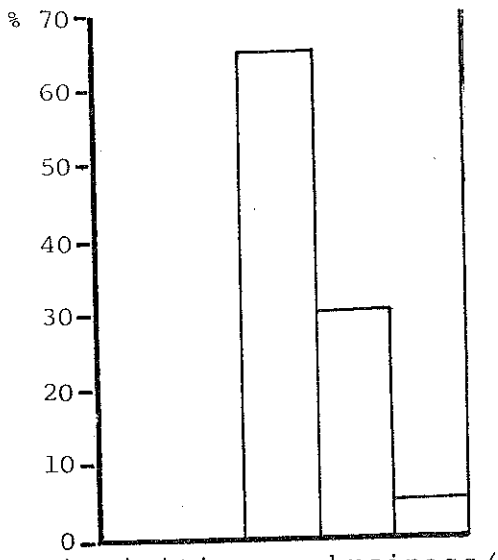
a) Permanent resident



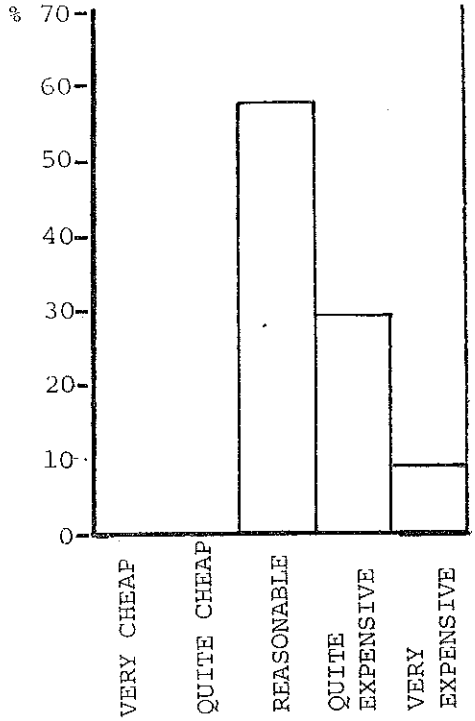
b) Temporary resident

Figure 8.9

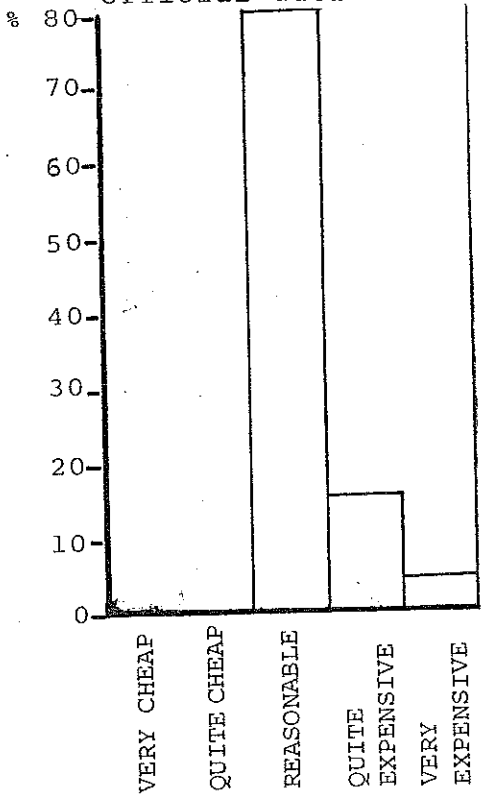
OPINION ON FARES BY PASSENGER TYPE - TAXICAB



c) Visiting on business/ official duties



d) Visiting for recreation/ turism



e) Visiting for other reason

Figure 8.9

OPINION ON FARES BY PASSENGER TYPE - TAXICAB

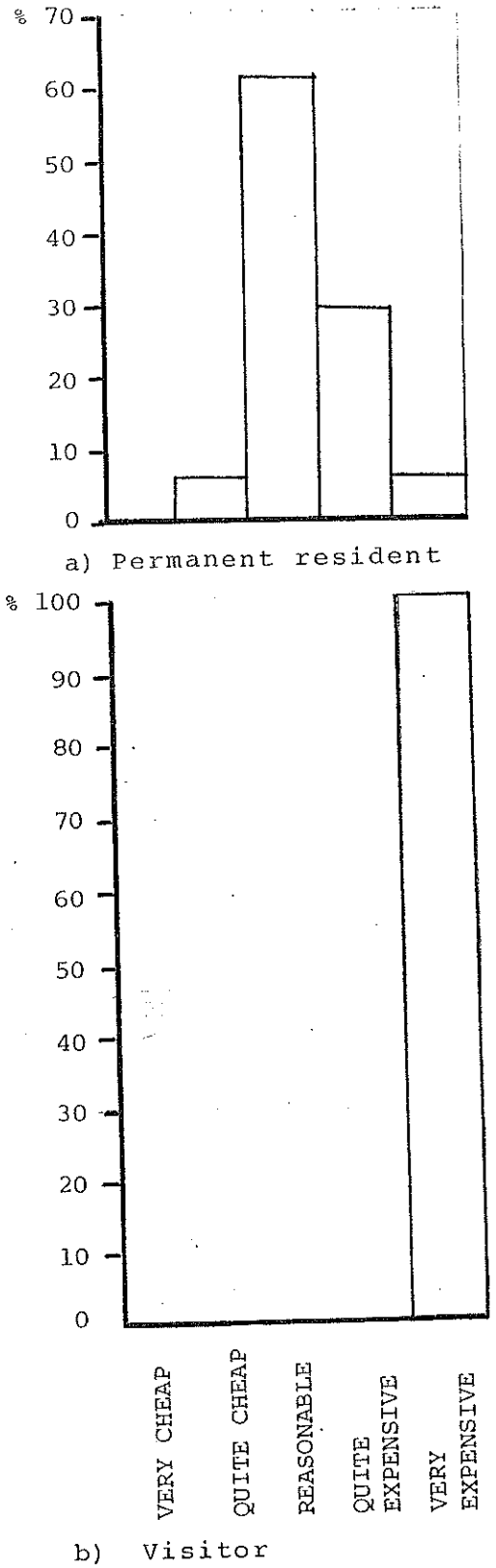


Figure 8.10

OPINION ON FARES BY PASSENGER TYPE - RICKSHAW

8.5 Attitudes to vehicle quality

We have already commented in an earlier section of this report upon the finding that the majority of taxis are already of a very respectable age and of very variable condition. In some of the worst cases it is not uncommon for vehicles to suffer from bald tyres, defective suspension, doors that do not clase properly,windows that do not work, and torn or dirty upholstery. On the other hand, some vehicles are well maintained and cared for. Thus in interpreting passenger's responses to vehicle quality we must bear in mind the inherent variability of the fleet.

Another important caveat to be made is concerned with the passenger's attitude themselves. We should expect a great deal of variability in response, according to differences in the passenger's past experience and personal standards. For example, someone who rarely travels in a taxi, who does not have his own car, whose sole experience of travelling in a motor car is obtained from the average taxi in Rawalpindi will assume that that vehicle is the norm. On the other hand, expectations should be far higher from someone who has his own car, or who has travelled in Europe or North America, where taxi standards tend to be much higher.

Ideally in an in depth attitudinal study we would attempt to reduce some of this variability by adopting the strategy of market segmentation, but due to the data collection constraints of this study, we have insufficient socio-economic data to do this and can at best hope to give but a general indication of opinions.

As with the question on fares, a five point semantic scale was used to ask for opinions on vehicle quality. The categories defined were:

- Very good
- Quite good
- Satisfactory
- Unsatisfactory
- Very unsatisfactory

Figure 8.11 shows the responses classified by each of the major vehicle types. Whilst there was an overall satisfaction rate (responses: satisfactory, quite good and very good) of 76%, the rickshaw is viewed as being appreciably worse with a score of only 52.5%. The only vehicle to qualify for a 'very good' response is the Suzuki, and then in only 2% of the responses given.

It would appear then that the travelling public are reasonably satisfied with the quality of the taxi vehicles, but an analysis of opinion by frequency of use does suggest that those users whose exposure to, and knowledge of the condition of vehicles is greater, are least satisfied. Figure 8.12 shows a small but consistent trend; 71% of daily users are satisfied, 78% of weekly and monthly users, and 87% of infrequent users express some measure of satisfaction with vehicle quality.

Analysing responses by passenger type (Figure 8.13) shows that recreational visitors are least satisfied (68.9%) whilst other visitors are most satisfied (81.9%).

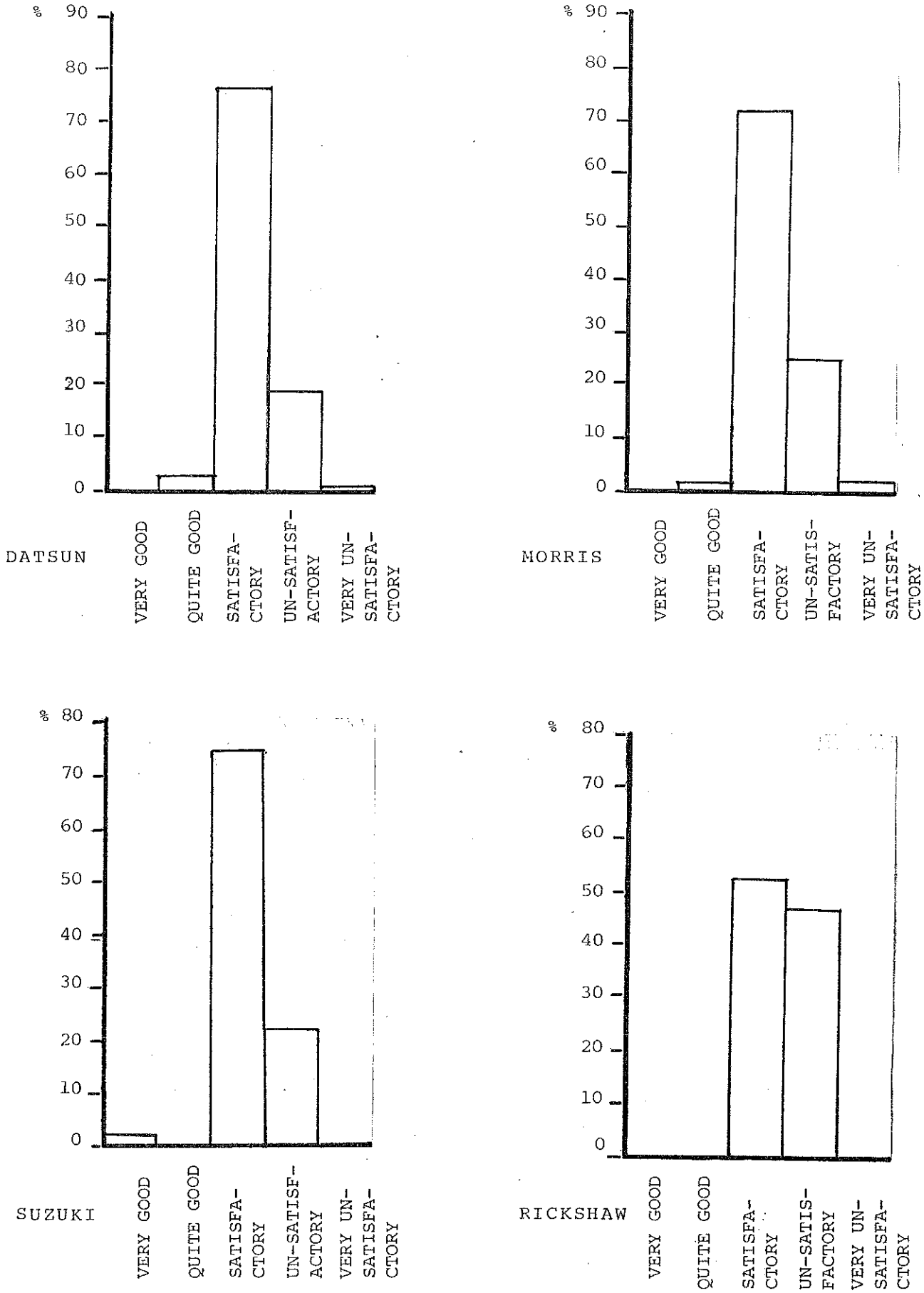


Figure 8.11

OPINION ON VEHICLE STANDARDS BY TYPE OF VEHICLE

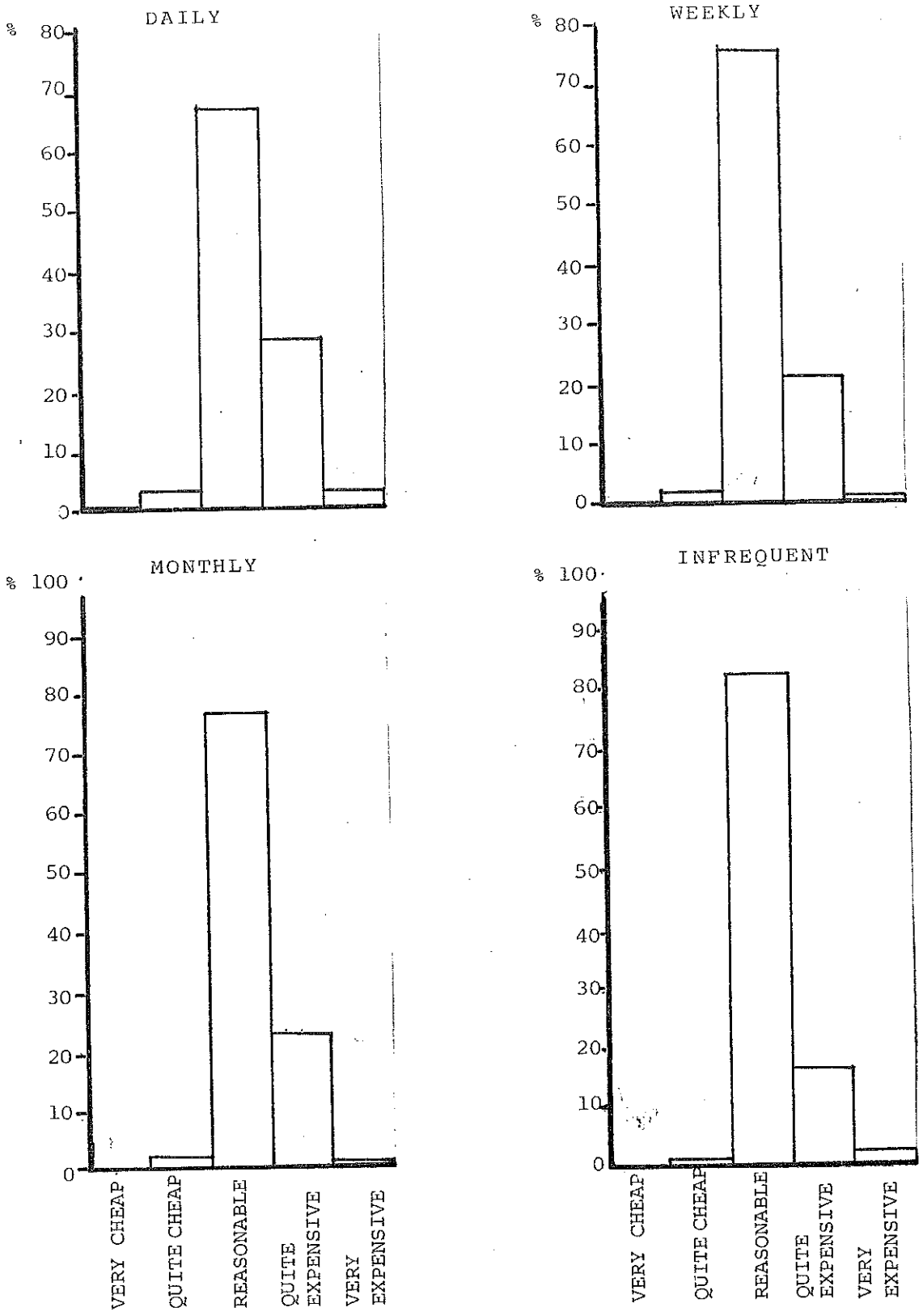
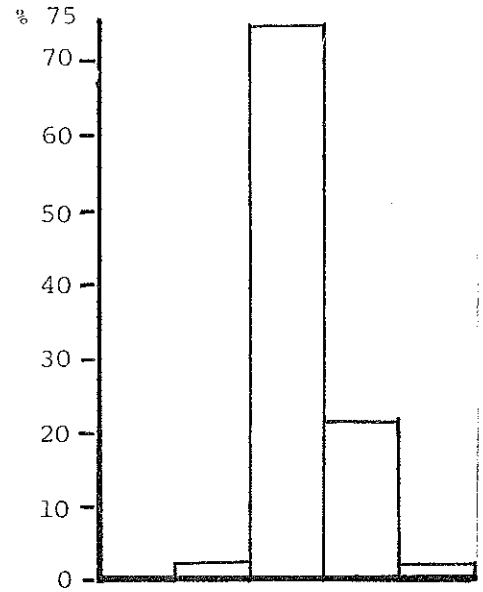
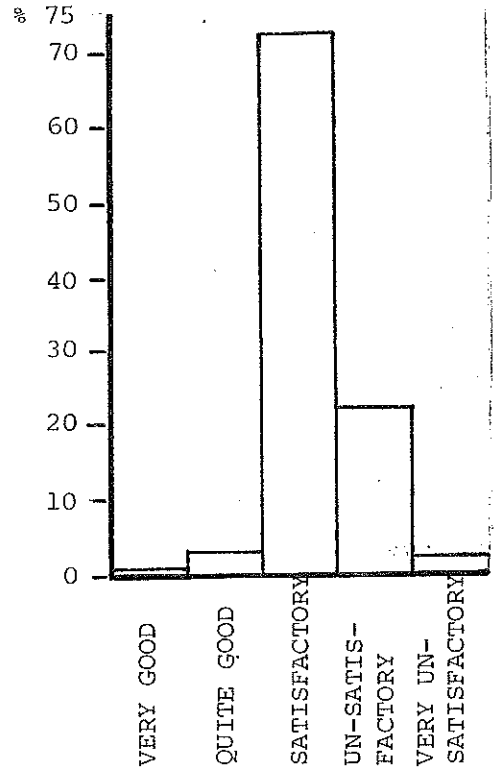


Figure 8.12

OPINION ON VEHICLE STANDARDS BY FREQUENCY OF USE



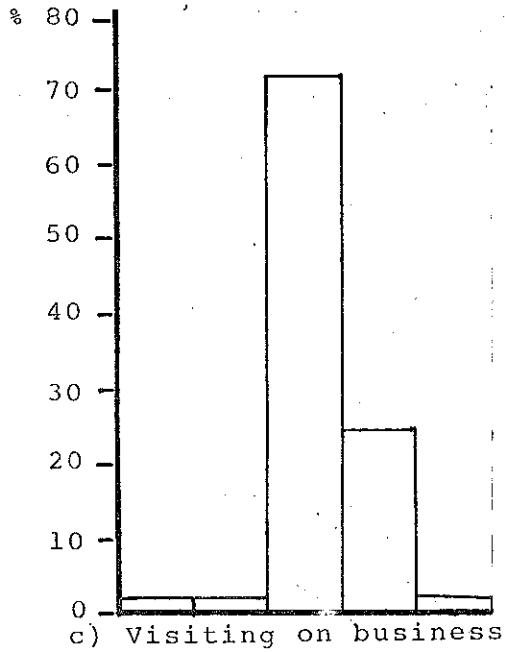
a) Permanent resident



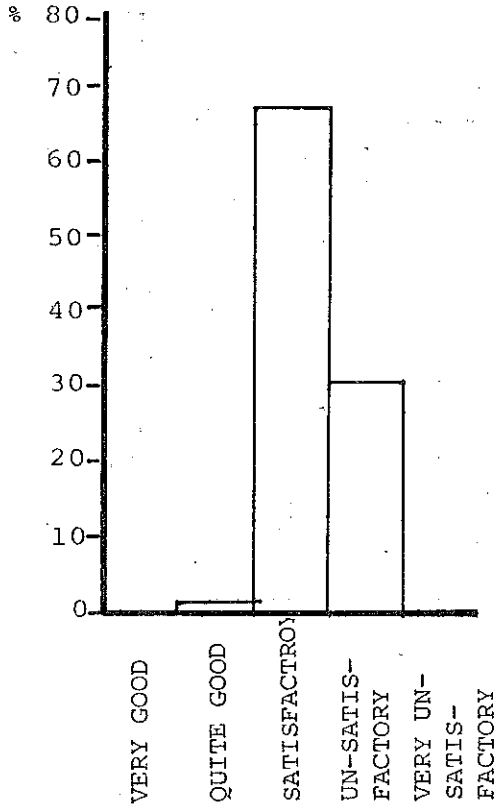
b) Temporary resident

Figure 8.13

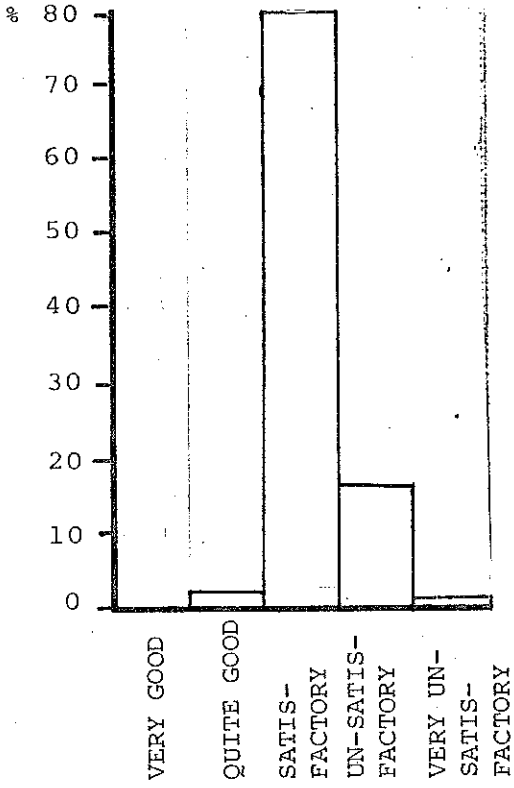
OPINION ON VEHICLE STANDARDS BY PASSENGER TYPE.



c) Visiting on business/ official duties



d) Visiting for recreation/ turism



e) Visiting for other reasons

Figure 8.13

OPINION ON VEHICLE STANDARDS BY PASSENGER TYPE

8.6 Mode preferences

As a corollary to the questions on opinions on fares and vehicle quality, and because preliminary investigations in designing the survey had revealed that in some cases passengers claimed that they were using taxis because there was no reasonable alternative open to them, two questions were included designed to identify user's preferences in this respect. This first question asked if the passenger would have prefered to use some form of public transport instead of the taxi for the journey he was about to undertake. Those responding in the affirmative were then asked to signify which of the four options would have been their first choice:

- Bus
- Mini-bus
- Wagon
- Suzuki

Figure 8.14, shows that overall 78.7% of respondents, (83.5% in Islamabad), would have prefered to use stage-carriage public transport instead of the taxi. This very high proportion serves to reinforce the hypothesis mentioned in the previous section that there is a strong possibility that many passengers are captive taxi users due to inadequacies in the stage-carriage public transport system. These inadequacies are most probably due to deficiencies in the structure of the route network rather than lack of capacity on those route which are operated.

Over the study area as a whole, preferences as to which mode would have been chosen were evenly split between bus and wagon. The Suzuki obtained only 9.8% of first preference votes (Figure 8.15), and only 5.1% in Islamabad.

Following through our analysis, differentiation by passenger type (Figure 8.16) reveals little apparent variation attributable to differences between categories of passenger when asked about the taxi as being the prefered mode, whilst preferences for

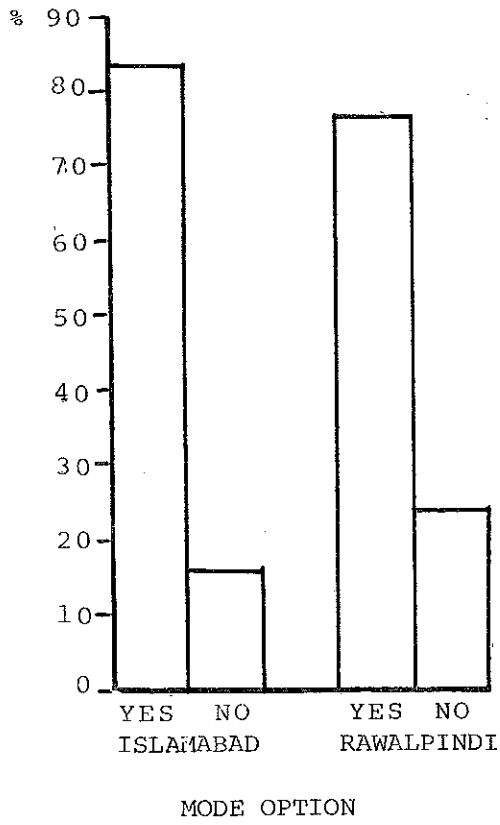


Figure 8.14

PERCENTAGE FREFERING TO TRAVEL BY OTHER MODE

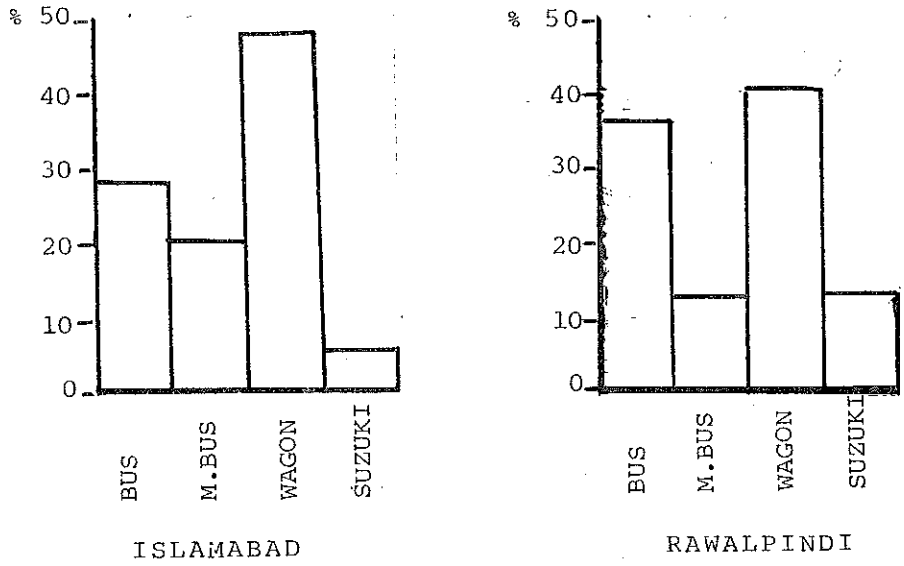


Figure 8.15

PREFERENCE TO TRAVEL BY VEHICLE TYPE.

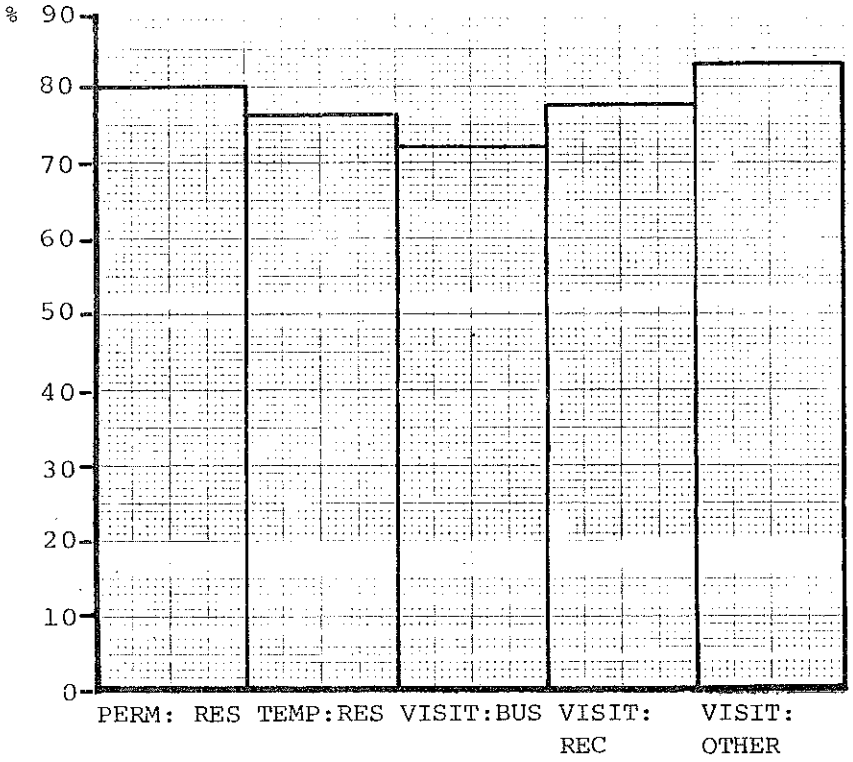


Figure 8.16

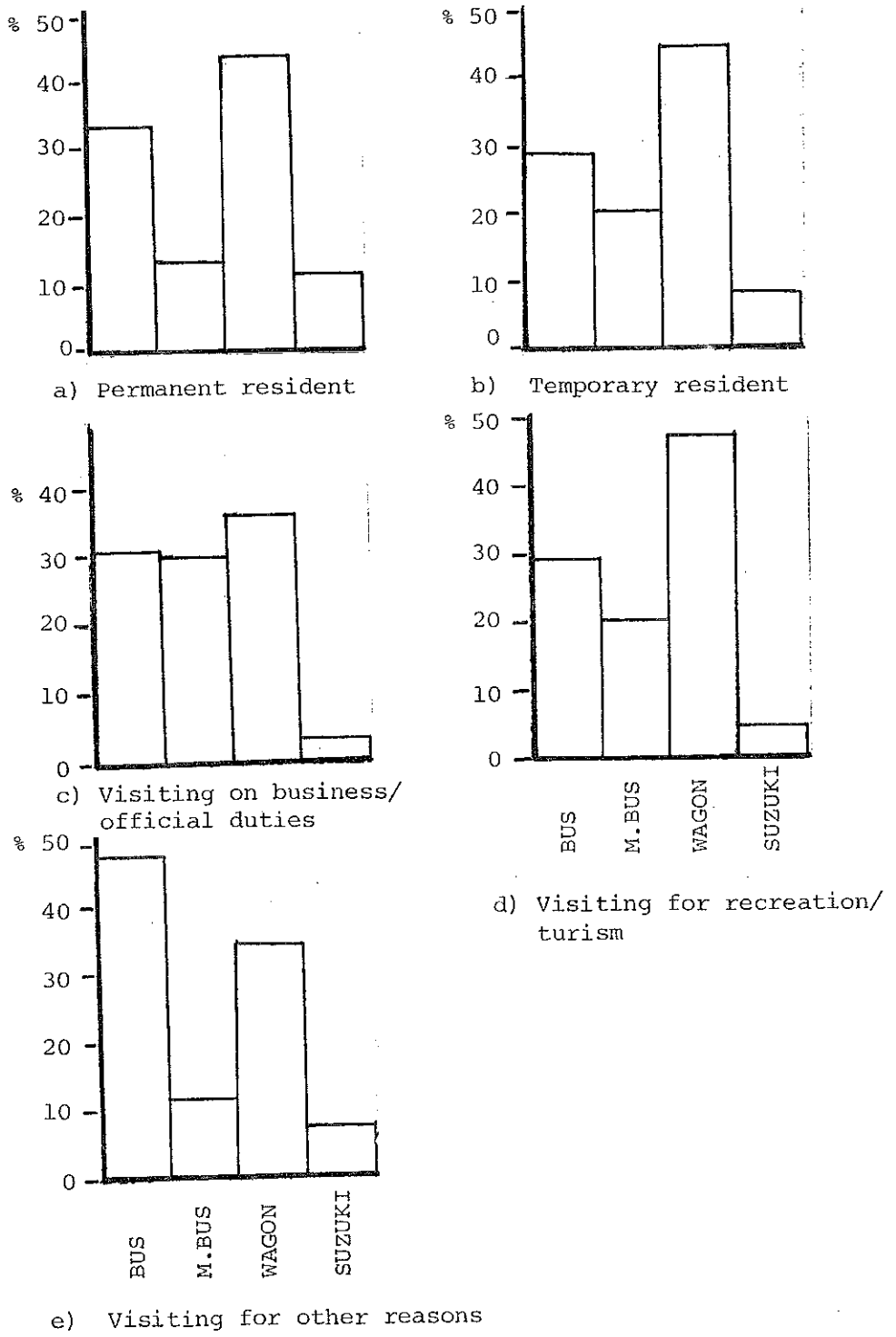
PERCENTAGE OF PASSENGER WISHING TO USE ANOTHER MODE BY PASSENGER TYPE

alternative modes (Figure 8.17) disagregated by passenger type indicate that for all categories except Other Visitors, the wagon is the most popular preference.

Finally, of those passengers expressing a preference for other modes Figure 8.18 suggests that this desire does not stem from a marked dissatisfaction with the quality of the taxi vehicle, in that the satisfactions score at 77.7% is very similar to that of all taxi users and is in fact slightly higher than those who said that they would not have prefered to travel by stage carriage service (71.7%).

8.7 Willingness to pay higher fares

Finally in this chapter, we report on the results of a series of questions which were designed to test whether the taxi user would be prepared to pay more if a new and better quality vehicle were to be introduced. In the survey we specifically mentioned air-conditioning as one of the features of the new vehicle. The questions were always put in a standardized manner and expressed in such a form as to ask the passenger if he/she would be prepared to pay a specific sum over and above the actual fare to be paid. These sums were worked out by the interviewer at the time, so that they were always, 25%, 50%, and 100% more than the passenger was actually paying for the journey he was embarked upon. In this way it was always clear to the passenger how much money was involved - how much extra in real terms he was being asked to pay. Surveys of behavioural intent should always be treated with a certain amount of caution since there is clear evidence that subsequent behaviour does not laways correlate well with expressed intent. However, the results obtained in the survey were at least internally consistent in terms of the general trend of the behavioural intent revealed, although there was a greater than expected proportion of users expressing a willingness to pay more than would have been expected considering the distribution of responses with respect to opinion of fares.



a) Permanent resident

b) Temporary resident

c) Visiting on business/ official duties

d) Visiting for recreation/ turism

e) Visiting for other reasons

Figure 8.17

PERCENTAGE OF PASSENGERS WISHING TO USE ANOTHER MODE BY PASSENGER TYPE

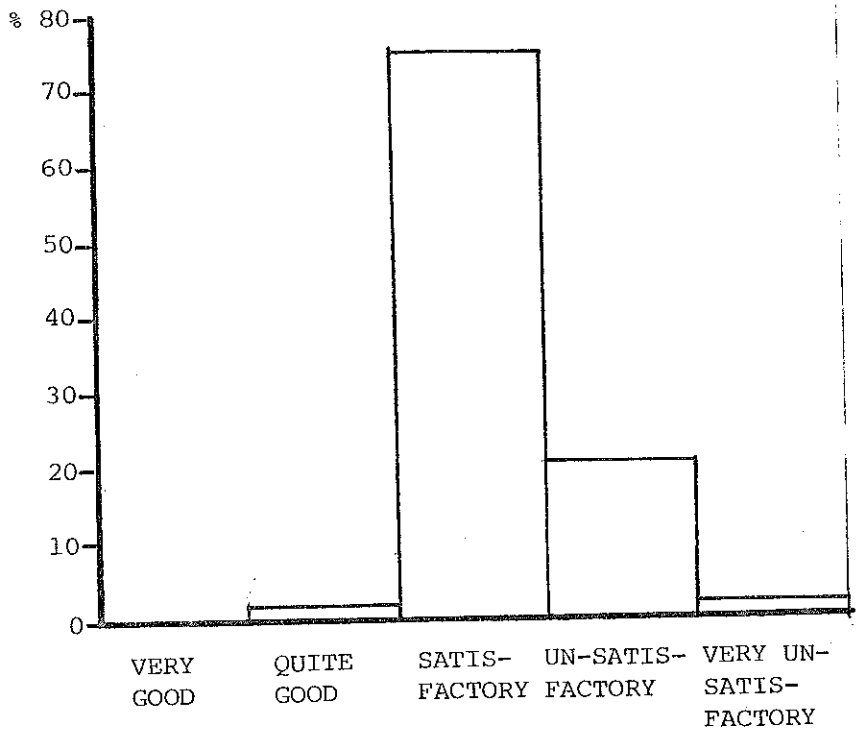


Figure 8.18

PERCENTAGE OF PASSENGERS WISHING TO USE ANOTHER MODE BY QUALITY OF TAXI VEHICLE

In the left column of Table 8.4 are 'yeses' as a percentage of the category immediately above them; figures in the right column are the percentages of all passengers responding in the affaimative.

Table 8.4
WILLINGNESS TO PAY A HIGHER FARE FOR A BETTER STANDARD VEHICLE

	Affairmative responses as a percentage of affairmative responses to previous question.	Affairmative responses as a percentage of all respondents.
Willing to pay more (amount unspecified)	-	55.0
Willing to pay at least 25% more than present fare	100.0	55.0
Willing to pay at least 50% more than present fare	43.6	24.0
Willing to pay 100% more than present fare	41.2	9.9

Interpreting these results, everyone responding positively to the idea of paying more (more than a half of all passengers) was willing to pay to lease 25% more, but only 43.6% were willing to pay at least 50% more. By the time we arrive at a 100% increase in fare only 9.9% of all travellers are prepared to pay this level of fare.

When disaggregated by fare bands, a smaller proportion are prepared to pay more at fares between Rs. 11-15 but otherwise there is little consistent variation in a passenger's willingness to pay a higher fare as a function of the actual fare.

Disaggregating by passenger type, we see in Figure 8.19 that the permanent residents as a group are least inclined to pay 100% more, although it is the temporary resident who is less inclined to pay at least 50% more. However, the differences are small and are probably not significant. Figure 8.20 suggests that as frequency of use declines, the proportion of passengers willing to pay more for a higher quality vehicle also declines, but rises again for very infrequent users. As a test of consistency in attitudes, if

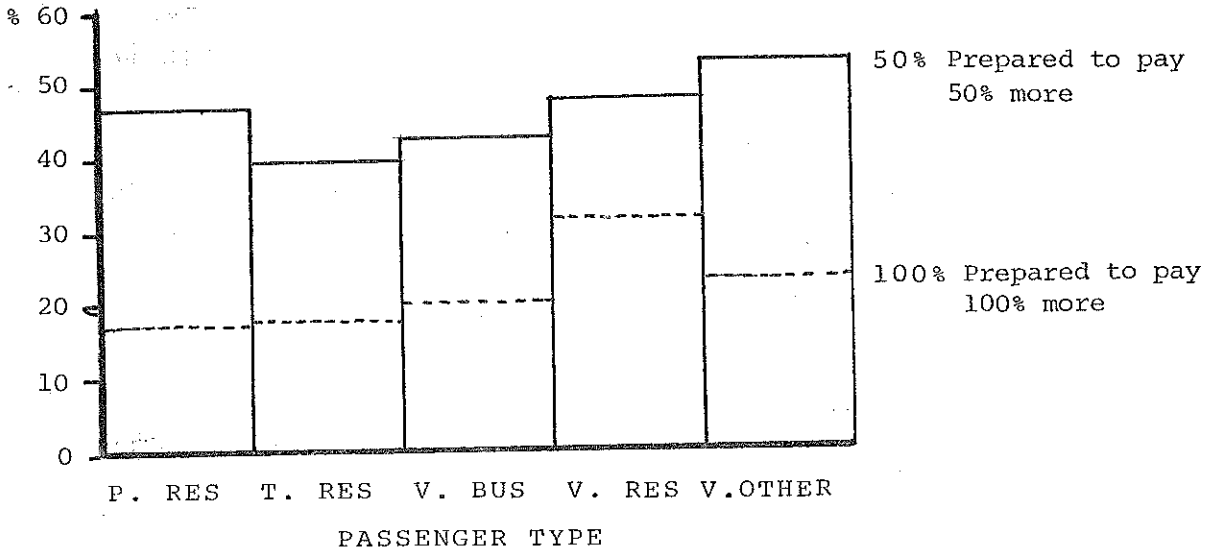


Figure 8.19

WILLINGNESS TO PAY HIGHER FARES BY PASSENGER TYPE

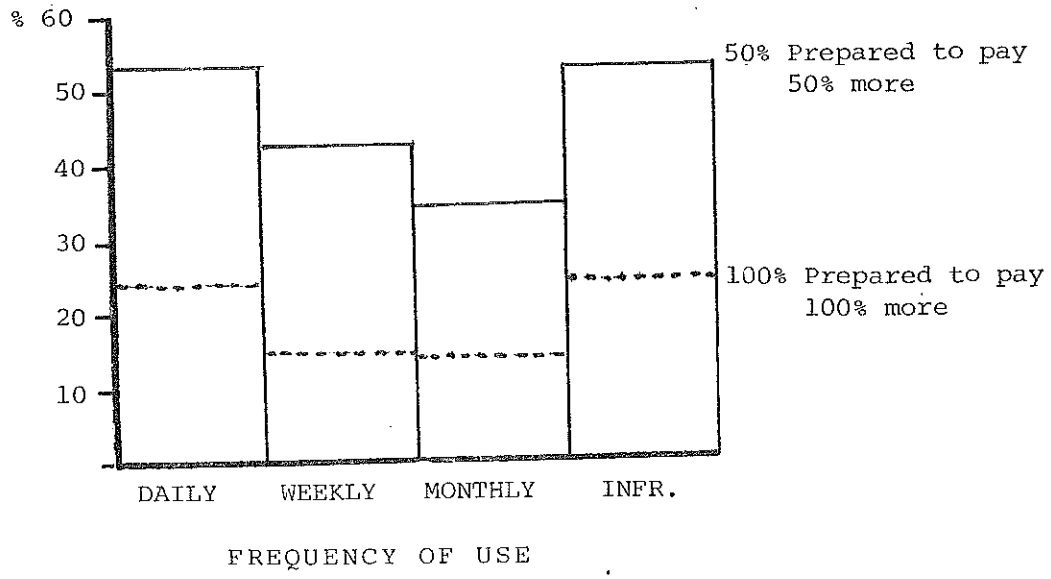


Figure 8.20

WILLINGNESS TO PAY HIGHER FARES BY FREQUENCY OF USE

we plot willingness to pay more against opinion on fares, we find (Figure 8.21) rational responses in that, on the whole, a far greater proportion of those who find the fares cheap are prepared to pay more than those who find them expensive. However responses are not very consistent with respect to opinion on vehicle standards (Figure 8.22) where we would expect those most dissatisfied with vehicle standard more likely to pay more to ride in a more comfortable vehicle of a better standard.

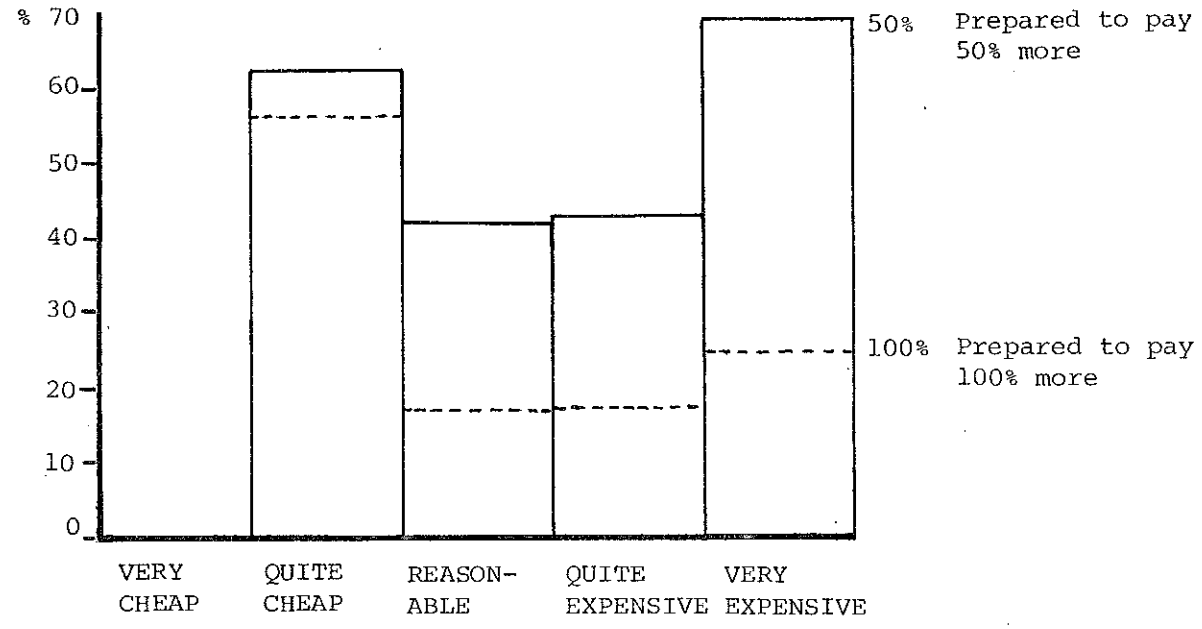


Figure 8.21

WILLINGNESS TO PAY HIGHER FARES BY OPINION ON EXISTING FARE

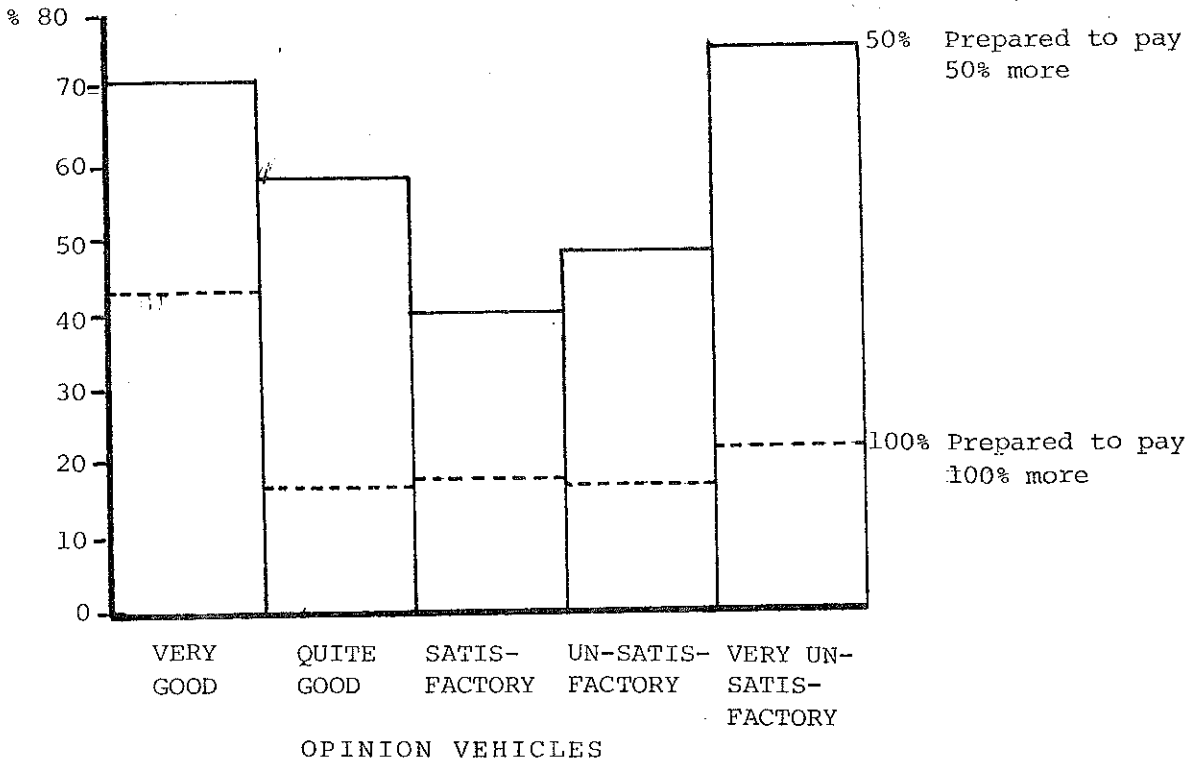


Figure 8.22

WILLINGNESS TO PAY HIGHER FARES BY OPINION ON VEHICLE QUALITY

9 OPERATING COSTS

9.1 Introduction

The profitability of an enterprise depends on the difference between its revenue and the cost of producing the commodity or service being sold. In this respect the economic performance of the taxi industry is no different from any other. However, whereas it is a relatively straightforward matter for a taxi operator to reckon his revenue i.e. the total sum of fares collected from passengers, the proper determination of costs is not so simple. Indeed, in the course of interviewing hundreds of taxi owners it become evident that many of them had never even attempted to calculate their operating costs and only a very few operators admitted to keeping any kind of written records of their costs and revenues.

It must be borne in mind then, that in this study a profile of operating costs for different segments of the industry has had to be reconstructed for the most part based on the recollections of the people interviewed. The quality of the end product can only be as good as the longevity of the memories of the taxi owners and the accuracy of their recall.

In the analysis of the operating cost data, the objective has been to classify each case into one of eight relatively homogeneous groups or strata. Vehicle type forms the first stratum and has been divided into four groups corresponding to the predominant types of vehicle; type of operation is the other stratum comprising two groups - owner drivers and owners who either employ a full time driver or contract out their vehicles. For the sake of brevity this second group is referred to as 'other owners' in the subsequent discussion. With a target sample of 50 respondents for each group, group averages should be representative of the actual conditions across the whole industry.

The convention in studies of vehicle operating costs is to classify the cost items into fixed and variable costs (variable costs are

those which alter as a direct ratio of the distance covered by the vehicle) and to convert the sum of the total operating costs into a unit cost, i.e. as a cost per unit distance or time.

In this study we have, by and large, adhered to this convention, although certain cost items have been aggregated in a way which corresponds closer to the peculiarities of the structure of the industry in Pakistan.

There are three broad categories:

- Fixed
- Semi-fixed
- Variable

We would emphasise that there is nothing sacrosanct about the use of these three headings, and in fact data have been stored in such a manner that other categorical systems could easily by set up if so wished.

9.1.1 Fixed costs. Fixed costs are largely those associated with the capital invested in the enterprise. They are termed fixed because they should be independent of variations in output. In other words, they are costs which are necessarily incurred irrespective of whether the vehicle covers 10 kms or 100,000 kms in a year's operation.

Included under this heading we have:

- The capital value of the vehicle, treated in terms of the opportunity costs of that capital.
- Depreciation of the capital assets represented by the vehicles owned.
- Depreciation of any capital assets represented by premises; offices, workshops and equipment, and garaging employed in the carrying out of the taxi enterprise.
- Vehicle registration, licensing, and costs associated with conforming to statutory and administrative requirements. In Pakistan this includes items such as fitness testing, route permits and token tax.
- Insurance.

9.1.2 Semi-fixed costs. This is a category of costs intermediate between the other two. Although they may vary as a function of output, the relationship is not as obvious as in the case of the variable costs. Items included are:

- Labour costs
- Accident costs
- Major repairs and renovation of the vehicles, which are more a function of the age of the vehicle then the number of kilometres run in the short term.

9.1.3 Variable costs. Sometimes referred to as the direct operating costs, in most cases these can be linearly related to the output of the vehicle.

They include:

- Fuel
- Oil and lubricants
- Tyres and innertubes
- Replacement and repair of mechanical and electrical components

In the remainder of this chapter we present the results of our findings with respect to each of these categories. In all cases the data refer to a twelve month period immediately prior to the date on which the interview was completed. The interviewer used a series of check lists to prompt the owner about specific items of expenditure. In cases where vehicles had been owned for period of less than 12 months, the costs were factored to represent an equivalent annual cost, but in subsequent analysis it was decided to exclude these cases in the calculation of group averages in order to avoid the distortion inherent in factoring what may have been unrepresentative partial cost data.

Unit costs have been calculated expressing the total annual cost as a cost per vehicle kilometre, for different vehicle types and type of operation.

9.2 Fixed costs

9.2.1 Capital value. The appropriate factor for consideratic in the calculation of the capital costs is the market value of the vehicle at the beginning of the accounting period. The cost to be calculated is the investment income foregone by retaining the vehicle and operating it as a taxi, rather than investing the equivalent amount in an alternative enterprise or deposting the money in a bank to secure a lower but more assured return on the investment. The calculation involves then, the estimation of the current market value, the market value 12 months prior, and the rate of return to be obtained from an appropriate alternative investment (the opportunity cost of the capital sum).

The quantification of market value and depreciation have been discussed earlier in Chapter 6. Hence the principal consideration here is to select an appropriate interest rate to represent the opportunity cost of capital. This again is an area fraught with difficulties. Present govenrment policy is to use a discount rate of 12% for public investments in the highway sector. However, since we are here dealing with the private sector, this value may not be appropriate. Figure 9.1; an advertisement from the local press, illustrates the wide range of interest (profit) to be gained from savings over different terms in low risk government bonds and saving schemes. We finally adopted a short - medium term investment giving an annual return of 15% as our bench mark in the calculation of the opportunity cost of capital.

Of the various estimates of depreciation discussed in chapter 6 we prefer to rely on the evidence of the transaction prices, (Table 6.20) which show vehicles appreciating in value rather than depreciating.

Table 9.1

AVERAGE ANNUAL CAPITAL COST - VEHICLES BOUGHT OUTRIGHT

a) OWNER DRIVERS (Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
1984 PRICES	55,452	26,622	-	39,500
ANNUAL APRECIATION	1,805	930	-	785
OPPORTUNITY COST OF CAPITAL	8,318	3,993	-	5,925
ANNUAL COST OF CAPITAL	6,513	3,063	-	5,140

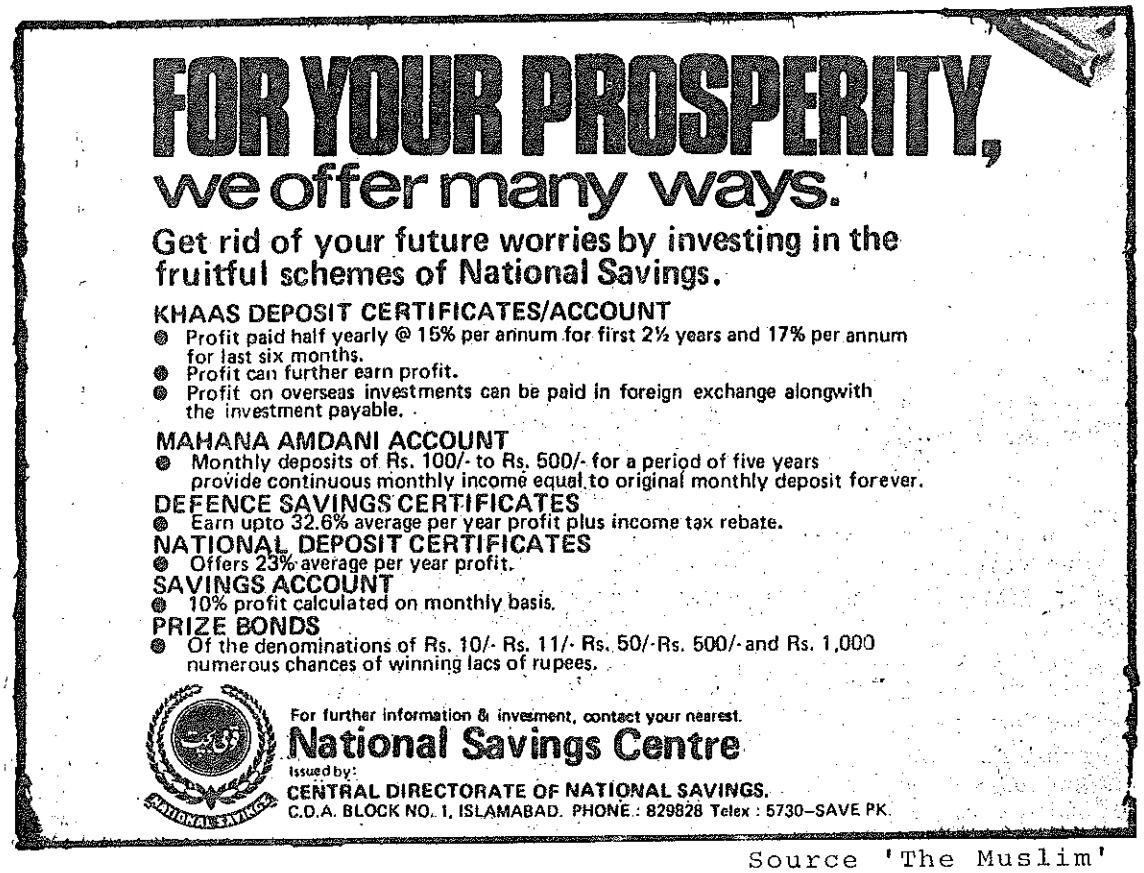
b) OTHER OWNERS

	DATSUN	MORRIS	SUZUKI	RICKSHAW
1984 PRICES	47,971	25,038	-	39,023
ANNUAL APPRECIATION	1,805	930	-	785
OPPORTUNITY COST OF CAPITAL	7,196	3,756	-	5,853
ANNUAL COST OF CAPITAL	5,391	2,826	-	5,068

c) ALL OWNERS

	DATSUN	MORRIS	SUZUKI	RICKSHAW
1984 PRICES	52,300	25,960	55,200	39,309
ANNUAL APPRECIATION	1,805	930	12,398	785
OPPORTUNITY COST OF CAPITAL	7,845	3,894	8,280	5,896
ANNUAL COST OF CAPITAL	6,040	2,964	-4,118	5,111

Thus in Table 9.1 the annual cost of capital is based on the 1984 market value of the vehicle, calculating the interest that would have been otherwise earned on this capital, and adding depreciation (In this case, since vehicles are appreciating, we subtract the appreciation from the interest foregone: the cost for the Suzuki is negative i.e. the owner makes a net profit by



Source 'The Muslim'
17.10.1986

Figure 9.1

PRESS ADVERTISEMENT SHOWING INTEREST (PROFIT) RATES FROM VARIOUS GOVERNMENT SAVING AND INVESTMENT SCHEMES

actually holding the vehicle). The calculation of capital costs in the case of vehicles being purchased on installments follows a different procedure. In reality, not only do the terms of the finance agreements vary widely within the industry, but also in any cross-sectional analysis we will find loan repayment schedules in various stages of completion for any one year of analysis. In order to not unduly complicate the analysis, we have made the simplifying assumption that the loan will have been taken out at the beginning of the 12 month period. Given the relatively short duration of the period over which the average vehicle has been owned this assumption should not be too unrealistic.

The costs involved can be approximated by calculating the interest foregone on the proportion of the market value represented by the down payment and adding to this interest foregone on 50% of the extra capital value acquired by one year's repayments. Depreciation should be charged on the same portions of the market value (down payment and the first year of capital repayments). To be added to this is the finance charge, represented by the remaining part of the year's repayments.

For example: A vehicle with a value of Rs. 25,000 ois bought by means of a down payment of Rs. 10,000 and 36 monthly payments of Rs. 1,000 each. Of the repayment schedule totalling Rs. 36,000 over three years, Rs. 15,000 represents the remainder of the capital value and Rs. 21,000 the finance charge.

At the end of the first year the proportion of capital value acquired will be Rs. $10,000 + \frac{15,000}{3} = 15,000$
Finance charges can be approximated as $\frac{21,000}{3} =$
Depreciation will charged on $\frac{15,000}{25,000}$ = three fifths of the value of the vehicle at the beginning of the period.

Table 9.2 summarizes that portion of the capital cost of vehicle ownership attributable to finance charges and interest foregone, whilst Table 9.3 shows how depreciation has been derived (again the negative sign indicates a net appreciation in the value of the vehicle).

Table 9.2

AVERAGE ANNUAL CAPITAL AND FINANCE COSTS - VEHICLES BOUGHT ON INSTALLMENTS.

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	16,403	6,786	15,088	7,520
OTHER OWNERS	8,253	7,401	-	7,681
ALL OWNERS	13,347	7,093	15,088	7,600

Table 9.3

ANNUAL DEPRECIATION CHARGES - VEHICLES BOUGHT ON INSTALLMENTS - ALL OWNERS.

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
ACQUIRED CAPITAL VALUE AT THE END OF 1 YEAR (Rs)	29,250	13,952	58,235	17,775
ACQUIRED CAPITAL VALUE AS % OF CASH PRICE (%)	77.22	71.74	83.19	48.6
ANNUAL APPRECIATION (Rs) DEPRECIATION	- 1,393	- 667	-10,315	- 382

9.2.2 Other fixed costs. YThe great majority of owners possess just a single vehicle and in none of the cases covered in the survey were there any premises being used in connection with the operation of the taxi business. Taxis appear to be parked overnight on the public highway, at the owners home or on vacant ground. Hence in the present context we can ignore premises and equipment as a cost item.

Information concerning the remaining items of fixed costs were gathered using a check list attached to the questionnaire. (Check list 1).

a) Token tax.

This is a tax levied on all motor vehicles and collected by the Excise and Taxation Office of the Provincial Government. The prescribed rate at the time of the survey was Rs. 130.00 per calendar quarter for taxi cabs and Rs. 98.00 for rickshaws.

Table 9.4

AVERAGE ANNUAL COST OF TOKEN TAX (VEHICLE LICENSE)

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	447.42	497.49	520	354.26
OTHER OWNERS	422.97	417.03	-	220.72
ALL OWNERS	437.74	458.87	520	288.45

Table 9.4 also reveals the extent of tax evasion - with the yearly tax rate at Rs. 520.00 for taxi cabs and Rs. 392.00 for rickshaws we can deduce that 18.6% of Morris owners are not paying tax and 11.7% of Datsun owners and as many as 43.7% of rickshaw other owners are evading payment.

b) Registration.

A fee of Rs. 450.00 is payable to the licencing authority for the registration of new taxis and rickshaws, in the case of a change of ownership or address for a previously licensed vehicle, and in the case of registering a change of category from private car to that of Public Service Vehicle.

Table 9.5

AVERAGE ANNUAL COST OF VEHICLE REGISTRATION.

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS >1 YEAR AVERAGE	168.64	24.87	440.0	0
OTHER OWNERS >1 YEAR AVERAGE	232.22	101.67	-	15.15
ALL OWNERS AVERAGE ALL	193.79	61.73	440.0	7.46

As would be expected from the age composition of the fleet, average costs are low except for Suzukis.

c) Route permit.

The route permit issued by the Secretary RTA, Rawalpindi has a validity of three years, The authorized fee is Rs. 200.00 for both taxicabs and rickshaws, and hence the average annual cost should be one third of the above fee (Rs. 66.66).

Table 9.6

AVERAGE ANNUAL COST OF ROUTE PERMIT.

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS >1 YEAR AVERAGE	183.85	145.64	180	119.74
OTHER OWNERS >1 YEAR AVERAGE	295.83	250.83	-	142.90
ALL OWNERS AVERAGE ALL	228.14	196.13	180	131.15

In practice however we see from Table 9.6 that actual average costs are four times higher than they should be. This is most probably attributable to the frequently reported necessity of having to employ agents or make ex-gratia payments in order to 'expedite' the release of permits from the RTA office.

d) Fitness test.

Each taxi is required to undergo a vehicle fitness test every six months. The test is carried out by a vehicle examiner under the responsibility of the Deputy Superintendent of the Traffic Police (DSP) in Rawalpindi. The authorized fee is Rs. 50.00 per vehicle for the first examination and Rs.25.00 for each subsequent examination. In cases where vehicle are presented for examination after the expiry of the previous certificate, a late fee of Rs.125.00 is charged. Average costs per vehicle are given in Table 9.7. On the assumption that it is unlikely that every vehicle is always charged a late fee, the reported costs are well in excess of the authorized fees; This time by a factor of five.

Table 9.7

AVERAGE ANNUAL COST OF FITNESS TEST.

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	236.36	292.56	212.00	231.43
OTHER OWNERS	256.53	274.03	-	256.90
ALL OWNERS	244.33	283.66	212.00	243.98

e) Union fees.

Separate driver's unions exist for taxicab drivers in Islamabad and Rawalpindi, whilst there is also a union for rickshaw Drivers in Rawalpindi. The annual membership fee quoted is Rs. 60.00 per annum. It can be seen from Table 9.8 that the participation rate is very low, but even so membership seems to be largely confined to owner-drivers.

Table 9,8

AVERAGE ANNUAL COST-UNION FEES.

(Rupees)

	DATSUN	NORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	4.09	13.72	0.00	85.71
OTHER OWNERS	0.00	1.72	-	48.78
ALL OWNERS	2.47	7.98	0.00	67.51

f) Insurance.

The premium for an insurance policy to cover statutory third party liabilities is Rs. 145.00, and there is a clear legal obligation for all motor vehicle to be covered for at least these risks.

The relevant statute is the Motor Vehicles Act 1939. Section 95.2(b) which defines the maximum liability for which insurance cover is required for taxis at Rs. 4,000 per passenger (with a maximum of Rs. 20,000 with respect to passengers) and a maximum of Rs. 20,000 in respect of other persons (non-passengers).

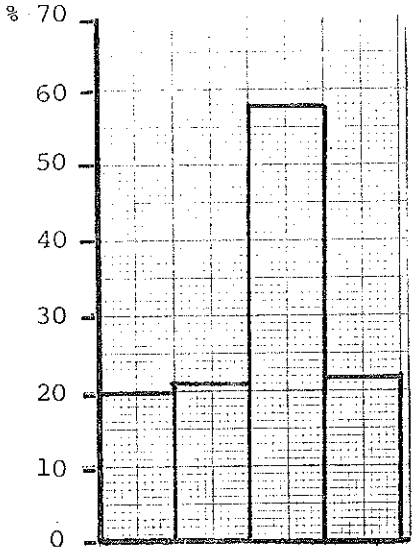
The survey showed that 16% taxicab owners and 2% of rickshaw owners carried no insurance cover whatsoever, while only a small minority (less than 5%) actually had any valid insurance cover. The remainder satisfied the legal requirement of being able to produce a certificate of insurance by the adoption of one of two practices:

a) The purchase from a non-tariff company of a certificate of insurance which is stamped 'Franchise certificate'. In thi arrangement, the insured is liable to pay the first Rs.10,000 of any claim. The Franchise certificate should only be issued if the company is appraised of the insured's financial background and is satisfied that the insured could in practice meet the liabilities at risk. However, we are informed that the provisions of this safeguard are not adhered to.

b) The other more widely adopted option is to purchase a certificate of insurance purporting to provide 'Third Party Act' cover. It is reported however that the possession of such a certificate does not gurantee that there is in fact any real insurance cover involved. In effect, the certificate is issued merely for the purpos of satisfying the legal requirement that the vehicle owner should be able to produce a certificate of insurance The price paid is a fee solely for the issuance of the certificate and does not constitute the payment of any premium or the writing of an insurance policy.

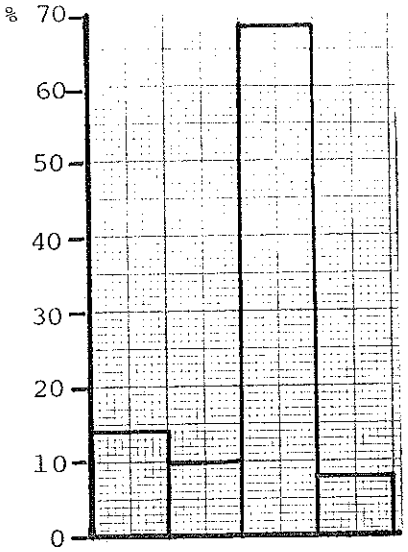
Figure 9.2 shows the proportion of different types of 'insurance' held by owners of different vehicle types, and Figure 9.3 shows the distribution of 'premiums' paid.

In the light of such widespread malpractices it is hardly surprising that the average annual costs of vehicle insurance given in Table 9.9 are extremely low.



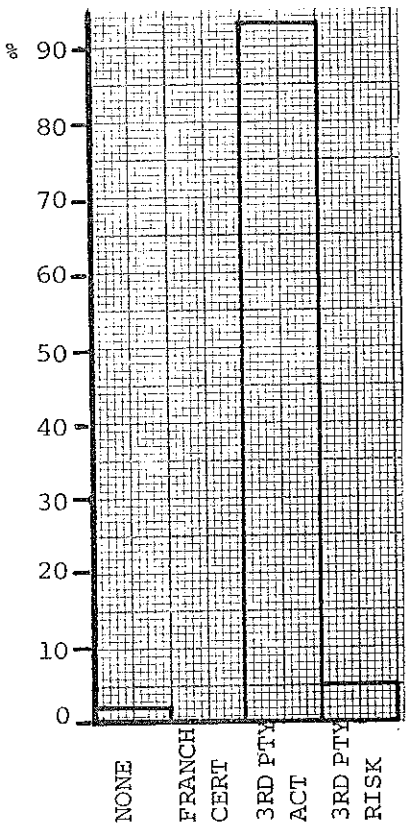
OWNER DRIVER

DATSUN



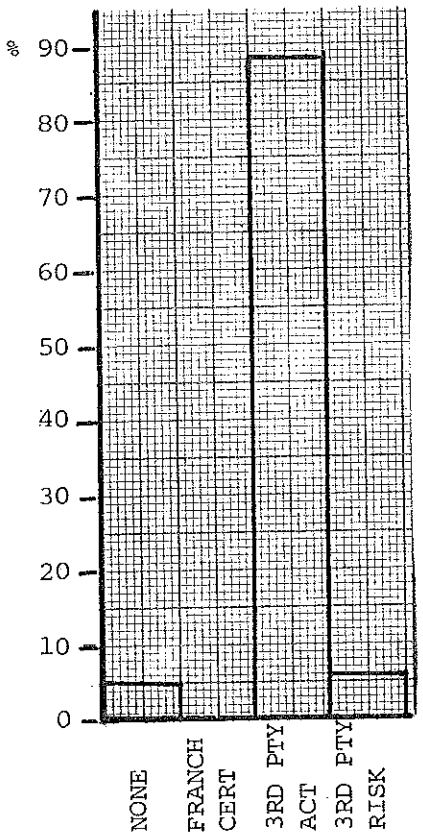
OWNER DRIVER

MORRIS



OTHER DRIVER

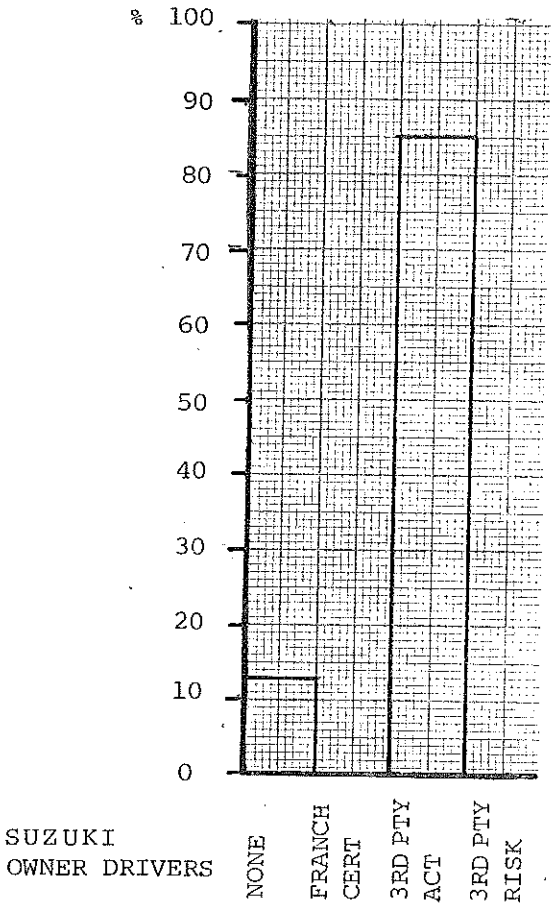
DATSUN

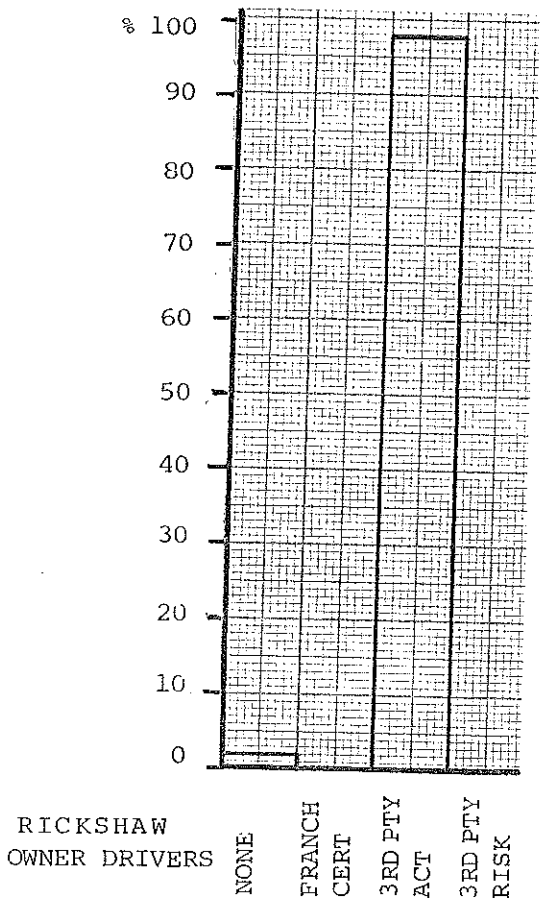


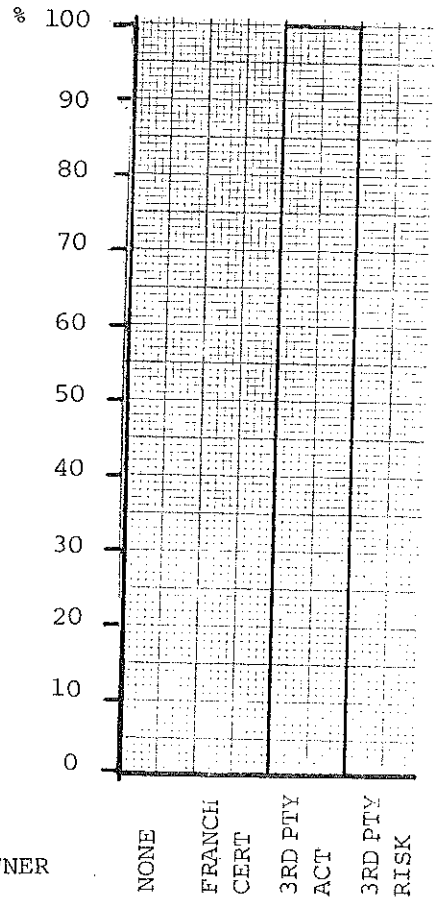
OTHER DRIVER

MORRIS

Figure 9.2 INSURANCE TYPE







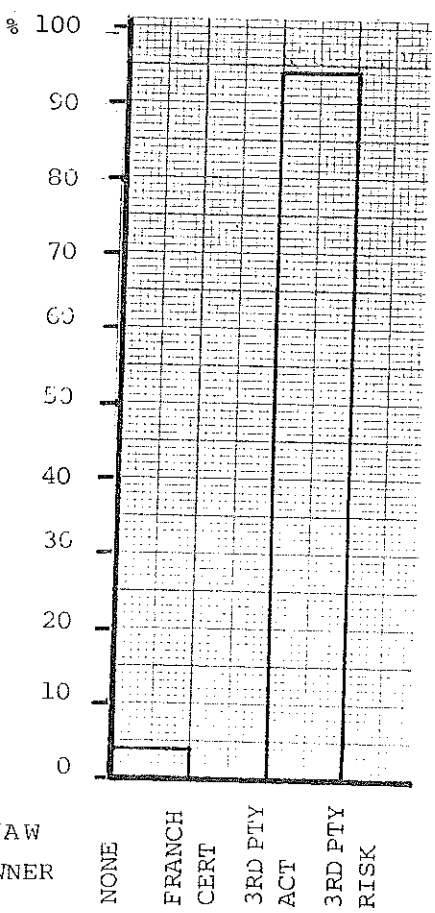
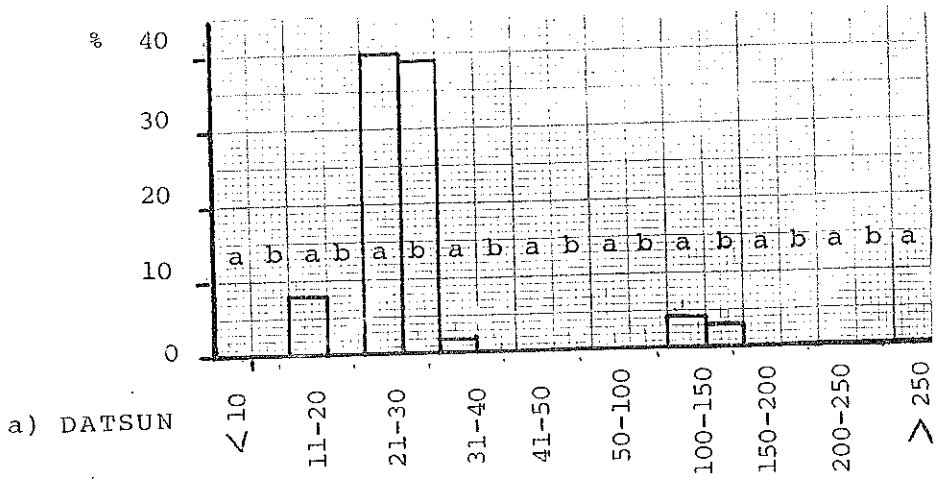


Figure 9.2 INSURANCE TYPE.



a) OWNER DRIVERS

b) OTHER OWNERS

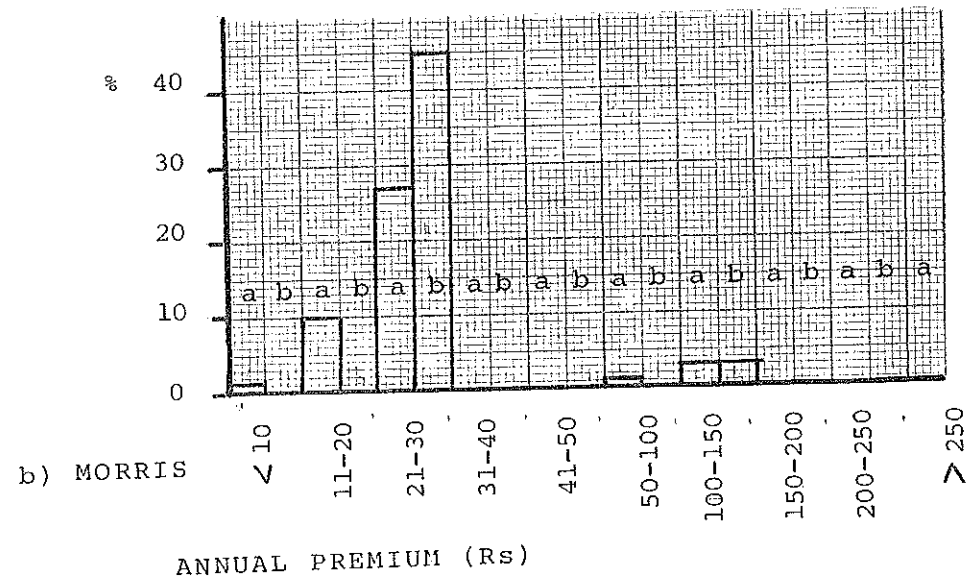
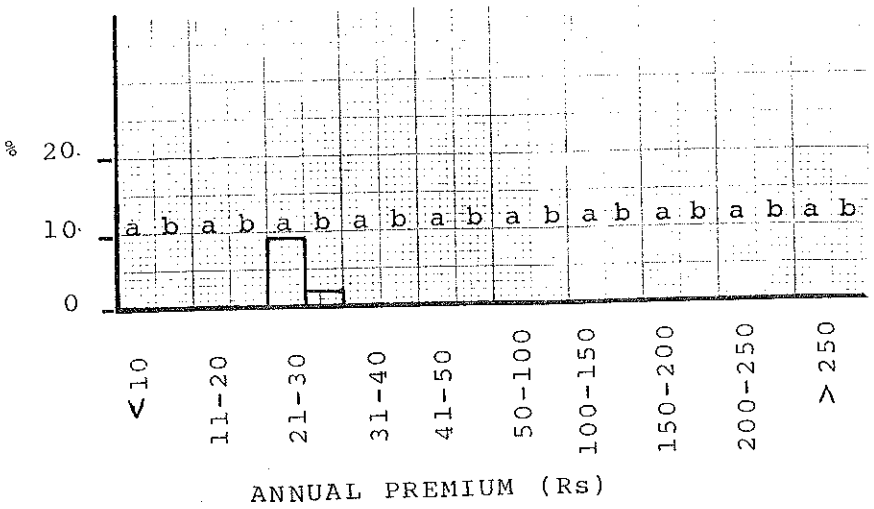
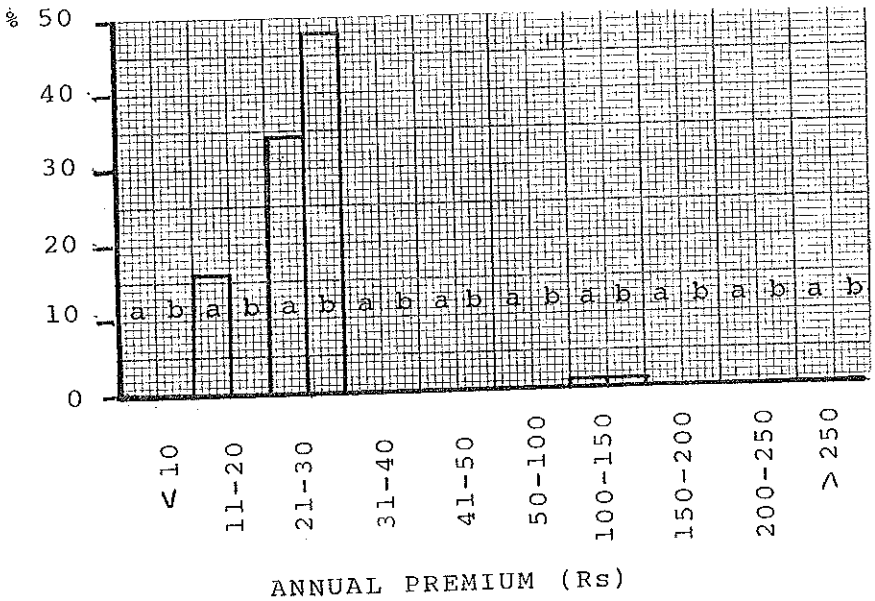


Figure 9.3

ANNUAL COST OF INSURANCE



c) SUZUKI



d) RICKSHAW

a) OWNER DRIVERS

b) OTHER OWNERS

Figure 9.3

ANNUAL COST OF INSURANCE

Table 9.9

AVERAGE ANNUAL INSURANCE COSTS

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	31.75	30.50	25.50	24.30
OTHER OWNERS	32.60	31.70	25.50	27.50
ALL OWNERS	32.10	31.20	25.50	25.80

g) Compensation payments.

Given that so many vehicles are effectively unisured, and the fact that those that are only covered against third party personal injuries, there arises the possibility that owners would have to pay compensation to third parties, either for personal injuries or for vehicle damage arising from involvement in accidents. However it transpired that this element does not figure largely as a component of operating costs since the prevailing practice in the event of an accident is for each party to pay for the repairs to his own vehicle, irrespective of who is to blame for the accident.

Reported costs are given in Table 9.10.

Table 9.10

AVERAGE ANNUAL COMPENSATION PAYMENTS.

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	332.91	21.79	100.00	31.43
OTHER OWNERS	48.61	69.31	-	22.72
ALL OWNERS	220.43	44.59	100.00	27.13

h) Gratifications to Traffic Police.

A marked feature of the operating environment for all public transport operators in Pakistan is the necessity of having to make periodic payments to the traffic police. This practice is now so deep-rooted and widespread that it has assumed some significance as a component of operating costs. During the survey, not all owners would admit to this practice, but others assured us that all taxi operators had to make payments in some measure. Hence the costs reported in Table 9.11, averaged across the whole industry, are most probably an underestimate of the total sums involved.

Table 9.11

AVERAGE ANNUAL COST OF POLICE GRATIFICATION.

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	341.91	241.79	140.00	485.71
OTHER OWNERS	310.14	393.06	-	280.30
ALL OWNERS	329.34	314.39	140.00	384.49

Based on these averages, the total sum involved for all taxi operators is at least one million rupees per annum. However, if we take the mean sum paid by those operators who admitted that payments were made, (Rs.630.00 per annum) and multiply with all vehicles, the total sum received by police officers from just the taxi operators could be somewhere in the range of Rs. 2.5 million per annum.

i) Fines.

Closely associated with the expenses incurred in payment to the Police are costs incurred in payment of fines. It has not been possible within the time constraints of this study to examine court records and analyse the nature of the offences

committed, but the general impression is that the majority of challans (summonses) are issued in connection with irregularities in vehicle documentation and hence are related to the standing charges or fixed costs of vehicle ownership. One observation warranted on the figures quoted in Table 9.12, is that the costs given here would not tally with an assesment made from court records, since only a small portion of the sums paid over by the taxi owners and drivers at the courts find their way into the public exchequer.

Table 9.12

AVERAGE ANNUAL COST OF FINES.

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	754.18	1,118.46	782.00	998.00
OTHER OWNERS	902.92	861.11	-	1,051.51
ALL OWNERS	813.02	994.93	782.00	1,024.36

j) Other fixed costs.

There are occasions when the vehicle owner incurrs additional expenses in connection with the ownership, registration, licensing etc. of the vehicle. It was discovered during the course of the survey that some owners use the services of an agent to look after the bureaucratic aspects of ownership, and an inclusive fee is paid to cover costs of obtaining permits and paying taxes. In many of these cases the owner was not able to say how much of the fee paid to the agent went to cover gratuities, the official charges and fees, or the agents fee. To some extent portions of such agent's fees and the necessary gratuities will be already included in the figures for such items as route permits etc. quoted earlier. The residue of these costs are enumerated in Table 9.13. The low average figures given are attributable to the small number of respondents reporting any expenditure under this heading.

Table 9.13

AVERAGE ANNUAL COST OF OTHER GRATUITIES AND EXPENSES

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	24.36	0.51	0.00	8.57
OTHER OWNERS	51.14	9.86	-	0.00
ALL OWNERS	20.43	4.99	0.00	4.34

Table 9.14

TOTAL AVERAGE ANNUAL FIXED COSTS

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	2,495	2,357	2,374	2,315
OTHER OWNERS	2,484	2,216	-	2,039
ALL OWNERS	2,491	2,289	2,374	2,179

The sum of the preceding items of fixed costs is given in Table 9.14; whilst Table 9.15 shows the sum of all fixed and capital costs for each vehicle type and ownership category. One of the striking features if the figure is the difference in the costs for those buying on installments, with the Datsun owner drivers incurring costs which are almost double those of the other owners of the same category of owners who have bought their vehicles outright. This is due to the relatively higher capital value of the Datsun and the rather more unfavourable terms for financing its hire purchase.

Table 9.15

AVERAGE ANNUAL COST - ALL CAPITAL AND FIXED COSTS

a) VEHICLE BOUGHT OUTRIGHT

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNERSDRIVERS	9,008	5,420	-	7,455
OTHER OWNERS	7,875	5,042	-	7,107
ALL OWNERS	8,531	5,253	-1,774	7,290

b) VEHICLES BOUGHT ON INSTALLMENTS

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	17,505	8,476	7,147	9,453
OTHER OWNERS	9,344	8,950	-	9,388
ALL OWNERS	14,445	8,715	7,147	9,377

Other features of these totals are the negative cost accrueing to the Suzuki owner due to the very high appreciation in the value of the vehicle, and the relatively high costs of rickshaw ownership, which are as much as 50% higher than those for the Morris when vehicles are bought outright.

9.3 Semi-Fixed Costs.

9.3.1. Vehicle Renovation. As explained in the introduction to this chapter; in view of the age composition of the vehicle fleet, there are certain major items of expenditure which are periodically incurred in order to keep the vehicle on the road and for the older vehicles in particular, these costs can be viewed as being incurred partly in lieu of depreciation. It was thought that they should be differentiated from routine maintenance costs and the most convenient way to handle them was to categorize

them separately. Not every vehicle will necessarily incurr a particular item of major expenditure every year, but our sample is large enough so that the within group averages will approximate to the average annual cost for a single vehicle.

Four major items were included:

- Engine
- Bodywork
- Chassis
- Gearbox

The costs recorded for each of these items are shown in Table 9.10 and the total for all itmes in Table 9.17.

Table 9.16

AVERAGE ANNUAL COST OF VEHICLE RENOVATION

a) ENGINE

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	2,139.91	3,006.59	400.00	1,351.43
OTHER OWNERS	2,861.39	3,523.14	-	1,239.40
ALL OWNERS	2,425.33	3,254.53	400.00	1,296.22

b) CHASSIS

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	210.91	582.93	0.00	215.71
OTHER OWNERS	206.94	291.67	-	159.09
ALL OWNERS	209.33	443.12	0.00	187.81

c) BODY REPAIRS/RE-SPRAY

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	1,904.91	1,774.83	1,890.00	908.58
OTHER OWNERS	2,666.11	1,650.00	-	1,059.09
ALL OWNERS	2,206.04	1,714.91	1,890.00	982.74

d) GEAR BOX

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	194.55	364.63	0.00	0.00
OTHER OWNERS	75.0	165.56	-	21.21
ALL OWNERS	141.21	269.07	0.00	10.45

e) MISCELLANEOUS

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	215.91	0.00	700.00	0.00
OTHER OWNERS	33.33	0.00	-	122.22
ALL OWNERS	143.68	0.00	700.00	60.21

Table 9.17

TOTAL ANNUAL AVERAGE RENOVATION COSTS PER VEHICLE

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	4,656.18	5,729.15	2990.00	2,475.71
OTHER OWNERS	5,842.78	5,630.36	-	2,539.39
ALL OWNERS	5,125.60	5,681.73	2990.00	2,507.03

We observed earlier that there was a significant difference in purchase price of Datsun between owner drivers and other owners, and it may be that the higher average annual renovation costs of the Datsun other owners (Table 9.17) are related to the lower average purchase price.

9.3.2 Labour costs. Details of the vehicle hire contracts and wages prevailing in the Islamabad/Rawalpindi taxi industry have been recorded in Chapter 5. Here we need to indicate how those costs should be accounted.

The simplest case is that of the owner driver, where in all but the exceptional cases there are no labour costs accruing to the operation - labour is recompensed out as profits. For the remainder, we shall eventually need to elucidate where responsibilities for different cost components lie - with the contractor or with the owner - and how the revenues are split between the two parties, but at this stage of the analysis the assignment of costs is not particularly material. The relevent annual costs are not proved feasible to carry out a full categorization of labour costs by individual vehicle type. The large majority of contracts in the taxi cab sector are of the contractor/employee type, and in the rickshaw sector are of the simple contract hire form, and hence these two types are typical for the industry as a whole.

Table 9.18

AVERAGE ANNUAL LABOUR COSTS

(Rupees)

	DATSUN	MORRIS	RICKSHAW
OTHER OWNERS-JOINT CONTRACTOR/EMPLOYEE	8,844	9,444	11,400
OTHER OWNERS - EMPLOYEE		28,800	-

Table 9.19

TOTAL AVERAGE ANNUAL SEMI-FIXED COSTS

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	4,656	5,729	2,990	2,476
OTHER OWNERS	15,227	15,014	-	13,939

The total average annual semi-fixed costs are given in Table 9.19. Since owner drivers as a rule do not have any direct labour costs it would in this case be misleading to give an average figure for both ownership categories.

9.4 Variable Costs

9.4.1 Vehicle Maintenance & Repairs. Conventional cost models distinguish between labour and part replacement in accounting for maintenance costs. In this case it was not possible to do this since due to the informal and small scale nature of the motor repair industry owners were in many cases unable to distinguish between the part and labour components of the cost of replacement of a worn out part or a repair,

Expenditure on part replacement and repairs in vehicle maintenance were tackled in the interview by following a fairly comprehensive pre-prepared check list dealing item by item with most eventualities. The average annual costs are given in Table 9.20, with items grouped into four categories; electrical, mechanical, tyres and innertubes, and bodywork. The aggregate of these repair and maintenance costs is given in Table 9.21.

There is little overall difference in the total costs between the Datsun and Morris vehicles, or between ownership groups. Total costs for the older vehicles are, as would be expected, higher than

Those for the Suzuki, whilst rickshaw costs are only about one half of those for the majority of taxicabs. Tyres and inner-tubes account for approximately 30% of the total costs, whilst battery replacement, viewed as a major cost item in previous vehicle operating cost studies in Pakistan, accounts for only about 10% of part replacement and repair costs.

In order to check on the consistency of the reported data, a survey of spare part prices was conducted with several dealers in Rawalpindi; the results of which are shown in Appendix 9.1.

Table 9.20

AVERAGE ANNUAL MAINTENANCE AND REPAIR COSTS.

a) ELECTRICAL.

(Rupees)

		DATSUN	MORRIS	SUZUKI	RICKSHAW
ALTERNATOR	OWNER DRIVER	55.36	90.38	18.00	74.19
	OTHER OWNERS	74.57	97.08	-	54.85
	OVERALL AVERAGE	62.95	93.59	18.00	64.66
GENERATOR	OWNER DRIVER	131.55	173.59	112.00	2.30
	OTHER OWNERS	137.43	206.39	-	21.52
	OVERALL AVERAGE	133.87	189.33	112.00	11.77
LIGHTS	OWNER DRIVER	55.36	131.41	44.00	72.27
	OTHER OWNERS	89.74	74.86	-	108.48
	OVERALL AVERAGE	68.96	104.26	44.00	90.11
DISTRIBUTOR	OWNER DRIVER	86.45	105.13	0.00	60.19
	OTHER OWNERS	44.57	42.50	-	15.15
	OVERALL AVERAGE	69.83	75.06	0.00	37.99
PLUGS	OWNER DRIVER	135.82	173.74	140.00	96.59
	OTHER OWNERS	213.00	216.50	-	97.97
	OVERALL AVERAGE	166.35	194.26	140.00	97.27
BATTERY	OWNER DRIVER	510.18	525.26	184.00	45.81
	OTHER OWNERS	586.03	650.42	-	90.30
	OVERALL AVERAGE	540.18	585.33	184.00	67.73
INDICATORS	OWNER DRIVER	37.07	71.62	40.00	31.76
	OTHER OWNERS	14.14	39.25	-	18.18
	OVERALL AVERAGE	38.68	56.08	40.00	25.06
OTHER ELECTRICAL ITEMS	OWNER DRIVER	90.09	80.38	20.00	11.35
	OTHER OWNERS	75.57	42.67	-	21.58
	OVERALL AVERAGE	84.34	62.27	20.00	16.39

b) TYRES/INNERTUBES

(Rupees)

		DATSUN	MORRIS	SUZUKI	RICKSHAW
	OWNER DRIVER	1605.76	1479.23	428.00	837.30
	OTHER OWNERS	1668.57	1315.28	-	1021.82
	OVERALL AVERAGE	1630.60	1400.53	428.00	928.22

c) MECHANICAL

(Rupees)

		DATSUN	MORRIS	SUZUKI	RICKSHAW
STEERING	OWNER DRIVER	165.27	211.54	230.00	335.68
	OTHER OWNERS	128.57	139.72	-	167.58
	OVERALL AVERAGE	150.75	177.06	230.00	252.34
BRAKES	OWNER DRIVER	264.73	270.97	94.00	215.68
	OTHER OWNERS	265.71	244.03	-	125.45
	OVERALL AVERAGE	265.11	258.03	94.00	171.21
WHEEL ALIGN-MENT AND BALANCING	OWNER DRIVER	140.39	25.00	119.00	5.14
	OTHER OWNERS	141.43	55.56	-	0.00
	OVERALL AVERAGE	140.62	39.66	119.00	2.00
CLUTCH	OWNER DRIVER	138.27	129.15	94.00	75.34
	OTHER OWNERS	149.43	128.47	-	40.42
	OVERALL AVERAGE	142.68	128.82	94.00	58.38
GEARS	OWNER DRIVER	53.75	0.00	20.00	147.03
	OTHER OWNERS	101.43	65.83	-	27.27
	OVERALL AVERAGE	72.61	31.59	20.00	88.01
DIFFERENTIAL/ AXLE	OWNER DRIVER	55.27	51.79	0.00	16.76
	OTHER OWNERS	65.71	30.00	-	121.33
	OVERALL AVERAGE	59.40	41.33	0.00	68.23
BEARINGS	OWNER DRIVER	89.55	91.28	112.00	120.54
	OTHER OWNERS	136.43	129.58	-	94.55
	OVERALL AVERAGE	108.09	109.66	112.00	107.73
SUSPENSION	OWNER DRIVER	346.00	245.26	110.00	111.76
	OTHER OWNERS	266.00	206.11	-	146.82
	OVERALL AVERAGE	314.35	226.46	110.00	128.29
CARBURETTOR	OWNER DRIVER	297.00	190.26	114.00	86.73
	OTHER OWNERS	241.63	148.33	-	112.50
	OVERALL AVERAGE	275.09	170.13	114.00	98.49

c) MECHNICAL (C ntinued)

(Rupees)

		DATSUN	MORRIS	SUZUKI	RICKSHAW
FUEL SYSTEM	OWNER DRIVER	27.73	39.74	34.00	3.14
	OTHER OWNERS	28.00	65.69	-	3.03
	OVERALL AVERAGE	27.83	52.19	34.00	3.08
EXHAUST/ SILENCER	OWNER DRIVER	80.00	94.23	52.00	88.22
	OTHER OWNERS	99.00	73.90	-	74.94
	OVERALL AVERAGE	87.51	84.13	52.00	81.67
RADIATOR	OWNER DRIVER	71.75	89.49	0.00	-
	OTHER OWNERS	101.14	100.20	-	-
	OVERALL AVERAGE	83.37	94.66	0.00	-
HOSES	OWNER DRIVER	51.55	40.05	17.00	13.92
	OTHER OWNERS	66.54	39.31	-	7.45
	OVERALL AVERAGE	57.46	39.69	17.00	10.73
FAN BELT	OWNER DRIVER	47.35	50.85	29.40	-
	OTHER OWNERS	53.71	36.89	-	-
	OVERALL AVERAGE	49.86	44.14	29.40	-

d) BODYWORK

(Rupees)

		DATSUN	MORRIS	SUZUKI	RICKSHAW
UPHOLSTERY	OWNER DRIVER	240.18	147.44	356.00	40.68
	OTHER OWNERS	294.29	183.06	-	81.03
	OVERALL AVERAGE	261.58	164.53	356.00	60.56
SEATS	OWNER DRIVER	140.73	118.72	40.00	43.65
	OTHER OWNERS	104.29	93.89	-	69.70
	OVERALL AVERAGE	126.31	106.80	40.00	56.48
WINDOWS/DOORS	OWNER DRIVER	105.20	120.51	50.00	9.95
	OTHER OWNERS	249.71	114.72	-	23.33
	OVERALL AVERAGE	162.36	117.73	52.00	16.54
MISCELLANEOUS	OWNER DRIVER	0.00	268.55	700.00	31.49
	OTHER OWNERS	0.00	159.31	-	13.33
	OVERALL AVERAGE	0.00	261.11	700.00	22.54

Table 9.21

TOTAL AVERAGE ANNUAL MAINTENANCE AND PART REPLACEMENT COSTS

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	5022.06	5015.58	3149.00	2560.51
OTHER OWNERS	5423.64	4698.92	-	2558.36
ALL OWNERS	5160.92	4863.58	3149.00	2559.45

9.4.2 Lubrication and routine servicing. The most common practice within the industry is for vehicles to receive a routine servicing and oil change at regular intervals of time, rather than as function of distance covered - this practice no doubt is in some measure due to the high incidence of defective odometers. Information on the cost of servicing and oils was obtained by asking how frequently (at what interval) they were carried out. Prices of lubrication were researched at several service stations; the cost of oil changes being calculated as a function of the volume of oil required by each type of vehicle. For rickshaws, the cost of two-stroke mixing oil was added to the cost of fuel. Thus the average annual costs (Table 9.22) have been calculated on the basis of the reported periodicity of servicing and oil changes, which have been factored to give annual rates to which have been applied appropriate market rates for each vehicle type for service and oil costs.

Table 9.22

AVERAGE ANNUAL COST OF LUBRICANTS AND SERVICING

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	1,848.00	1,720.00	2,497.00	1,088.00
OTHER OWNERS	1,932.00	1,724.00	2,000.00	887.00
ALL OWNERS	1,880.00	1,722.00	2,250.00	989.00

9.4.3 Fuel costs. Although fuel costs are a major element in the cost of taxi operation, we were not able to carry out independent tests of fuel consumption in the typical driving environment of the study area, and instead have had to rely on the owners estimates of the average fuel consumption of his vehicle.

Fuel consumption varies as a function of the average speed of the vehicle, and since driving conditions and average speeds in the study area vary quite widely, there will be wide variations in fuel consumption, even for the same vehicle type. Average speeds in the bazar areas of Rawalpindi are low, due to the high density of non-motorized traffic and of pedestrians and the many obstructions encountered. Speeds along many of the principal corridors of Rawalpindi (such as Pirwadahi - Raja Bazar) tend to be every variable but also give a low overall average due to narrow carriageways and the incidence of animal-drawn traffic. On the other hand, Islamabad's highway network allows much higher operating speeds, with the average speed being determined by the incidence of traffic signals and network configration rather than by traffic density or carriageway width restrictions.

The procedure adopted for the calculation of the annual cost of fuel was to:

a) calculate the average fuel consumption (kms/litre) for all vehicles of the same type
b) determine the number of days worked per annum
c) determine the daily kms operated
d) calculate the annual consumption in litres.... $b(\frac{c}{a})$
e) multiply the resultant by the cost per litre

The most complex part of the calculation involved the estimation of the daily kms performed by each vehicle. This was arrived at from data obtained during the first survey, where drivers were asked where they had dropped their last fare, and how long they had been waiting between dropping the last fare and picking up

Table 9.23 a

PARAMETERS USED IN THE DERIVATION OF ANNUAL FUEL COSTS

		DATSUN	MORRIS	SUZUKI	RICKSHAW
AVERAGE FUEL CONSUMPTION KMS PER LITER	OWNER DRIVER	10.65	9.9	12.66	13.94
	OTHER OWNERS	11.34	8.8	11.5	14.43
	ALL OWNERS	10.93	9.3	12.45	14.26
DAYS WORKED PER ANNUM	OWNER DRIVER	278	268	273	284
	OTHER OWNERS	277	270	295	266
	ALL OWNERS	278	269	277	275
AVERAGE PASSENGER TRIP LENGTH (KMS)	OWNER DRIVER	5.03	4.09	4.03	2.77
	OTHER OWNERS	4.62	4.22	6.47	2.8
	ALL OWNERS	4.79	4.14	5.09	2.79
AVERAGE DISTANCE EMPTY PER TRIP (KMS)	OWNER DRIVER	2.92	2.37	3.47	1.75
	OTHER OWNERS	2.33	2.40	2.47	1.25
	ALL OWNERS	2.67	2.39	2.97	1.5
AVERAGE DISTANCE COVERED PER TRIP (KMS)	OWNER DRIVER	7.95	6.46	7.5	4.52
	OTHER OWNERS	6.95	6.62	8.94	4.05
	ALL OWNERS	7.46	6.53	8.06	4.29
AVERAGE* JOURNEY TIME (MINS)	OWNER DRIVER	15.9	12.92	15.0	13.56
	OTHER OWNERS	13.9	13.24	17.88	12.15
	ALL OWNERS	14.92	13.06	16.12	12.87
TRIP CYCLE TIME (MINS)	OWNER DRIVER	58.2	46.88	44.66	28.07
	OTHER OWNERS	56.2	47.2	47.54	26.65
	ALL OWNERS	57.15	47.02	45.78	27.37

* ASSUMED AVERAGE SPEED 30 KMS/HOUR FOR TAXI CABS AND 20 KMS/HOUR RICKSHAWS.

Table 9.23 b

DERIVATION OF ANNUAL FUEL COSTS

		DATSUN	MORRIS	SUZUKI	RICKSHAW
DAILY HOURS WORKED PER DRIVER	OWNER DRIVER	10.59	10.58	8.66	11.19
	OTHER OWNERS	11.56	10.98	11.5	10.41
	ALL OWNERS	10.89	10.78	11.36	10.8
DAILY NO. OF TRIPS PER VEHICLE	OWNER DRIVER	10.92	13.54	11.63	23.93
	OTHER OWNERS	12.34	13.96	14.51	23.43
	ALL OWNERS	11.43	13.76	14.89	23.68
DAILY KMS TRAVELLED PER VEHICLE (KMS)	OWNER DRIVER	86.8	87.5	87.2	108.2
	OTHER OWNERS	35.8	92.4	129.6	94.9
	ALL OWNERS	85.3	89.8	120.0	101.6
DAILY REVENUE KMS PER VEHICLES (KMS)	OWNER DRIVER	54.9	55.4	46.9	66.3
	OTHER OWNERS	57.0	58.9	93.9	85.6
	ALL OWNERS	56.0	57.0	75.8	66.1
ANNUAL REVENUE KMS PER VEHICLE (KMS)	OWNER DRIVER	15262.2	14,347.28	12,803.7	18,029.2
	OTHER OWNERS	15789	15903	27700.5	17,450.74
	ALL OWNERS	15206.6	15333	20996.6	18,177.5
TOTAL ANNUAL KMS PER VEHICLE	OWNER DRIVER	24130.4	23450	23805.6	30,728.8
	OTHER OWNERS	23766.6	24946	38232	25,243.4
	ALL OWNERS	23713.4	24156.2	33240	27,940
ANNUAL FUEL CONSUMPTION PER VEHICLE (LITRES)	OWNER DRIVER	2207.7	2521.5	1912.1	2,154.9
	OTHER OWNERS	2174.4	2682.6	3,070.8	1,770.2
	ALL OWNERS	2159.6	2597.4	2,669.9	1,959.3

ANNUAL FUEL COST PER VEHICLE (RUPEES)	OWNER DRIVER	15,785	18,029	13,672	15408
	OTHER OWNERS	15,547	19,676	21,956	12657
	ALL OWNERS	15,513	18,566	19,090.22	14,007.80

the next. By calculating the average distance travelled empty, and the average hired trip distance we found the average trip cycle time (the time elapsed between the start of one journey and the start of the subsequent journey). Having asked the number of hours worked per day, this enable us to calculate the average number of journies per day.

We need to emphasise the rather precarious basis on which these estimates have been derived i.e. on estimates of fuel consumption provided by the drivers and owners. Individual estimates vary widely even for the same type of vehicle, and the overall average figure used in our calculations should be considered as a guide only. This is particularly unfortunate since fuel costs obviously form a considerable proportion of the total operating cost. Deviations from the average fuel consumption for individual vehicles could result in costs as much as plus or minus 30% of the figures quoted here.

As indicated earlier some of this variation can legitimately be accounted for by different operating regimes in different parts of the city, by differences in mechanical efficiency and maintenance standards and by different driving styles.

9.4.4 Discussion of some of the pertinent factors in variable costs.

When it comes to repairs and replacement of spare parts there is a powerful ethos of 'make do and new'. There is a flourishing industry in reconditioning worn out parts, batteries and tyres. Prices for individual items can vary tremendously depending on the origin and the quality. It is also reported that there is a flourishing contraban trade in imported auto parts, made possible by the high levels of import duty levied on imported parts.

Tyre wear can vary greatly from summer to winter, and replacement practice also varies. Some practice of using recent second hand tyres, - which are cheap but neither economic nor particularly safe. The prices of spare parts and tyres can also vary during

the year, the prices of tyres go up in the summer when demand is greatest, and the prices of batteries increase in the winter months; with upto 30% difference between winter and summer prices. Appendix 9.1 which contains the results of a market survey of auto part prices also shows the great disparity in prices between imported and locally manufactured parts. One particular problem facing the unwary purchaser is the extensive counterfeiting of auto parts which ouurs, with locally manufactured items packaged so as to give the appearance of imported products.

There is a great deal of ingenuity exercised in keeping the Morris Minors on the road. Since factory produced parts are no longer available, engines are replaced by imported Marine engines, generators and other elctrical parts are adapted from Suzuki parts, and gear boxes are always rebuilt locally.

The average annual variable costs are given in Table 9.24 where it can be seen that apart from the Suzuki there is little difference between owner drivers and other owners. The rather high variable cost for other owner Suzukis may not be representative due to the small size of the sample involved. The variable costs of the rickshaw are only marginally below then of the Suzuki.

The total annual operating costs obtained by surving all the fixed, semi-fixed and variable costs are given in Table 9.25. They will be discussed in the following Chapter.

Table 9.24

ANNUAL VARIABLE COSTS PER VEHICLE

a) OWNER DRIVERS

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
MAINTENANCE AND REPAIRS	5022	5016	3149*	2561
LUBRICATION AND SERVICING	1846	1720	2497	1030
FUEL	15785	18029	13627	15408
TOTAL	22653	24765	19273	19057

* Average all owners

b) OTHER OWNERS

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
MAINTENANCE AND REPAIRS	5424	4699	3149*	2558
LUBRICATION AND SERVICING	1932	1724	2000	887
FUEL	15547	19176	21956	12657
TOTAL	22903	25599	27105	16102

* Average all owners

Table 9.25

TOTAL ANNUAL OPERATING COSTS.

a. OWNER DRIVERS.

(Rupees)

		DATSUN	MORRIS	SUZUKI *	RICKSHAW
FIXED COSTS	a) OUTRIGHT PURCHASE	9063	5420	- 1774	4775
	b) INSTALLMENTS	17505	8476	7147	9453
SEMI FIXED		4656	5729	2903	2476
VARIABLE COSTS		22653	24765	19273	19057
TOTAL	a) OUTRIGHT PURCHASE	36317	35914	20409	28988
	b) INSTALLMENTS	44814	38970	29410	38986

b. OTHER OWNERS.

(Rupees)

		DATSUN	MORRIS	SUZUKI *	RICKSHAW
FIXED COSTS	a) OUTRIGHT PURCHASE	7875	5042	- 1774	7107
	b) INSTALLMENTS	9344	8950	-	9380
SEMI FIXED		15227	15014	** 15227	13939
VARIABLE COSTS		22903	25599	27105	16102
TOTAL	a) OUTTIGHT PURCHASE	46005	45655	40558	37148
	b) INSTALLMENTS	47474	49563	-	39429

* Average value both owner groups.

** In the absence of data on labour costs specific to the Suzuki, values for Datsun have been used.

Appendix 9.1

PRICES FOR AUTO PARTS FROM DEALERS IN RAWALPINDI

a) RICKSHAW

S.No	I T E M	R A T E	ORIGIN	REMARKS
1.	Alternator/Coil	Rs. 25/- 1	Pak.	1 used
2.	Head Light	Rs. 158/- 1	Foreign	1 used
3.	Comb bush/ Distributor	Rs. 15/- 1	Foreign	1 used
4.	Battery			No need for light for horn 2nd hand used.
5.	Direction Indicators	Rs. 35/- 1 (front) Rs. 60/- 1 (back)	Pak.	
6.	Electrical wire set	Rs. 70/-	Foreign	Complete set.
7.	Tyres with Tubes	Rs. 380/- 1 Rs. 200/- 1	China Pak.	3 used and runs for 8 to 10 months.
8.	Steering Rod used	Rs. 800/-	Foreign	1 Rod used.
9.	Brakes	Rs. 1500/-	Foreign	For all pieces
10.	Clutch Assembly	Rs. 900/-	Foreign	Usually clutch Plate used Rs.40/-
11.	Gear Box	Rs. 1350/-	Foreign	For all pieces
12.	Differential	Rs. 550/- Rs. 200/- Rs. 60/-	Italy Italy Pak.	Usually Rs.200/- or Rs.60/-used.
13.a)	Bearings (Wheel)	Rs.60+20=80/- with cone	Japan	Two Bearings used in one wheel 6 used for the three wheels.
13.b)	Bearings (Engine)	Rs. 100/- Rs. 205/-	Japan Japan	6 Bearings used in engine.

a) RICKSHAW

S.No	I T E M	R A T E	O R I G I N
14.	Shock Absorbers	Rs. 300/-	Foreign One used.
15.	Carburettor	Rs. 650/-	Foreign One used.
16.	Silencer	Rs.60/- Rs.100/-	Pak. One used usually welding repairs.
17.	Hoses	Rs. 10/-	Pak.
18.	Complete Engine overhauling	Rs. 1500/-	including labour charges Rs.85/-
	Half overhauling	Rs. 800/-	including labour charges Rs.30/-
19.	Painting (Complete respray auter with (inside and out) bodies repairs (denting)paintings	Rs. 2200/-	
	Outer Respray with denting	Rs. 1300/-	

PRICES FOR AUTO PARTS FROM DEALERS IN RAWALPINDI

b) TAXI CABS

S.No.	I T E M	R A T E	ORIGIN	REMARKS
1.	Alternator (Coil)	Rs. 85/-	Hitachi (Japan)	Last Year variation in price (Rs.60/-Rs.100/-)
		Rs. 85/-	Hanshion (Japan)	(summer - winter variation)
		Rs. 60/-	China	
2.	Generator	Rs. 150/-	Pak.	Recondition in Pakistan.
3.	Direction indicator	Rs. 70/- 4 pieces Rs. 15/-1	Pak.	Complete set.
4.	Head Light	Rs. 75/-	Japan	
5.	Spark Plugs	Rs. 17/-each	Japan	
6.	Battery	Rs. 430/-		In winter the price increase upto Rs 430/- In summer Rs. 330/-
		Rs. 330/-		
7.	Brake shoe	Rs. 220/-each	Japan	Datsun
		Rs. 350/-	Japan	Suzuki
		Rs. 50/-	Pak.	Morris
8.	Clutch plate	Rs. 225/-	Japan	Datsun
		Rs. 50/-	Pak.	Morris
9.	Bearings	Rs.18-40/-	France Japan Germany	Rs.25/- Bearings Japanies in common use.
10.	Shock Absorbers	Rs. 380/- (shock) each	Japan	For all vehicles the rate is the same
11.	Carburettor	Rs. 700/-	Japan	Suzuki
		Rs.200-300/-	2nd hand	Morris, Datsun
12.	Gears	Rs. 600/-	2nd hand	New set never used.
13.	Fuel pump (Filter)	Rs. 30/-	Japan	Suzuki (complete set not used).
		Rs. 15/-	Japan	Datsun (complete set not used).

b) TAXI CABS

S.No.	I T E M	R A T E	ORIGIN	REMARKS
14.	Silencer	Rs. 300/-	Pak.	New one is usually use. Driver repairs the 2nd hand.
15.	Radiator (Jally) Front grille.	Rs. 300/-	Japan	Usually complete set is not used.
	Complete Radiator set	Rs. 1450/-	Japan	
16.	Hoses	Rs.5-8/- Rs.10-12/- Rs.10/-	Pak. Pak. Pak.	For Morris For Datsun For Suzuki
17.	Fan Belt	Rs.10-12/- Rs.12/- Rs.18/- Rs.10-12/-	Pak. Pak. Japan Pak.	Morris Suzuki Datsun
18.	Mechanical overhaul	Rs.4500/- Rs.4800/- Rs.3000/- Rs.3500/-		A-1 overhaul B-Class overhaul (labour costs 600-700/-)
19.	Respray	Rs.3000/- Rs.2000/-		A-1 Paint (Datsun) A-1 Paint (Morris)
20.	Reconditioned Engine	Rs.3000/- Rs.4000/-		Datsun
21.	Tyres	Rs. 600/- Rs. 650/- Rs. 450/- Rs. 300/-	General Tyre General 2nd hand	Datsun new innertubes @ 100/- included Depends upon condition of tyre. Summer prices for tyres higher by about 50/-

10 ECONOMIC PERFORMANCE

10.1 Introduction

In the preceding chapter we have focused largely on presenting a quantitative description of the taxi industry as revealed through the findings of the two surveys. In this chapter our purpose is to consolidated those findings and present an interpretation of the economic performance of the industry as set out in the third set of objectives for the study. In order to facilitate the interpretation of the cost data we show their percentage compositions in terms of the fixed, semi-fixed and variable costs, and convert them into unit costs; cost per total vehicle kilometre and cost per revenue kilometre performed. Subsequently we compare costs with estimated revenues and show the consequences in terms of net earnings for owner drivers and other owners.

10.2 Percentage composition of costs

The starting point for this analysis will be to take the profile of operating costs presented at the end of the preceding chapter and examine its structure in a little more detail. In Table 10.1 we present, for each ownership category and vehicle type, a percentage breakdown of the annual fixed, semi-fixed and variable costs.

In interpreting the data in Table 10.1 it should be remembered that many taxis, particularly those belonging to owners who contract out their vehicles, are also used for private purposes. It has not been possible to estimate the extent of this practice and hence the estimate of annual vehicle kilometres does not include any provision for this element. Therefore the cost per km is likely to be overstated to some unknown degree.

The salient feature of the figures in Table 10.1 is the relatively high percentages shown for capital costs (except in the case pf the Suzuki). We have seen that tin Rio de Janeiro for example[1] capital costs account for just 10% of total operating costs, and

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(1) Briggs D.A. (1986) Table 4.11

Table 10.1

PERCENTAGE BREAKDOWN OF ANNUAL OPERATING COSTS

a) OWNER DRIVER - OUTRIGHT PURCHASE

(Column percentage)

	DATSUN		MORRIS		SUZUKI		RICKSHAW	
FIXED	24.8		15.09		0		25.72	
SEMI FIXED	12.82		15.95		13.43		8.54	
VARIABLE FUEL	43.47	62.38	50.20	68.96	61.21	86.57	53.15	65.74
VARIABLE OTHERS	18.91		18.76		25.36		12.59	

b) OWNER DRIVER - INSTALMENTS

(Column percentage)

	DATSUN		MORRIS		SUZUKI		RICKSHAW	
FIXED	36.06		21.75		24.30		30.51	
SEMI FIXED	10.39		14.70		10.17		7.99	
VARIABLE FUEL	35.22	50.54	46.26	63.55	46.33	65.53	49.72	61.50
VARIABLE OTHERS	15.32		17.79		19.20		11.78	

c) OTHER OWNERS - OUTRIGHT PURCHASE

(Column percentage)

	DATSUN		MORRIS		SUZUKI		RICKSHAW	
FIXED	17.11		11.04		-		19.13	
SEMI FIXED	33.09		32.39		-		37.52	
VARIABLE FUEL	33.79	49.78	42.0	56.07	-		34.07	43.35
VARIABLE OTHERS	15.98		14.07				9.28	

d) OTHER OWNERS - INSTALMENTS

(Column percentage)

	DATSUN		MORRIS		SUZUKI		RICKSHAW	
FIXED	19.68		18.06		-		23.81	
SEMI FIXED	32.07		30.29		-		35.35	
VARIABLE FUEL	32.75	48.24	38.69	51.65	-		32.1	40.84
VARIABLE OTHERS	15.49		12.96				8.74	

Table 10.2

VEHICLE OPERATING COST PER KM

a) OWNER DRIVERS

(Rupees per km)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OUTRIGHT PURCHASE	1.5	1.53	0.86	0.94
INSTALLMENTS	1.86	2.11	1.24	1.01

b) OTHER OWNERS

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OUTRIGHT PURCHASE	1.94	1.33	-	1.47
INSTALLMENTS	2.00	1.99	-	1.56

Table 10.3

VEHICLE OPERATING COST PER REVENUE KM

a) OWNER DRIVERS

(Rupees per km)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OUTRIGHT PURCHASE	2.38	2.42	1.60	1.54
INSTALLMENTS	2.94	2.02	2.30	1.65

b) OTHER OWNERS

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OUTRIGHT PURCHASE	2.91	2.07	-	2.13
INSTALLMENTS	3.01	3.12	-	2.26

undoubtedly the high proportion shown here is accounted for by the comparatively low revenue kms output by the vehicles. On the other hand the ratio of fuel to other variable costs for taxi-cabs at a little Over 2 to 1 is in accordance with the Brazilian data. The rickshaw's capital costs are consistently higher as a percentage of total costs than all other vehicles due, as we have seen, to the high capital cost of the vehicle. Likewise the rickshaw has the lowest proportion of maintenance and part replacement costs.

10.3 Unit costs

A useful insight in interpreting the operating cost data can be obtained from unit costs; in this case we have calculated the average operating cost per km covered in the year (Table 10.2) and also operating cost per revenue km (Table 10.3).

Whilst direct comparability between figures for owner drivers and other owners is complicated by the non-inclusion of wage costs for the former category, here we can clearly see some of the variations which occur across the industry with for example, the Suzuki owner driver's costs per revenue km at almost half of those incurred by a Morris owner buying on hire purchase and contracting out his vehicle.

More significant perhaps is the contrast within the same ownership group between the Suzuki and the other makes of taxi cab. The Suzuki, though perhaps not the ideal type of vehicle to operate as a taxi due to its small size, would appear to have a lower operating cost per total km covered than the rickshaw, though it falls a little behind in terms of costs per revenue km since the rickshaw operators manage to achieve a higher output. However, it is certainly a far more comfortable vehicle for the passenger than the rickshaw.

We can also observe the effect of the high finance costs noted earlier. The operating costs of those taxi cabs being bought on hire purchase are as mush as 43.8% higher than those bought

outright for Suzukis, 20% higher for Datsun and 8.3% for Morris.

One important conclusion to be drawn from Table 10.3 is that the cost per revenue km at the time of the survey was already far in excess of the official fare rate in force at that time (Rs.2.00 per km. for taxi cabs and Rs.1.75 per km. for rickshaw).

For the other owner category buying on hire purchase, even the new fare level (Rs.3.00 per km. for taxi cabs) is lower than their operating costs per revenue km. In fact it is interesting to note that the 'de facto' average fare set by the industry itself (Rs.3.09 per km. for taxi cabs) approximates quite closely to the actual average costs. As will be seen more clearly below, the rickshaws, with actual average fares at Rs.2.89 per km, have operating costs which are below this actual rate, and for the owner operator without finance charges to bear, costs per revenue km (without wages) are approximately one half of the actual fare rate.

10.4 Estimated annual average revenues

We now extend our analysis to ecompass a comparison of costs with revenues. The revenues for the different segments of the industry have been compiled from data on passenger journey lengths, fares paid, number of trips made daily and the number of days worked annually. It should be noted that the average annual revenue for Suzuki other owners given in Table 10.4 appears extremely high in relation to other categories. This is probably in large measure due to the very small sample on which these data are based (2 vehicles) and as in the case of the cost data we shall henceforth ignore this group infurther analysis.

Revenues for the Suzuki taxicabs are lower than for other types of taxi cab. One explanation offered for this phenomenon is that since their costs are lower they do not have to work so long in order to earn an acceptable income. We would also add that the

revenue earning capcity of the Suzuki in Table 10.4 perhaps understated since we know that at least one Suzuki owner driver also employees an additional driver, so that the vehicle is operated on a double shift basis. Table 10.4 also shows that the annual average revenue obtained by rickshaw operaters is higher than that for taxi cabs; this despite the marginally lower fare rate changed by the rickshaw.

Table 10.4

ESTIMATED AVERAGE ANNUAL REVENUE PER VEHICLE

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVERS	47,160	45,877	39,563	54,605
OTHER OWNERS	48,788	49,140	85,594	50,605

Average fares. a) Taxi cabs. Rs.3.09 per km.
b) Ricksaws. Rs.2.89 per km.

Table 10.5

ANNUAL VEHICLE REVENUE MINUS VEHICLE COSTS

(Rupees)

		DATSUN	MORRIS	SUZUKI	RICKSHAW
OWNER DRIVER	OUTRIGHT PURCHASE	10,843	9,963	19,074	25,617
	INSTALLMENTS	2,346	6,907	10,153	23,619
OTHER OWNERS	OUTRIGHT PURCHASE	2,783	3,485	-	13,457
	INSTALLMENTS	1,314	423	-	11,176

10.5 A comparison of cost with revenues: net earnings

Subtracting revenues from the costs provides an estimate of the industry earnings (Table 10.5). Again we see the effect of the finance charges on hire purchase seriously eroding the earnings of all but rickshaw owners; the most profitable type of vehicle to operate being the rickshaw, and the poor financial performance of the other owners in the taxi cab sector. We can observe at this stage that the lower finance charges for rickshaw purchase (about half of those for taxi cab purchase) means that the rickshaw

is an inherently more profitable operation and hence less of a risk to the vehicle vendor and therefore, as a low risk, a lower interest charge is warranted. Again the market seems quite finally attuned to the realities of the situation.

10.5.1 Net earnings of owner-drivers. As has already been observed the net revenue figures for the category of owner driver have not as yet included any item to cover the wages of the owner driver himself, so the net revenue shown in Table 10.5 can be thought of as the driver's wage or income. To put this into a better perspective, the annual net revenues of Table 10.5 can be converted to give an equivalent monthly sum, which in effect is the driver's monthly wage (Table 10.6).

Table 10.6

MONTHLY EARNINGS - OWNER DRIVERS

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OUTRIGHT PURCHASE	904	830	1,590	2,135
INSTALLMENTS	196	576	846	1,968

Alternatively, bearing in mind that contract drivers receive a basic wage of about Rs.800 per month, we can deduct an equivalent sum from the figures in Table 10.5 to represent an annual wage cost for the owner driver (Rs.9,600 per annum). This done, a somewhat different picture of net profit for the owner driver emerges (Table 10.7).

Table 10.7

OWNER DRIVERS - ANNUAL NET SURPLUS AFTER DEDUCTION OF ELEMENT FOR DRIVERS WAGE

(Rupees)

	DATSUN	MORRIS	SUZUKI	RICKSHAW
OUTRIGHT PURCHASE	1,243	363	9,474	16,017
INSTALLMENTS	-7,254	-2,693	553	14,019

It is evident from Tables 10.6 and 10.7 that only the Suzuki owner drivers who have no finance charges to bear and the rickshaw owner drivers are financially viable. In interpreting the very small surpluses made by Datsun and Morris owner drivers who have bought outright it must be observed that these data have throughout been compiled from average figures, and since the data for which these averages are taken are more or less normally distributed, roughly 50% of the members of each category would be financially worse off than the average shown!

These findings go a large way to explain the very high turnover rates of entrants into the business commented upon earlier. Also, the fact that the earning potential of the rickshaw appear to be double that of the taxi cab, perhaps helps to explain the high capital value which these vehicles have acquired.

10.5.2 Net earnings of other owners. Having examined the fortunes of the owner driver we should now work out what the net revenue figures mean for the Other owners and their drivers; a procedure which is a little more involved. As the owner who contracts out his vehicle receives a fixed (daily) contract fee, he is not particularly interested in the productivity or output of the vehicle. On the contrary the less mileage the vehicle does the less he will have to spend on maintenance and repairs. In the typical contracting arrangement for taxi cabs the owners pays all expenses except for fuel and police gratification, whilst the contractor having paid these two items and the contract fee can keep any remaining fare revenue. A breakdown of the costs is given in Table 10.9; with the results in Table 10.10.

Table 10.8

ANNUAL NET CONTRACT PRICES (CONTRACT FEE LESS WAGES PAID)

(Rupees)

	DATSUN	MORRIS
Based on 12 monthly payments.	24,636	15,564
Based on 267 (Datsun) and 270 (Morris) working days p.a.	17,984	11,517

Table 10.9

ANNUAL COST ACCRUEING TO THE CONTRACTING OWNER

(Rupees)

		DATSUN	MORRIS
FIXED COSTS	PURCHASE OUTRIGHT	7,565	4,649
	INSTALLMENTS	9,034	8,557
SEMI-FIXED COSTS		15,227	15,014
VARIABLE COSTS		7,356	6,423
TOTAL	PURCHASE OUTRIGHT	30,148	26,086
	INSTALLMENTS	31,617	29,994

Table 10.10

OTHER OWNERS ANNUAL REVENUE (CALCULATED ON BASIS OF 12 MONTHLY CONTRACTS)

(Rupees)

	DATSUN	MORRIS
PURCHASE OUTRIGHT	- 5,512	- 10,522
INSTALLMENTS	- 6,918	- 14,430

The losses shows in Table 10.10 are quite substantial; in the case of the Morris Minors they are equal to 50% or more of the capital value of the vehicle.

The net revenue earned by the contract driver is made up from the whole of the fare revenue earned plus the monthly wage minus the contract price, fuel payments and in some cases, police gratifications.

Table 10.11

CONTRACT DRIVERS - DERIVATION OF NET ANNUAL INCOME

(Rupees)

	DATSUN	MORRIS	RICKSHAW
PAYMENTS			
a) FUEL	15,547	19,178	12,657
b) NET CONTRACT	24,636	15,564	11,400
c) POLICE	310	393	280
FARE REVENUE	48,788	49,140	50,605
ANNUAL EARNINGS	8,295	14,007	26,268
MONTHLY EARNINGS	691	1,167	2,189

Table 10.11 shows that the contractor driver is only a little better off than the owner driver in terms of net earnings, but the fact that a monthly wage is received must make their condition much more attractive than that of the owner driver; a conclusion which is substantiated by the data on length of employment.

The situation for Rickshaw contractors on the other hand is appreciably more promising with monthly earnings at least double those in the taxicab sector.

The clearest result of the foregoing analysis is that the taxi cab sector is unnecessarily financially burdened because of its extremely low output (annual revenue kms). This means that the fixed costs assume a large proportion of the total operating costs - nearly 40% for Datsuns.

11 POLICY IMPLICATIONS

11.1 Introduction

Apart from general legislation covering the construction and use of motor vehicles on public highways, there are four fundamental ways in which Government can chose to regulate public transport operations in the interests of public safety and economic welfare.

- It can grant a monopoly to an operator or group of operators (oligopoly) to provide services covering specified geographical areas or routes.
- It can regulate the number of vehicles which will be allowed to operate (both minimum and maximum); termed as quantity control.
- It can impose conditions as to the type of vehicle that will be allowed to operate and define standards for both vehicles and operating staff; termed as quality control.
- It can determine how fares should be structured and impose maximum fare levels to be charged. This is termed as price control.

Government also of course levy taxes, both directly and indirectly and whilst public transport is an essential public service which economists would argue should not be subject to taxation, in practice many governments do levy taxes; to varying degrees and of different types.

The extent to which any or all of these regulatory powers are used is a matter for government policy, but it should be observed that ultimately it is market forces, operating within the above constraints, which determine industry output and earnings and the degree of public satisfaction with the service.

In this chapter we examine the problems of the taxi industry in Islamabad and Rawalpindi, the effects of government regulation on it, and offer a number of recommendations which we judge to be in the interests of promoting public welfare and economic efficiency.

11.2 The nature of the problem

The evidence marshalled in the preceding chapters shows that there is a high level-of-service offered to the taxi user in terms of physical access and availability of vehicles, and there is a reasonable level of satisfaction with regard to the level of fares. However, over the industry as a whole, output is low, wages are low and profits are very moderate, and entry costs are low we are forced to conclude that the industry is in a far from healthy condition, and that the basic cause is quite simply that there are too many vehicles in competition with each other in relation to the size of the market.

In such circumstances there are two options avaiable in order to improve profitability. The first is to increase revenue, the second to reduce costs. The evidence has shown that fixed costs account for a higher than average proportion in the total cost composition, indicating that it is probably to this area that we must look for cost cutting opportunities. However, it is unlikely that there is much scope for any significant reduction in costs, hence we must look largely to the revenue side of the equation in order to promote a healthier economic operating regime.

Here there aretwo options - increase fares, on the assumption that market is price inelastic over the shorter journies, or increase revenue by increaseing the engaged output of the vehicles. Since there is no logical case to me made for making the public pay more to perpetuate the ineffeciency of the industry, we need to look to the second course of action; ways and means of improving productivity.

For example, taking the owner driver operated Datsun, if remunerated output could be be increased by a modest 50%, raising the number of engaged kms from 55 to 82 per day, variable costs would increase pro-rata, adding Rs.11,300 to total annual operating costs, but unit costs would decrease (as shown in Table 11.1) from Rs. 2.94 per km to Rs.2.45 per km. This would result in a six-fold increase in annual net earnings and provide the operator with a

reasonable monthly wage. Likewise a 100% increase in output to 110 kms of engaged kms a day, equivalent to a daily distance covered of 160-180 kms (which would in reality amount to some six hours of actual driving time per day), would further reduce costs per km so that additional operating revenue generated could begin to be ploughed back into improving the standard of the vehicle being operated.

Whilst the above example goes some way to illustrate the nature of the problem diagonosed there is no single simple remedy that can be prescribed. Productivity cannot be improved simply by resorting to the expedient of issuing a government edict to the effect. As we have described in the earlier working paper, there are many inter-related factors involved. Any treatment proposed should be of a systematic nature and in order to be successful would need to be applied in small does over a relatively long period of time.

In the remaining sections of this chapter we examine some of the possible prescriptions.

Table 11.1

OPERATING COST PROFILE FOR AN INCREASE OF 50% AND 100% IN ANNUAL OUTPUT - DATSUN OWNER DRIVER - PURCHASED ON INSTALLMENTS

	REVENUE KMS PER DAY					
	55 kms		82.5 kms		110 kms	
	Rs	%	Rs	%	Rs	%
FIXED COSTS	17,505	39.06	17,505	31.18	17,505	25.95
SEMI-VARIABLE COSTS	4,656	10.39	4,656	8.29	4,656	6.9
VARIABLE COSTS	22,653	50.55	33,980	60.53	45,306	67.15
TOTAL COSTS	44,814	100.00	56,141	100.00	67,467	100.00
COST PER REVENUE KM.	2.94	-	2.45	-	2.21	-
ANNUAL OPERATING SURPLUS	2,346	-	14,600	-	28,853	-
MONTHLY REMUNERATION	197	-	1,217	-	2,238	-

11.3 Price control

The analyses have shown that during the period covered by the survey, the authorized fare levels were clearly set too low. Even the new fare levels which came into force at the beginning of 1986 were still not sufficient to provide reasonable operating margins and wages for operators and drivers. Fortunately, the effect of this is to a large extent mitigated by the tendency of both operators and passengers alike of regarding authorized fare levels as irrelevant and adopting a market determined pricing policy. Hence the current situation is that fares are virtually unregulated, but due to the large proportion of passengers who are regular taxis users and consequently very familiar with current fares and the widespread opportunities which exist for price bargaining, actual fare rates are on average very close to average operating costs.

One policy option would be for the government to acknowledge the 'status quo' and simply abandon its hitherto ineffectual attempts to impose fare regulations on the taxi industry.

However, a policy of deregulated fares can be prejudicial to the public interest. At times, when taxis are scarce (late at night) or in cases of emergency, or where passengers (such as tourists or visitors) are unfamiliar with prevailing market conditions, abuses will occur. Thus some regulation is deemed advisable, and the most equitable system so far derived is that of the fare being charged pro-rata to the distance travelled, with a taxi meter showing to the passenger the fare that is due to the end of the journey.

For fare regulation to work effectively, the fare levels have to be calculated in a systematic way so that the operator obtains a reasonable income. Moreover, some mechanism needs to be instituted so that any changes in factor prices which materially affect operating costs can be readily identified and fare levels speedily adjusted (upward or downwards) accordingly. In addition, procedures

need to be established so that meters can be adjusted in accordance with any changes in tariffs, and the public should easily be able to identify that the meter is charging at the correct rate.

At present none of these conditions exist. The Provincial Ministry of Transport and Communications whose responsibility it is for determining fare levels has no technical capability for such a task. Industry costs are not evaluated on a regular and systematic basis by any government agency and no objective formula or mechnism exists for carrying out such a task. Whilst the setting of fare levels is, and must remain a matter of policy; the role of the policy makers is to lay down guide lines and criteria which will determine fare policy. The calculation of the fare level necessary to satisfy the policy criteria is a technical matter and is no trivial exercise; requiring consideration of the interactions between industry costs, industry output and passenger level-of-service.

On the question of the taxi meter - the fact that less than 10% of present journies are charged according to the meter speaks for itself. The taxi meter, as a measuring instrument needs to be calibrated and tested on a regular basis and any readjustments necessary should be carried out by a techically qualified government agency. In Brazil for example, adjustment, calibration and sealing of all taxi meters is carried out by the Institute of weights and Measures; and a plastic windscreen sticker shows clearly to the passenger the date on which the meter was last adjusted. The present arrangements whereby responsibility for readjusting the taxi meter lies with the owner with the Motor Vehicle Examiner responsible for verifying its accuracy does not give any safeguard to the public, especially as the Motor Vehicle Examiner's office has no instrumentation or technical support for this purpose.

One way to improve the net earnings in the taxi industry would be to increase remuneration by allowing higher fares to be charged. From an economic point of view such a policy is not justifiable since there would be clear disbenefits to the travelling public, and other means are available for improving remuneration without

incurring such disbenefits. This point will be enlarged upon in the following section.

11.4 Quantity controls

Chapter 6 of the working paper on the Economic of Taxi Operation puts forward a model for determining the optimum number of taxis required as a function of level-of-service, fare-level, the pattern of demand and operators net earnings. Briefly; the argument states that having determined what should be a reasonable net income for the operators (i.e. that which is sufficient to persuade him to stay in business) the number of taxis that should be licensed is the largest number that would, at the prevailing fare level and operating cost structure, earn just sufficient revenue to meet the net income criterion. For example, if fares should be permitted to increase - but all other factors remain the same-the number of taxis should also increase since there would be a larger fund of potential revenue to be divided amongst the operators.

If there are too few taxis, the proportion of unengaged time decreases for the operator and net earnings increase, but passenger waiting time also increases. Likewise if there are too many taxis, a condition which we have described as one of 'over-supply' will pertain, whereby adding an extra vehicle to the fleet will not improve passenger level-of-service although it will result in a further diminution of operator's net earnings. The condition of over-supply is not economically efficient; not only does the passenger not obtain any additional benefit from there being more taxis than necessary to meet the demand at the prescribed level-of-service, but also capital and labour are being used in a very unproductive manner - the excess vehicles depressing the average earnings of all operators in the industry.

The optimum number of taxis for a given market is that where both operator's and passengers interests are balanced - add one vehicle and earnings decrease without any compensatory increase in level-of-service - subtract one vehicle and earnings increase but at the expense of passenger level-of-service.

One policy option open to the licensing authority (RTA) would be to exercise its powers of quantity control and determine the maximum number of taxis to be licensed based on the above criteria.

To show how this could be done we offer the following example. We have shown that the average operating costs for a Datsun owner driver is Rs. 2.94 per revenue km at present output levels of 57 revenue kms per day. Bearing in mind that these costs already include a proper allowance for return on capital invested etc, but do not allow for any wage element; if it were decided that a reasonable wage would be, say Rs.1500 per month, then disallowing any increase in fare levels the operator would have to reduce his costs to Rs. 2.45 per revenue km in order to obtain this level of net income. This could be achived by increasing output to 85 revenue kms per day. In order for him to be able to do this, however, the total fleet size would have to be reduced by the fraction 57/85 (67%).

The licensing agency would then have to determine what effect a reduction of this order would have on level-of-service. Since we know that at times of peak demand, the average passenger waiting time is less than 1 minute and that for empty taxis is 45 minutes, we can argue that the effect of reducing the fleet to two thirds of its present size would be to reduce the average time the taxi spends waiting at the stands by the same proportion, and since the resultant value would still be greater than the average passenger waiting time we can conclude that level-of-service would be unaffected by the reduction in vehicle numbers. Theoretically, the optimum number of taxis for the given set of constraints would be that at which the average passenger waiting time would be equal to the average time spent by taxis waiting at the stands. In practice however, since there is a good deal of random variation in both passenger and taxi arrivals at the stands it would be sensible to keep the balance always slightly infavour of the waiting passenger.

The above model which demonstrates how sensible quantity limits could be determined by the licensing agency is simple in concept and in practice. However, to be successful it would require

periodic systematic monitoring of passenger waiting times, taxi waiting times, operating costs, and fares being charged. This would be important since if the quantity limit falls too low, then licences start to acquire a market value, passenger level-of-service deteriorates and conditions are then ripe for unlicensed or pirate operators to enter the market. If, on the other hand the limits become too high, as at present, all the attendant problems of over-supply become manifest. Periodic monitoring would also be necessary since demand for taxi services will change over time: the urban populations is currently increasing at approximately 6% per annum, the supply of private vehicles is also increasing and the pattern of stage-carriage public transport service changes from time to time.

The model not only provides the licensing authority with the means for determining the maximum number of taxis that should be permitted to operate but can also provide a flexible quantitative tool for the routine evaluation of different policy options. For example, if it were decided to maintain the existing fleet size, and instead increase fares to provide a reasonable rate of return for the operators (a policy which we have a argued against) then it is a matter of simple arithmetic to arrive at the conclusion that the fare would need to be set at Rs. 4.12 per km in the case of the Datsun owner driver. Likewise, if there were to be an increase in fuel prices (unlikely in the present context), the resultant increase in operating costs could be compensated for either by an increase in fare or by a reduction in the number of vehicles operating.

For example:

If fuel prices were to increase by 20% then the figures for the owner-operator Datsun would be;

	Rs.
. existing annual fuel cost	18,912
. additional fuel cost	3,782
. total annual operating cost (without wage element)	48,596
. driver's earnings	18,000

. full annual operating cost 66,596

We should then divide the annual operating cost by the annual revenue kms to obtain the new fare level.

= 66596/15262

= Rs. 4.36 per km.

Hence there would be a requirement to grant a 5.8% increase in fare over and above the fare of Rs.4.12 per km quoted previously to give a reasonable remuneration to the driver.

11.5 Quality control

Quality controls are employed to ensure that certain minimum standards of public safety and comfort are maintained, the extent to which operators conform to these minimum standards depends on the powers given to the licensing agency to enforce compliance with those standards, the efficacy with which it does so, and the penalties or sanctions which can be imposed upon infractors.

The economic effect of the adoption of more stringent quality controls is to increase the operator's costs. Depending on the type of measure they can affect fixed, semi-fixed and variable costs in differing degrees. For example, one type of control frequently employed is that of stipulating a minimum size and maximum age for the vehicle to be employed in taxi operations. This has the immediate effect of increasing the operator's fixed costs by virtue of the larger capital investment required for the vehicle purchse. It may also increase his variable costs in that part replacement and fuel consumption will generally be more expensive than for smaller vehicles. On the other hand newer vehicles may require less expenditure on part replacement. Quality controls can also be exercised on an operator's staff, and will also tend to increase costs.

One well known case of quality control being imposed with respect to drivers is the rigid examination which London's taxi driver's have to pass. The effect of this requirement is that driver's

wages have to refleet the time invested in aquiring theknowledge necessary to pass the examination, and hence semi-fixed costs for the London taxicab operator are higher than they would be otherwise.

Any attempt to raise standards, either by enacting new controls or by more diligently enforcing existing controls, will increase operating costs.

At present the only quality controls stipulated are the requirements that vehicles should pass a fitness test every six months and that drivers should be licensedto drive a taxi, with one of the criteria being their ability to pass a test on the geography of the area in which they intend to operate. These requirements are set by legislation. The interpretation of what standards should be adopted in deciding if vehicles and drivers meet these requirements is left to the agency responsible for applying the tests; the traffic police, It should be a matter of considerable concern that this agency is totally ill-equipped in terms of technical capability, manpower capacity, and integrity of the personnal involved in order to discharge these functions correctly and in the public interest. In the course of our survey we failed to identify a single taxi driver who had been tested by the police on his knowledge of the area. Moreover, the simple analysis of comparing the number of vehicles in the registration district which are required to undertake fitness tests twice a year (including taxis, all public transport vehicles and public carrier goods vehicles) with the number of Motor Vehicle Examiners normally on duty, reveals that it would be physically impossible for each vehicle to receive even a cursory visual inspection. Moreover, the cost data collected from the taxi owners suggest that they are having to pay, on average, four times more than the prescribed fee to obtain the Fitness Certificates from the Motor Vehicle Examiners.

In this respect it should also be mentioned that there is a clear statutory obligation laid on the RTA to licence all PSV drivers and conductors and to issue them with badges and numbers. Again

there is evidence that the RTA does not even attempt to fullfill its obligations in this respect. One further serious breach of statutory requirements is the fact mentioned previously that only a minute percentage of vehicles carry any effective insurance to cover claims for damages from third parties or passengers.

Should the Administration deem it advisable to remedy these defects then, as explained earlier, we should expect costs to rise. Without further research, and perhaps without the benefits of a period in which the effects of stricter enforcement of exisiing quality controls could be monitored, it is difficult to estimate the extent by which costs could rise. However, it is possible to forsee that sticter enforcement of more rigorous fitness standards would result in some of the more dilapidated and unsafe vehicles being removed from circulation. Net earnings would increase as a result of the diminution of fleet size, but at the same time it is almost certain that repair and maintenance costs would rise. If such cost increases were to add to the already very high fixed costs, it would be all the more imperative that productivity be enhanced if costs per revenue km were also not to rise. If fixed costs were to rise by 20% for the Datsun owner driver then, if existing fleet numbers were to be maintained, a fare increase to 4.44 km would be necessary to cover the extra operating costs, or a further reduction of 7% in the fleet size would be necessary if present fare levels were to be maintained (under the assumption that the driver would receive a monthly revenue of Rs. 1500 as in the previous examples).

11.6 Operating regime

In the preceding sections of this chapter we have dealt with a number of important institutional responsibilities which specifically affect the economic performance and operating efficiency of the taxi industry; in this section we touch on a number of issues which could also improve conditions for both the operator and the public.

Firstly we address the problem of taxi stands. We have pointed

out that the great majority of existing stands have no official recognition; only a handful of stands are licenced by the different local government agencies involved. It is in the interest of both public and operators alike to have as many stands evenly distributed throughout the area served as the market will justify. Operating from stands reduces the operating costs thereby helping to keep down fare levels and improves the public's access to taxi services. It also helps to alleviate traffic congestion which can be exacerabated when there is a large number of cruising taxis.

Taxi stands do not need any elaborate infrastructure, but care should be taken in sanctioning their location so that they do not obstruct intersections, interfere with the operation of bus stops or otherwise impede traffic flow or present dangers for pedestrians crossing the highway. It is difficult to see that economic justification can be made for the present practice whereby local authorities charge taxi operators for the use of the official stands. A survey needs to be carried out with a view to officially recognising as many of the existing stands as possible. The area of each stand should be demarcated and signs erected identifying their capacity in terms of the maximum number of vehicles to be permitted to wait at any time, and the head of the rank so that taxis can use each rank on the basis of first in first out.

It has been observed that in other parts of the world, the taxi industry is looking increasingly to the use of despatched operations as a way of increasing productivity. In the present context we have seen that ownership structure of the industry is highly fragmented and there is no specific trade association or union which can represent the industry as a whole in making representations or negotiating with the Administration. In the short term then, partly for the above reason and partly in view of the special difficulties involved in fitting civilian vehicles with two-way radios we do not see much possibility of improving effeciency and output by looking to some system of despatched operations is Rawalpindi/Islamabad. However, consideration could be given to equipping some of the busier stands with a public telephone

(designed so that it would receive incoming calls only) so that the public could use the telephone number to call a cab. This facility would benefit users particularly at night when the number of cabs operating is naturally low, and in those cases where a taxi is required in emergencies or by the physically handicapped. The cost involved could be recovered by a small levy charged on the industry as whole, perhaps being collected at the time that the route permit is renewed.

There is proof from other countries that there are some economies of scale to be obtained from operating larger taxi fleets: discounts on the purchase of vehicles, better credit terms, common servicing and garaging facilities, better accounting and managment of costs are some of the benefits to be looked for. However in the present context we see little prospect of larger scale operators coming into the industry since returns on investment are so low.

The burden of high fixed costs imposed on most operators by lack of access to institutionalized credit, by police corruption and other official malpractices could certainly be reduced to some extent in the short term given the Administration's determination to tackle the problems at their root cause, but it will need some more radical approach on the part of the government and the operators alike to effect any marked improvement in the economic performance of the industry over the long term.

Serious consideration should be given to reviewing the administrative infrastructure and responsibility for policy making and regulation of the industry. Existing arrangements simply do not work. They merely add to the operator's costs with scant attention being paid to considerations of economic efficiency, public welfare or safety. The existing legislation provides sufficient powers and imposes adequate duties on the administration; what needs to be done is to bring the disparate responsibilities and functions together and place them within the ambit of a single agency with responsibilities for determining which standards should prevail and

equipped with sufficient technical capability for equitably and honestly ensuring that those standards are adhered to.

How this agency should best be constituted would ideally be a matter for further study. There are several ways in which it could be done; for example, the 'Taxi Office' (as we shall term it) could be set up as a separate Department of the Provincial Transport Authority. What is more important than the name are the powers and responsibilities is should exercise, and as we see it, these should include:

- Testing and licensing of taxi drivers
- Licensing of taxi vehicles
- Definition of the number of taxis to be licensed each year
- Definition of fares
- Definition of quality criteria
- Inspection of vehicles to ensure that they meet the quality criteria
- Calibration and inspection of taxi meters
- Definition of taxi stands and the number of vehicles to operate at each
- Setting up an office to receive complaints from the public, to investigate those complaints, and to deal with general inquiries, lost property etc.
- Compile and publish annual statistics on the operation of the taxi system within the area under its jurisdiction
- Collect data on accidents, injuries, and infractions committed by drivers and operators
- Monitor the level-of-service and operating costs on a regular basis so that policies with regards to fare levels, vehicle numbers etc., may be reviewed on a regular and systematic basis
- Provide information and guidance for owners on matters such as insurance, vehicle standards etc. and to promote better working conditions and operating practices within the industry through publicity, training courses, seminars etc.
- Liaise with other agencies with responsibilities for stage-carriage services, traffic engineering and other areas which affect the provision and level-of-service of taxi services

Even in the short term there areother measures which could be explored and in the next section we show by of a case study, one manner in which some small scale improvements could be obtained.

11.7 Taxi operations at the International Airport: a case study

11.7.1 Introduction. Since the President's directive specifically mentioned an inquiry into the feasibility of some kind of cooperative system for taxi operation, and in the knowledge that such types of operation are to be found in a number of countries around the world, we have examined the implication of setting up a similar scheme in Islamabad/Rawalpindi.

The first question to be asked is what objective is to be achieved from such a modification in the operating regime of the indsutry and indeed one must address the question of whether the cooperative would be in addition to or instead of existing operations.

There are two areas where benefits can be looked for in operation of a cooperative; one stems from the economies Of scale possible from such an enterprise, the other lies in the area of social welfare and labour policy in that the higher financial rewards arising from improved economic efficiency are distributed amongst the workers who generate them.

However, if by introducing a cooperative we were simply to increase the number of vehicles operating, this would mean a further dilution of the already meagre operating margins. At the same time it is hard to see what additional benefits could be gained for either the operator or the passenger from an attempt to organise the existing 3000 or so individual taxi owners into some form of cooperative structure.

If the benefits outlined above are to be secured, the organization must in some way be given some type of competitive edge or advantage. One way in which this couldbbe done is to grant it monopoly rights (a reserved market) for some particular type of operation

or over some specific geographical area.

Although we have no information about the nature of the taxi cooperatives mentioned in the Presidential Directive, we can cite one example from previous personal knowledge; the case of the taxi cooperatives serving the International and Domestic airports of Rio de Janeiro, Brazil. In this case two cooperatives have been given as exclusive franchies for picking up passengers at the airports. They may also return with passengers to be set down at the airport, but may not ply for hire in the normal way. They operate 1600cc cars of identical make, colour and equipment, and all vehicles charge standard fares (varying according to the district of the destination) with thepassengers buying a ticket before entering the vehicle. The vehicles are relatively new, air conditioned and equipped with 2-way radio.

It seem that an international airport is in some measure an ideal place to introduce a modification to the operating regime of the taxi system. Vehicle entry to and from the airport premises are fairly easily controlled, the taxi operation is very visible, and from the passenger's point of view (many of whom are foreigners) an efficient and comfortable taxi service can contribute to a favourable first impression of the country. In addition, the scheme could be mounted on a sufficiently modest scale so that its effects can easily be monitored. The near anarchic conditions of existing taxi operations at the Islamabad/ Rawalpindi airport observed at the time of our survey, would be another cogent reason for such a choice.

Since this study has provided us with the requisite data with which to evaluate such a proposal, a scheme for operating airport taxi services on a special basis has been prepared and its performance evaluated. The details of this case study are presented below. The results suggest that such a scheme could be feasible provided that the right stimulus and formula could be found for its creation, and a technically competent agency of proven integrity could be found to prepare and monitor the scheme.

11.7.2 Basic data. On the day of the survey at the airport, between 08:00 hours and 22:00 hours, 120 drivers and passengers were interviewed, with a total of 222 taxis observed leaving the airport with passengers.

We would assume a total of 300 taxi journies over a period of 24 hours, with an observed peak hour demand of 26 journies hour.

More than 50% of the vehicles had been waiting for more than one hour before picking up their passengers. The actual distribution of vehicle waiting times is given in Table 11.2.

Table 11.2

DISTRIBUTION OF TAXI WAITING TIMES - ISLAMABAD/RAWALPIDNI AIRPORT

TIME	%
< 1 Hour	47.4
1-2 Hours	30.0
2-3 Hours	13.6
3-4 Hours	5.1
> 4 Hours	4.9

As far as passengers were concerned, the following data were found:

- 93% waited less than one minute for taxi
- 45% would have prefered to use stage-carriage public transport. (There is no such service at the airport)
- Only 50% were permanent residents of the study area
- 30% considered the vehicle unsatisfactory
- The distribution of journey lengths fell into two distinct groups; 83% were relatively short journies with an average length of 5.58 kms, 17% were longer journies (to Islamabad) with an average length of 19.23 kms.
- The average fare was Rs.3.17 per km
- 63.3% expressed a willingness to pay at least an additional 25% over and above the actual fare paid in order to travel in a better quality vehicle

11.7.3 Fleet requirements. Assuming an average operating speed of 40 kms per hoursfor the shorter journies and 50 kms per hour for the longer ones, allowing 5 minutes for unloading at hthe destination and with the taxi returning directly to the airport, average round-trip journey times would be 22 minutes for the shorter journies and 51 minutes for the longer. Operating at peak capacity, 83% of vehicles would be capable of working 2 journies per hour and 17% of working journey per hour. With a peak demand of 26 passengers per hour; 21 making short journies and 5 making long journies, the number of vehicles to just satify this demand is 21/2)+ 5=16. Allowing a margin if 25% additional capacity to cater for fluctuations in the peak demand and to allow for servicing and repair would give a total requirement of 20 vehicles.

A more realistic fleet dimensioning calculation would take into account the flight arrival schedules and the time distribution of passengers leaving the baggage reclaim hall. From observations made, however, it is likely that for wide-bodies aircraft arrivals, there would be sufficient time for a taxi to have completed one short trip and returned to the airport in the time elapsing between the first and last passengers leaving the baggage reclaim hall.

11.7.4 Vehicle output. Taking weighted averages such vehicle would perform 7.85 revenue kms per journey and cover a total distance of 15.7 kms per journey.

Based on the assumption of 300 journies to be made in each 24 hour period by 20 vehicles, daily output for each vehicle would be 117.75 revenue kms per day, or allowing for 320 operating days per annum, 37,680 revenue kms per annum, and 75,360 total kms per annum.

11.7.5 Vehicle type. It would be desireable if the vehicle to be used for the airport taxi could be one that had been manufactured in Pakistan. However, the only saloon car that meets this criterion is the Suzuki which is rather small to serve as an airport vehicle where many of the passengers have personal baggage to be transported as well as themselves.

Table 11.3 presents the results of a survey of availability and prices for saloon cars in the local market. For the purposes of this exercise we have adopted the Datsun Sunny Nissan. It is a four-door Saloon; fuel consumption is similar to that of the Suzuki and spare parts are commonly available.

11.7.6 Operating costs. Since we do not have any operating costs data for the new Datsun, we have assumed that they are similar to those of the Suzuki. We now proceed to calculate a profile of annual operating costs.

a. Fixed costs

Perhaps the simplest conception of how the cooperative might be constituted would be to think of it as a non-profit making leasing agency. Assuming that it had access to institutional credit, it could buy a vehicle fleet, lease it to the drivers, and then sell the vehicles at the end of 12 months and buy a new fleet. On this basis the capital costs could be:

- 15% interest on full market value of vehicle	26,550
- Allowance for depreciation @ 10% of full market value of vehicle	17,700
- Administrative costs and overheads @ Rs.7,500 per month: 7,500x12/20 =	4,500
	48,750

Other fixed costs

-	Vehicle insurance (third party and loss)	3,540
-	Token tax	520
-	Other fixed costs - route permit, fitness test, vehicle registration - say	1,000
-	Total of other fixed costs	5,060
Total fixed costs		53,810

b. Semi-fixed costs

The major item under this heading would be due to labour costs. As demand is not uniform throughout the 24 hrs of each day the vehicles could be operated by drivers working in two shifts, with an extra allowance of 0.15 drivers per vehicle to cover for holidays, sick leave and night time working.

Allowing a monthly wage of Rs. 1,500

-	Driver costs per vehicle 1,500x2.15 x 12 = 43,020	43,020

We also make provision for contributions to a welfare fund to cover sickness benefits, and some pension provision @ 15% of basic wage.

-	Welfare payment	6,453
-	Renovation costs, accident repairs	3,000
		52,473

c. Variable costs

Fuel costs are calculated on the basis of total of 75,360 kms per annum at an estimated fuel consumption of 12.5 kms/litre.

-	Fuel costs	43,106

Other variable costs are assumed to be similar to those incurred by the Suzuki Taxi, but since the airport taxis will operate a significantly greater annual distance the Suzuki's annual cost of Rs. 5150 is factored by-2.5

-	Other variable costs	12,875
-	Total variable costs	55,981

d. Total annual cost per vehicle

--	Fixed costs	53,810
-	Semi-fixed costs	52,473
-	Variable costs	55,981
-	Total	162,264

11.7.7 The economics of operation. The total revenue kms to be operated by each vehicle based on the data given in section 11.7.2 would be 37,680. With annual costs at Rs.162,264, a tariff of 162,264/37,680 = Rs. 4.31 per km would be required to just cover the economic costs of operation. This fare is some 42% higher than the fares actually being charged at the end of 1985.

The above calculation is based on a set of assumptions, obviously if we change any of the assumptions the outcomes will be different. For example, if it were assumed that vehicles could operate for 350 days per annum, rather than 320, then we could look to an additional 10% increase in revenue for a 3.4% increase in costs i.e. of fare of Rs. 4.05 per km. If 10% of the return journies to the airport could be made with fare paying passengers then there would be a further 10% increase in revenue without any increase in costs i.e. a fare of Rs. 3.70 per km an increase of just 17% over the 1985 fares.

Given that 63% of the passengers interviewed at the airport said that they would be prepared to pay at least 25% more for a better vehicle and that the above calculations shows the possibility of

providing such a service at fares ranging from 16% to 42% higher than the existing ones, it would appear that the introduction of a cooperative taxi service operating with relatively expensive vehicles might be feasible. Much would depend on the management, the cash flow arrangements and the marketing of the service. Should the service be provided by the Pakistani built Suzuki, the capital costs would be obviously much lower, and the fare required to just cover the economic costs with the most unfavourable set of assumptions would be Rs. 3.63 per km.

Table 11.3

SALOON CAR PRICES FROM RAWALPINDI CAR DEALERS

MAKE	MODEL	CURRENT MARKET PRICES (1986)
Honda Accord 1600cc	1986	500,000 495,000
Honda Civic 1300cc	1986	255,000
Honda Civic GL 1300cc	1986	265,000 264,000
Toyota Corrolla Standard 1300cc	1986	245,000 246,000
Toyota Corrolla XL 1600cc	1986	275,000
Datsun Sunny Nissan 1000cc	1986	177,000
Suzuki Car 800cc	1986	76,000 75,000
Datsun (Recon) (Karachi) 1200cc	1372	90,000
Toyota Corrolla (Recon) Karachi 1200cc	1974 1976 1977	95,000

12 CONCLUSIONS AND RECOMMENDATIONS

12.1 Introduction

This study has perforced had to extend over a wide range of issues in an attempt to provide a choerent quantitative description of the anatomy of the taxi industry in Islamabad and Rawalpindi. This basic fact finding has provided the evidence for a diagnosis of the principal problems afflicting the industry and for a series of recommendations put forward as to how some of those problems could be alleviated. The research upon which the study's findings are based has involved an extensive programme of data collection and interviewing of passengers, drivers,taxi owners and government officials. As with most studies involving socio-economic phenomena there are limitations to these data; limitations connected with the representativeness of samples the accuracy of recall of owners and drivers in offering information about costs, and in interpretation of the statistics which are derived from them. During the course of the study we endeavoured to ensure that sampling procedures were systematic and scientific. In the coding and analysis of data by the staff of NTRC, data edit and validity checks were carried out at each stage of the process. In the last resort however, there is no reliable way of cross checking the veracity or accuracy of all the basic information provided by the travelling public and members of the industry, and in interpreting the results this fact must be borne in mind.

In setting out our conclusions we will follow the scheme adopted in the introduction, where the study objectives were grouped into four; general trends, the use made of the taxi system and the level-of-service it provides, the structure of the industry - its ownership costs and outputs, and an analysis of the industry's problems and the role of government in administering and regulating it.

12.2 General trends and the role of the taxi system

Over the past 10 years for which national statistics on motor vehicle numbers are available, Pakistan has seen a marked increase

in the level of personal mobility, Nationally, the number of private motor vehicles has grown by a factor of 3.8 in a period when population has increased by some 38%. As far as urban transport is concerned we are hampered by a marked lack of statistics dealing with this important area. We know that the number of buses on the road doubled over the period from 1974 to 1983 (i.e. increased at only half the rate of private motor vehicles) - but what proportion of theses provide urban stage-carriage services we do not know. Nor do we know how the numberof wagons and Suzuki Pick-ups in service for urban transport has changed over this period, or indeed what their numbers are at present.

The statistics show that the national taxicab fleet has increased by a factor of 2.63, with approximately 20,000 vehicles said to be operating in 1983. The number of rickshaws, which in absolute terms was double the number of taxi cabs in 1974, has grown by a factor of 2.5 to stand at 36,500 in 1983. To put these figures into some perspective, there were approximately twice as many taxi vehicles (taxicabs and rickshaws) on the road in 1983 as there were buses.

We have pointed out in the study the various contradictions which exist between different official sources as to the number of taxis which may be in operation. However, there should be little doubt as to the general validity of the trends delineated above. These trends reinforce the view obtained from the study in Islamabad/ Rawalpindi that the taxi system is an important and integral part of the urban transport system and is apparently extensively used to make up for shortcomings and deficiencies in the availability of stage-carriage services.

In chapter 2 we dealt with the issue of taxi numbers in terms of provision rates (vehicles per 1000 population) showing that the rate of taxis has doubled over the last 10 years. It was also pointed out that at a level of 3.17 vehicles per thousand it is now considerably higher than that found in those more developed countries with higher rates of personal vehicle ownership and better public transport systems.

As urban populations increase we can expect the number of taxis to increases, but the trend in provision rates will be more a function of trends in future public transport vehicle provision rates, and is not something that can be forecast by simple trend extrapolation.

In some cities the rickshaw has grown in importance relative to the taxi cab. As revealed in chapter 10, the rickshaw has better economic performance (at least in our study area) than the taxicab, but since the liberal policy adopted for the import of Vespa motor scooters is no longer operative, and the prices of rickshaws are escalating at a rate out of proportion to their true worth, it is difficult to see how long the trend will continue. The Pakistani built rickshaw is not popular in the trade and is seen in only very small numbers, and whilst it was not represented in our survey, we are informed that its operating cost profile is not attractive when compared to that of the conventional taxicab.

In certain cities, such as Lahore and Peshawar, the taxicab is virtually a dying species. This can be attributed parth to the competition from the rickshaw, and partly to the fact that once taxi numbers fall below a certain threshold, then the public has little expectation of finding a taxi except at certain stands, (which may be few and far between) and consequently makes other travel arrangements. If it had not been decided as a matter of policy that rickshaws would be excluded from operating in Islamabad and the unofficial policy of restricting rickshaw members in Rawalpindi, it is likely that rickshaw numbers in area would have been substantially higher than at present.

12.3 Passenger level-of-service

The survey findings with respect to the second group of objectives, concerned with identifying the use made of the taxi system and the level-of-service it officers, were reported in chapter 7 and 8.

On average the Rawalpindi/Islamabad taxi system carries some 65,000 passengers a day. There is an average accupancy of two passengers

per vehicle; and distance covered in each jouney tend be short, with the average journey distance in the region of 4.5 kms. On aggregate, the system performs some 109 million passenger kms per annum just within the twin city area.

Preliminary findings from studies currently being undertaken at NTRC on the public transport system of Rawalpindi Islamabad suggest that the taxi sector may account for as much as 14% of the total passenger kms carried by the private sector of the system; included Mini-buses, Wagons Suzukis and Tongas and probably more than 10% of the total passenger kms travelled overall by public transport (The public sector buses of PUTC perform about 15% of the vehicle kms covered by all stage-carriage services).

The surveys have revealed that a high proportion of the passengers are both regular taxi users and permanent residents of the study area. Very few (less than 10%) of journies were charged on the meter, and although the average fare paid was in the region of Rs. 3.00 per km - some 50% higher than the authorized tariff at the time of the survey, the majority of users were satisfied with fare levels, and over 50% reported that they would have been prepared to pay at least 25% more to ride in better vehicles, although the majority seemed to be at least satisfied with the overall vehicle standards.

There appeared to be little significant variation in fare levels as far as spatial differences were concerned; fares in Rawalpindi were marginally cheaper than in Islamabad, but at the Airport fares were on average approximately 10% higher than the study area average. One significant distortion in the fare pattern which was found was that relating to distance travelled; with very short distance being charged at twice the rate of the longer distances. It would appear that the passenger's preoccupation in relation to fares is not the value for money obtained in terms of rupees per kilometre, but is more centred on the absolute amount he has to pay.

As far as other level-of-service attributes are concerned, there are few problems. Our analyses have shown that with over 70 operational taxi stands covering all the major residential areas, business centres, transport interchanges, hospitals and other public buildings and activity generators, the distance that an one has to walk to the nearest taxi stand is short. Moreover, a plentiful supply of vehicles ensures that the passenger's waiting time is minimal, even at time of peak demand.

12.4 The structure of the taxi industry

The best estimate that could be made is that there were, at the time of the surveys, something in the order of 3250 taxis operating within the Islamabad/Rawalpindi area. Nearly 90% of these vehicles were taxicabs; the fleet being made up predominantly of 12 years old Datsuns and 20 years old Morris Minors in about equal proportions, with just a small proportion of new Suzuki's and a mere handful Of other makes of car making up the rest.

These vehicles travel an estimated 81 million kms per year, out of which about 50 million kms are covered with fare paying passengers; earning in the process approximately Rs. 150 millions in fare revenue.

Some pirate or unlicensed operators were identified, but this practice appears to take place on a very small scale and is not seen as a problem by the formal sector of the industry. In addition, a classsof taxis called 'private hire cars' are licensed to operate from the airport, and also operate without licenses from the 'five star' ho els charging fares which may be 30-50% higher than those of the licensed taxis. Again the scale of operation is very small.

The ownership structure of the industry is fairly equally divided between owner drivers and those owners who contract out their vehicles to drivers. Very few taxicab or rickshaw operators own more than one vehicle, the maximum fleet size recorded was 4 vehicles.

The operating cost structure of the industry is marked by the high percentage which fixed costs account for in the operating cost profile. This is problematical for the industry, and is especially serious considering the low capital cost of the equipment and the low depreciation charges involved. The major cause of this distortion can be attributed to the very low output of the average vehicle. Fixed costs may account in certain cases for more than 35% of the operating cost per km. Since output is low, with taxi cabs averaging only some 55-65 engaged kms per day, earnings are also very low. Correspondingly, wages are low, working conditions are poor, and profits in most cases non existent. In view of these conditions it is hardly surprising that there is a high rate of turnover in the industry, with as many as 30% of existing owners having been in the industry for only one year or less.

There is no access to any institutionalized credit; those owners who are buying their vehicles on hire purchase are economically worse off due to the high finance costs involved (interest rates in excess of 3% per month are common) and in financial (cash flow) terms find themselves in great difficulties due to the added burden of having to meet the monthly installments due. If we add to the financial instability of many of the operators, the fact that no vehicle is covered for loss or damage by insurance and the constant depredations of the traffic police; the emerging picture is one of an industry which is basically unhealthy. The apparent paradox of an industry half of whose members are really not financially viable, but which nevertheless has a very large number of participants and no apparent shortage of prospective new entrants is perhaps explained by the owner's poor percepation of the real nature of his overall costs and the lack of knowledge about the industry's costs and revenue earning potential on the part of new entrants. This hypothesis is backed up by the large turnover in vehicle ownership which we identified.

Those owners who operate Suzukis have a much better economic performance than their Datsun and Morris owning counterparts. To a large extent this can be attributed to the peculiar nature of the

second hand car marked for Suzukis, induced by the very long delivery periods on the purchase of new cars and a history of substantial increases in their price. Even so, discounting this effect on the fixed costs of Suzuki operation, the fact that the Suzuki is a newer vehicle, and has a better fuel consumption and availability of spare parts than the older vehicles, means that its variable costs are also appreciably Lower.

The rickshaw sector, although comparatively small in Rawalpindi present some unique characteristics. With an ownership structure dominated by owner drivers, the economic performance is considerably more healthy than that of the taxi cab sector. The vehicle has a disproportionaly high capital costs due in some measure to its increasing scarcity value but also to the fact that it provides better returns than either the Datsun or Morris taxicabs. It is perhaps for this reason that finance costs on loans are given at about half of the intrest rate that prevails for the purchase of taxicabs. Whilst operating costs are lower, revenues can in fact be higher than those obtained in the taxicab sector due to the larger number of shorter journies undertaken by the rickshaws at fare rates which are not significantly different from those charged by taxicabs.

Due to its small size and high manoeuvreability the rickshaw is, in many respects an ideal vehicle for operating in the congested bazar areas of the inner city and in the narrow lanes of the residential colonies. Unfortunately, it is at the same time an uncomfortable and unsafe vehicle to ride in; affording little passenger protection in the event of an accident. It is also environmentally objectionable on account of its high noise levels and exhaust emissions.

Two sub themes were built into the way in which the data were disaggregated. One was concerned with identifying any differences between the service in Islamabad and that in Rawalpindi. Our conclusion in this respect is that there is little discernible difference. Fares are marginally higher in Islamabad, and more

people would have preferred some other form of public transport, but otherwise service patterns are very much the same in the two cities.

The other area of inquiry was concerned with possible differences between owner drivers and other owners. Again there were far significant differences reveald. Where some other owners appear to pay less for their vehicles, and at least as far as Datsuns are concerned obtained better loan facilities than the owner drivers. As far as the bulk of the taxi cab sector is concerned owner drivers tend to work slightly longer hours contract drivers, but otherwise patterns of output, costs, and revenues seem to be similar for the two sectors. The sample of Suzuki other owners was not large enough for any conclusions to be drawn and this small sector of the industry has not been included in our analyses. We would also point out that the proportion of rickshaw other-owners was also small and the generality of the findings concerning this sector must be treated with circumspection.

12.5 Problems and policies

The final group of objectives were directed towards analysing the Government's role in the regulation and control of the taxis industry; requiring that recommendations should be made where improvements were deemed necessary.

The root cause of many of the problems afflicting the industry appears to be one of over-supply. A simple model has been developed to show the interrelationships between the size of the taxi fleet, fare revenues and level-of-service. Whilst there are obvious advantages to the public in general from having a plentiful psupply of taxis, there is no additional advantage to be derived from having too many, only disadvantages.

The conclusion is quite clear. The number of taxis need to be regulated in such a way so that the level-of-service is maintained at the highest level possible consistent with the need to provide a reasonable return to the operator. What is not clear, unfortunately,

is how this could be implemented within the present administrative structure, where different responsibilities are spared amongst different agencies where none of those agencies have staff with appropriate professional or technical qualifications, and where an invidious complacency is revealed as to the widespread and systemized corruption and inefficiency that permeates throughout.

In the short term, only limited improvement can be looked for. One measure would be to reduce the burden of high fixed costs on the operator by reviewing the practices and charges made by RTA, the MVE, and the traffic police. One other measure suggested for the short term was the setting up a small scale cooperative as a practical way of evaluating the feasibility of charging the operating regime.

In chapter 11 we argued that no substantial system-wide improvements could be hoped for without a substantive change in the way in which the taxi sector is regulated and administered and we indicated the type of measure necessary.

12.6 Recommendations for further study

This study has necessarily been centred on the conditions and practices prevailing in the Islamabad/Rawalpindi area. We sould beware about generalizing these results and conclusions by re presuming that the same set of conditions and problems will be found in other cities where both city size and the composition of the taxi fleets are different.

For this reason it would be advisable to test the generality of the cost structures and industry performance data found in this study by undertaking a similar study in at least one other city. Since the rickshaw population in our study area is uncharacteristically small, a further study would also serve to furnish more representative data for this important sector of the industry.

More intensive research is necessary on a number of issues which have been touched upon in this study, but babout which constraints

of time and manpower have precluded more detailed investigation. A list of topics is given below:

- In view of the complexities experienced in trying to determine market prices and in calculating an appropriate allowance for depreciation, we would suggest that a more detailed study be undertaken of the second-hand car market; investigating the nature of the variation in prices found and attempting to account for the influence of macro-economic factors such as inflation, price of new cars, money-supply, foreign remittances etc.

- One of the factors that affects the operating cost structure of the operator is the incidence of taxation. For example some 20% of the retail cost of gasoline is accounted for by taxis. Spare parts and tyres attract taxation to varying degrees, but it is not known what proportion of thoseparts used in the taxi industry have been imported through proper channels, nor for those which have what the true taxation elements is. This is a highly complex area which needs a great deal more light shed on it. One of the issues would be to determine whether the revenue raised actually exceeded the costs of collecting it. There is a suspicion that in some areas of direct taxation, such as the issual of route permits, the amount of revenue collected that finds its way into the public exchequer is poor compensation for the administrative costs involved and with little public benefit to show for the exercise.

- One of the constant criticisms voiced by the public is in the performance and attitudes of the taxi drivers. This is a problem which applies to all operating staff employed in private sector public transport operations (vide the problems with mini-bus drivers in Karachi). The root canses of this poor quality and performance are the working conditions, pay and labour practices in the industry. Sooner or later this nettle will have to be grasped by the Government, and we would suggest a

thorough review of labour practices and conditions of employment in the industry with a view to obtaining, in the long run, a more professional and competent class of drivers; analysing what effects the adoption of better standards would have an industry costs.

- Since fuel costs are an important element of variable operating costs and in view of the fact that in this study we have had to rely on an estimation of average fuel consumption in order to derive, fuel costs, it would be highly desirable to obtain more accurate data. A study should be undertaken of actual fuel consumption of the different types of vehicle in thier normal-urban operating environment. With such data available it would then be feasible to evaluate the benefits of say, introducing deisel engine saloon cars for taxi operations; and to examine to what extent the higher capital costs involved would be offset by the savings in fuel costs.

- All the data on vehicle operating costs compiled for this study are based on 'hearsay' evidence. We would suggest the setting up of a small scale study whose objective would be to select a small sample of vehicles of each make, and maintain (with the cooperation of the owners) a record of all expenditure, distances covered, fare paying journies made etc, as an independent source of data which could be usdd to check the veracity of the statistics derived in this study.

Table 12.1

SUMMARY STATISTICS ON PASSENGER USE OF TAXIS

		ISLAMABAD	RAWALPINDI	STUDY AREA
AVERAGE VEHICLE OCCUPANCY		1.85	2.1	2.01
AVERAGE WAITING TIME (MINUTES)		0.82	0.77	0.79
AVERAGE WALKING DISTANCE (METRES)		89.4	81.4	84.2
AVERAGE TRIP LENGTH (KMS)		4.68	4.32	4.44
AVERAGE FARE PAID (RUPEES)		11.60	11.11	11.28
FREQUENCY %	DAILY	25:3	22.5	23.5
	WEEKLY	29.6	27.4	28.2
	LESS THEN ONE WEEK	25.9	30.0	28.6
	INFREQUENT	19.3	20.1	19.8
PERCENTAGE PREFERING TO TRAVEL BY OTHER MODE.		83.5	76.2	78.8
OPINION ON FARES %	VERY EXPENSIVE	6.8	3.8	4.8
	QUITE EXPENSIVE	31.9	25.9	28.0
	REASONABLE	59.9	69.9	66.4
	QUITE CHEAP	1.5	0.5	0.8
	VERY CHAEP	0.0	0.0	0.0
OPINION ON FARES %	VERY UN SATISFACTORY	2.2	1.8	2.0
	UNSATISFACTORY	21.8	21.5	21.6
	REASONABLE	73.0	73.5	73.5
	QUITE GOOD	2.1	2.8	2.6
	VERY GOOD	0.7	0.1	0.3
PERCENTAGE OF PASSENGER WILLING TO PAY MORE				55
PASSENGER TYPE %	PERMANENT RESIDENT	61.3	73.2	69.0
	TEMPORARY RESIDENT	19.2	17.3	18.0
	VISITOR ON BUSINESS	10.0	2.8	5.4
	VISITOR ON RECREATION	5.2	1.0	2.5
	OTHER VISITORS	4.2	5.6	5.1

Table 12.2

SUMMARY STATISTICS - TAXI FARES

	FARE RATE (Rs per km)
ALL VEHICLES ISLAMABAD	3.16
ALL VEHICLES RAWALPINDI	2.87
STUDY AREA AVERAGE	3.09
RICKSHAWS	2.86
VISITORS	3.33
ISLAMABAD AIRPORT	3.21
DEARI (RAWALPINDI)	2.79
JINNAH MARKET (ISLAMABAD)	3.16

Table 12.3

SUMMARY STATISTICS OF TAXI OPERATION

		DATSUN	MORRIS	SUZUKI	RICKSHAW
ESTIMATED NUMBER OF VEHICLE IN FLEET		1690	1397	97	39
PERCENTAGE OWNER DRIVERS		48.2%	56%	56.5%	47.5%
AVERAGE AGE OF VEHICLE YEAR		1972	1966	1984	1978
AVERAGE TRIP LENGTH		4.79	4.14	5.09	2.79
DAILY OUTPUT (KMS)		85.27	89.85	120.01	101.59
DAILY REVENUE (KMS)		56.0	57.0	75.8	66.1
ANNUAL COST: OUTRIGHT PURCHASE	OWNER DRIVERS	36,317	35,914	20,489	28,988
	OTHER OWNERS	46,005	45,655	-	37,148
ANNUAL COST: BOUGHT ON INSTALLMENTS	OWNER DRIVERS	44,814	38,970	29,410	30,986
	OTHER OWNERS	47,474	49,563	-	39,429
ANNUAL REVENUE	OWNER DRIVERS	47,160	45,877	39,563	54,605
	OTHER OWNERS	48,488	49,140	85,594	50,605
VEHICLE OPERATING COST: OUTRIGHT PURCHASE	OWNER DRIVERS	1.5	1.53	0.86	0.94
	OTHER OWNERS	1.94	1.83	-	1.47
VEHICLE OPERATING COST: BOUGHT ON INSTALLMENTS	OWNER DRIVERS	1.86	2.11	1.24	1.01
	OTHER OWNERS	2.00	1.99	-	1.56
ANNUAL NET EARNINGS OWNER DRIVER WAGE ALLOWED AT Rs.9,600 p.a	OUTRIGHT PURCHASE	1,243	363	9,474	16,017
	BOUGHT ON INSTALLMENTS	- 7,254	- 2,693	553	14,019
	OUTRIGHT PURCHASE	- 5,512	-10,522	-	-
	BOUGHT ON INSTALLMENTS	- 6,918	-14,430	-	-

References

BRIGGS D.A. (1986)

The economic of taxi operation Working paper No 95 National Transport Research Centre. Islamabad.

FOURACRE P.R., D.A.C. MAUNDER, M.G PATHAK and C.H. RAO (1981)

Public transport supply in Indian cities Laboratory Report No. 1081, Transport and Road Research Laboratory Crowthorne. UK.

HUNDAL S.H (1984)

Transport Statistics Working paper No. 83. National Transport Research Centre. Islamabad.

A survey of mechanized road transport: Rawalpindi, Federal Bureau of Statistics. Government of Pakistan Karachi (1983)

A survey of mechanized road transport: Lahore, Federal Bureau of Statistics. Government of Pakistan Karachi (1983)

A survey of mechanized road transport: Karachi, Federal Bureau of Statistics. Government of Pakistan Karachi (1983)

A survey of mechanized road transport: Peshawar, Federal Bureau of Statistics. Government of Pakistan Karachi (1983)

A survey of mechanized road transport: Quetta, Federal Bureau of Statistics. Government of Pakistan Karachi (1983)

1981 Census Summary reports. Census Bureau. Government of Pakistan, Islamabad. 1982.

The tasks of data collection, the conduct of the interviewed surveys and subsequent coding and analysis of data was undertaken by the following NTRC staff.

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