

WILLINGNESS-TO-PAY ATTITUDE OF CAR USERS ON TOLL CHARGES

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Abstract: This research investigated the willingness-to-pay attitude of car users in Metro Manila to understand the factors affecting their willingness and ability to pay road tolls. Stated-Preference Surveys and Focus Group Sessions were undertaken to collect data on socio-economic profiles, current travel characteristics, and willingness-to-pay road charges. The research findings indicated that travel time/cost, work trip purpose and socio-economic characteristics greatly affect the willingness-to-pay attitude of car users. It was also found that other factors that may affect the willingness-to-pay attitude of car users were awareness of environmental problems, traffic congestion, safety and convenience of alternative travel modes. Further studies were recommended to explore said factors.

1. INTRODUCTION

The study on willingness-to-pay (WTP) attitude of private car users has evolved from a concept on how set of options affect the individuals' decision choices. It deals about the criteria of economy and efficiency to choose from the set of options that maximizes time saving and better driving condition for a type of road and/or the use of alternative mode that also maximizes reduction in travel time and cost. One choice-set was for the car users to choose between toll and ordinary road and another was the decision to shift to mass rail transit (MRT) or other modes for significant trips. Given the challenge to let WTP takes its course into the transport planning process, this research investigated the willingness-to-pay attitude of private car-users in Metro-Manila. WTP recognizes the mode choice behavior of car users in the event the use of car on an untolled road would be impossible for them to reach their desired destination on time. To define WTP, it is a concept in which an individual is willing to express his preference to pay for the value of the level of service he is going to benefit, this case, like an improved toll facility.

In this study we used data obtained from the recent survey of Metro Manila Urban Transportation Integration Study (MMUTIS) on "Willingness-to-Pay Attitude of Private Car Users" (MMUTIS, 1997). It was fitting to say that the survey contains this research's most salient features of interest. This includes the assessment on the willingness-to-pay attitude of car users for travel time reductions while using toll roads, the route choice between toll and ordinary road, and the mode choice between car and MRT. The first two features have the major impact in the study considering the magnitude of demands on road space compared to MRT. Stated-Preference Field Surveys and Focus Group Sessions were undertaken to collect data on car-users current travel characteristics, socio-economic profiles, mode choice attitudes and perceptions, and willingness-to-pay road charges. The primary data collected were statistically analyzed and discrete choice models were developed to test various hypotheses. Brief statement of model estimation is presented in the summary of findings and recommendation.

2. OBJECTIVE

1. Focusing on several factors influencing the WTP attitude of private car users, this research would like to examine the following:
 - a) the WTP for travel time reductions;
 - b) the choices of route between toll and ordinary roads; and
 - c) mode choice behavior from car to MRT and/or other modes in the event transportation demand management (TDM) measures and other related control measures are implemented.
2. To assess the public's support and acceptability of toll road pricing policies.

3. SIGNIFICANCE OF THE STUDY

This undertaking would help determine the segment of society who possesses willingness-to-pay attitude for using toll roads. It helps enhance the level of awareness of individual car users and the public in general on the purpose and advantages of toll road pricing scheme over alternative policies. Development of highways with the help of toll revenue sources minimizes alternative policies, such as the necessity of raising very large loans for road infrastructures or the penalization of non-road users through general taxation system. An analysis of willingness-to-pay attitude as part of transportation planning studies is very vital in formulating appropriate policies for effective implementation of toll road pricing.

4. SCOPE AND LIMITATION

The scope of the study covers the assessment of willingness-to-pay attitude of private car users on toll charges to measure how much they would offer to pay for a saving in travel time if conditions on toll facilities would be improved. It also includes modeling on the respondents' route choice behavior from ordinary to toll road.

To facilitate gathering of necessary data, this research used the result of the survey conducted by the MMUTIS on "Willingness-to-Pay Attitude of Private Car Users". Separately, Focus Group Sessions were also undertaken to validate some data of MMUTIS and to collect other necessary information which were not covered by the earlier survey. The sampling areas encompass the villages and subdivisions in Metro Manila near the South Luzon Expressway (SLE), the EDSA Avenue, and the North Luzon Expressway (NLE). Interviews have been conducted on sample respondents, specifically private car users, about their most recent trips on their way to various destinations. It was also specified that the qualified respondents were those car users whose travel costs were shouldered by themselves.

5. METHODOLOGY

For better perspective, Figure 1, describes the flow of activities undertaken during the course of the study. It started with the statement of the problems and setting of objectives designed to determine the purpose and goal of the study, followed by the review of related literatures which gave direction in the formulation of research methodology, collection of data and analysis. Data analysis used descriptive statistics in processing data, and related tools to determine probabilities, ranking, tests and level of confidence of the expected results. Modeling involves forecasting the choice behavior of individual car users as responses to transport problems and schemes. For example,

when faced with increased congestion, a trip maker can respond to a range of simple changes (Ortuzar and Williamsen, 1994), such as: a) the route to follow to avoid congestion or take advantage of new links; b) the mode to take to get to the destination on time; c) the time of departure to avoid the most congested part of the peak. The output would describe the summary of findings and conclusions of the study. This would also provide policy recommendations to solve the issues concerning toll road pricing and suggestion for furtherance of the study to cover the remaining issues, which were not able to tackle in this exercise due to inadequacy of data.

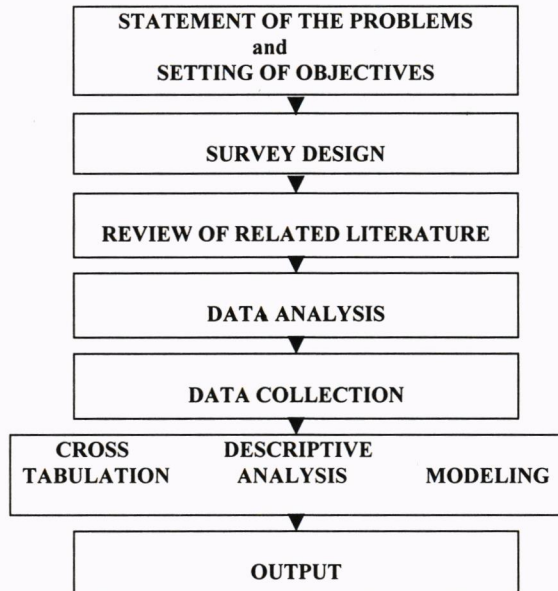


Figure 1. Methodology of the Study

6. DATA COLLECTION AND ANALYSIS

The survey questionnaire of MMUTIS is structured into five parts: (1) the general information contains the date and time the survey conducted, the vehicle type used, and the survey area; (2) the personal attribute would determine the respondent's profile such as age, sex, car ownership, and personal and family income; (3) the trip information describes the car user's trip purpose, trip origin and destination, the length of travel, the frequency of using his car for this trip purpose from his usual origin to destination, and the trip cost if the car user is using the toll road; (4) the willingness-to-pay for 20% and 50% travel time reduction of a trip would allow the car user to think how much he would pay for an additional cost of toll if the toll road is improved by such means as TDM and other expressway developments; and 5) conversion to MRT, a question which would allow the car user to choose other mode, like MRT, instead of using a car in order to save time.

The survey also includes portion for stated preference (SP) experiment cases indicating preferred travel time and costs. This portion would enable the car user to choose which route and mode to take for a particular "to work" trip purpose. The SP experiments cover the following: a) willingness-to-pay for travel time reduction between ordinary road and toll road; and b) conversion to MRT or a choice between car and MRT.

The objective to examine the factors that influence most their WTP depended on how survey inquiries had been responded rationally. It was hypothesized that travel time reduction would greatly influence the decision of car users to pay for additional toll charges in using the toll roads and/or shift to other mode, like MRT, to reach his destination on time. This hypothesis had to be supported by the attractiveness of the options, considering the above attributes. These quality responses had been assessed and analyzed in the foregoing sub-topics.

6.1 Profile of MMUTIS Data

A total of 1,225 sample respondents have been interviewed from the three specific areas of study, the vicinities of EDSA Avenue, North Luzon Expressway (NLE), and South Luzon Expressway (SLE). The spatial distribution, as indicated in Table 1, shows that the area within the radius of influence of SLE has the greatest number of respondents, at about 483 or 40% of the total samples. The NLE with 409 respondents or 33% follows this and the lowest is EDSA with only 333 samples or 27%.

Table 1. Spatial Distribution of Respondents

Target Area	MMUTIS HIS Zone	Target Samples	%
Southern Area near SLE	242, 244, 348	483	40
Eastern Area near EDSA	133, 135	333	27
Northern Area near NLE	180, 389	409	33
Total	7 zones	1,225	100

Age, Gender and Car Ownership Distributions of Respondents

Figure 2 shows that out of 1,225 car users interviewed, the highest count of 895 (56%) belonged to the middle age group, between 20-40 years old. The groups of less than 20 year-old, and 61 and above were the lowest, representing a total of 8%. With respect to the gender distribution of car users, it was obviously noted that there were more male respondents (884 or 73%) participated in the interview than female (341 or 27%), as reflected in Figure 3.

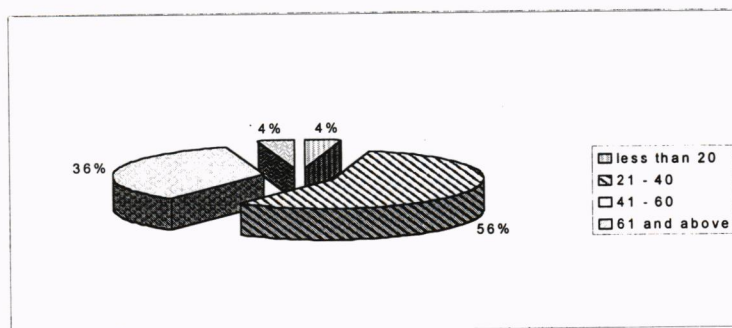


Figure 2. Age Distribution of Car Users

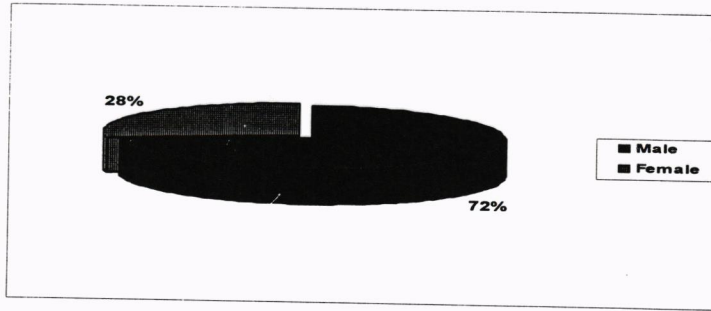


Figure 3. Gender Distribution of Car Users

For car ownership, Table 2 shows that majority of the car users interviewed used personal cars in making their trips (97%), and the remaining portion (3%) used family cars.

Table 2. Car Ownership Distribution

Car Ownership	EDSA		NLE		SLE		TOTAL	
	Count	%	Count	%	Count	%	Count	%
Personal	330	99.1	384	93.9	478	99.9	1192	97.3
Family	3	0.9	25	6.1	5	1.0	33	2.7
Total	333	100.0	409	100.0	483	100.0	1,225	100.0

Personal and Family Income of Car Users

With respect to income attributes, Tables 3 indicates that the average personal income of car users was about P10,300, while the average family income was P44,400. As expected, majority (55%) of the respondents belong to middle and upper-middle income group ranging from P6,000 to P30,000. There were only 70% and 62 % of the total respondents who revealed their respective personal income and family income. Investigating the cross-sectional data of personal and family income of respondents as against car ownership shown in Table 3, the highest combined count (350 or 29%) of personal and family car ownership belonged to respondents with personal and family income range of P6,000-P15,000. The lower counts were shared by the lower income groups below P3,000 and higher income groups P40,000 and above. A difference of 363 responses has not been accounted due to lack of information.

Table 3. Personal and Family Income Distribution versus Car Ownership

Amount (In Peso) per Month	Income				Car Ownership					
	Personal		Family		Personal		Family		Total	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
None	22	1.8	0	0	21	1.8	0	0.0	21	1.7
Under P3,000	51	4.3	3	0.2	51	4.2	0	0.0	51	4.2
P3,000-5,999	112	9.2	36	2.9	104	8.5	2	24.2	106	13.1
P6,000-9,999	179	14.6	72	5.9	164	13.4	7	45.6	171	14.0
P10,000-14,999	178	14.6	147	12.0	174	14.2	5	12.1	179	14.6
P15,000-19,999	94	7.7	120	9.8	94	7.7	4	0.0	98	7.8
P20,000-29,999	112	9.2	116	9.5	112	9.2	4	0.0	116	9.5
P30,000-39,999	67	5.5	71	5.8	67	5.5	6	0.0	73	6.0
P40,000-59,999	39	3.2	82	7.7	38	3.1	1	3.0	39	3.2
P60,000 & over	8	.2	95	7.8	8	0.2	0	0.0	8	0.7
No Response	363	29.7	438	38.4	359	32.2	4	12.1	363	25.2
Total	1,225	100.0	1,225	100.0	1,192	100.0	33	100.0	1,225	100.0
Mean =	(P10,300)		(P44,400)							

Trip Purpose

The distribution of the trip purpose in Table 4 indicates that work trip purpose dominated the ranks and accounted about 43%, followed by private and employers' business trips of about 18% and 12%, respectively. Another significant trip purposes were shopping and school trips, which accounted 9% and 7%, respectively. These trip categories could be characterized as regular trip activities next to the three categories mentioned above, considering their importance in the everyday life of human beings. The lower ranks were shared by: accompanying other household members, medical, social, church, eating and other trips, which could be considered as optional and not regularly done, unless so necessary.

Table 4. Trip Purpose by Study Area

Purpose	EDSA		NLE		SLE		TOTAL	
	Count	%	Count	%	Count	%	Count	%
Work	182	54.7	199	48.8	146	30.2	517	43.0
School	40	12.0	11	2.7	31	6.4	82	6.7
Priv. Bus.	48	14.4	36	8.8	133	27.5	217	17.7
Empl. Bus.	5	1.5	105	25.7	32	6.6	142	11.6
Shopping	17	5.1	17	4.2	73	15.1	107	8.7
Accom. Other HH	12	3.6	23	5.6	20	4.1	55	4.5
Medical, Social, Eating, Church, Others	29	8.7	8	4.3	48	10.0	95	7.8
Total	333	100.0	409	100.0	483	100.00	1,225	100.0

Trip Length and Cost

As shown in the Table 5, the longest trip took a car user to drive about 6.5 hours to reach to his destination. This was felt by two respondents in the NLE area whose trip by origin and destination (O/D) started in Muntinglupa City and ended in Kalookan City. The situation was extra ordinary due to heavy traffic along their trip routes during that particular interview period, brought about by the on-going construction of Metro Manila

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Skyway, along SLE and the MRT III, along EDSA. The shortest time of travel was felt by about 4% (54) of the total respondents, which took them only less than 10 minutes to reach their destinations. The highest count of about 41% (492) has a range of travel time of only 10 to 30 minutes, most of which were from NLE area also. Car users in this area may have chosen alternate routes to their destinations or trips were made at nearby zones only. The average length of travel, which was slightly less than 1 hour, was experienced by 208 respondents or 17% of the total count.

Table 5. Trip Length by Study Area

Minutes	EDSA		NLE		SLE		TOTAL	
	Count	%	Count	%	Count	%	Count	%
< 10 min	11	3.30	40	9.78	3	0.64	54	4.47
10 – 20	88	26.43	109	26.65	49	10.49	246	20.35
21 – 30	52	15.62	82	20.05	112	23.98	246	20.35
31 – 40	20	6.01	9	2.20	15	3.21	44	3.64
41 – 50	43	12.91	23	5.62	47	10.06	113	9.35
51 – 60	52	15.62	63	15.40	93	19.91	208	17.20
61 – 70	7	2.10	1	0.24	5	1.07	13	1.08
71 – 80	9	2.70	2	0.49	2	0.43	13	1.08
81 – 90	13	3.90	29	7.09	76	16.27	118	9.76
91 – 110	0	0.00	2	0.49	4	0.86	6	0.50
111 – 120	17	5.11	31	7.58	40	8.57	88	7.28
121 – 150	10	3.00	8	1.96	14	3.00	32	2.65
151 – 180	10	3.00	7	1.71	1	0.21	18	1.49
181 – 210	1	0.30	1	0.24	6	1.28	8	0.66
211 – 390	0	0.00	2	0.49	0	0.00	2	0.17
Total	333	100.00	409	100.00	467	100.00	1,209	100.00
Mean (Min.) =	48.00		48.00		59.00		52.00	

The query on toll cost would tell the actual amount the car users had paid in using the toll road on their recent trips. Table 6 shows that the total responses for this portion accounted only 737 (60%) out of 1,225. The increment could be seen that not all that was interviewed regarding their recent trips used the toll ways. Observation indicated that the highest count of 353 (48%) paid toll less than P2.00. Most of them belonged to the NLE area, which could also mean that their destinations were just within the influence area of the route where the toll ways are located. The lowest group of respondents (3%) paid the highest toll fees of P12.00 and above mostly belonged to NLE area. The average toll paid by these respondents was P4.00.

Table 6. Trip Cost in Using the Toll Road

Amount (In Peso)	EDSA		NLE		SLE		TOTAL	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Less than 2.00	0	0.00	314	76.77	39	12.38	353	47.90
2.00-3.99	3	23.08	54	13.20	206	65.40	263	35.69
4.00-5.99	0	0.00	13	3.18	61	19.37	74	10.04
6.00-7.99	0	0.00	3	0.73	5	1.59	8	1.09
8.00-9.99	6	46.15	1	0.24	1	0.32	8	1.09
10.00-11.99	3	23.08	5	1.22	3	0.95	11	1.49
12.00 and over	1	7.69	19	4.63	0	0	20	2.70
Total	13	100.00	409	100.00	315	100.00	737	100.00
Mean =	P7.00		P2.00		P3.00		P4.00	

Willingness-To-Pay For 20% and 50% Travel Time Reduction

Of the 1,225 samples, 99.6% responded the question on "how much would a car user pay for a 20% reduction in travel time as a result of transport demand measure (TDM) and other expressway developments. In this scenario, car users would like to pay the amount of P1.00 to P25.00. The highest 77% of the total count would like to pay P5.00. This was followed by 20% of the respondents who would be willing to pay P6.00 to P10.00. The lowest 3% would like to pay the amount of P11.00 to P25.00. The average willingness-to-pay amount was registered at P5.00, corresponding to a reduction in travel time of 11 minutes. Per minute reduction in travel time was calculated at P0.76. Summary statistics for these data are shown in Table 7.

For 50% travel time reduction, the highest frequency of 514 respondents or 46% of the total responses of 1,107 were willing to pay the observed amount of P1.00 to 5.00. Thirty eight percent of them would like to pay P6.00 to P10.00 followed the rank. Sharing the lowest 12% would like to pay the amount of P21.00 to P50.00. The average amount the car user would like to pay for this travel time reduction was P8.00, corresponding to an average travel time reduction of 27.45 minutes. Related summary statistics for 50% travel time reduction, indicating an average cost per minute reduction of P0.45, is also shown in Table 7.

In calculating the average amount the car users would like to pay for the 20% and 50% reductions in travel time, the result would yield P6.75, corresponding to an average travel time reduction of 19 minutes. The cost per minute reduction in travel time is P0.61. The statistics for these data is also shown in Table 7.

Table 7. Average Cost/Minute for 20% and 50% Travel Time Reduction

Particular	Mean	Minimum	Maximum
a. Cost (P) per 20% Travel Time Reduction	5.00	1.00	25.00
Travel Time Reduction (In Min.)	10.97	2.00	78.00
Average Cost (P) per Min.	0.76	0.03	7.50
b. Cost (P) per 50% Travel Time Reduction	8.00	1.00	50.00
Travel Time Reduction (In Min.)	27.45	5.00	195.00
Average Cost (P) per Minute	0.45	0.005	6.00
c. Ave. Cost (P) for 20% and 50% Travel Time Red.	6.27	0.37	35.00
Travel Time Reduction (In Min.)	19.00	3.50	78.00
Ave. Cost (P) per Minute Time Reduction	0.61	0.02	6.75

A Route Choice between Ordinary Road and Toll Road

Tables 8 and 9 summarize the results of the analysis for stated preference experiments in Cases A and B. Using five types of questionnaires with stated preferences for travel time and costs designed for Cases A and B, the respondents were asked which route they generally prefer to use for "work trip" purpose. Popularly, between the two cases, majority of the respondents preferred using the toll road than the ordinary road, because of their attractive features, which facilitate less travel time than the latter. There were about 51% accounted using toll road and 49% used ordinary road, in Case A, while Case B, has 53% for toll road and 47% for ordinary road. Total response level for Case A was 99.84% (1,223) and for Case B, was 99.92% (1,224). Negligible portion of respondents did not subscribe to the question.

Those who did not wish to switch to toll road inferred to prefer ordinary road as their convenient route in going to their "work trip" destinations. This situation is prominent in

levels 3 and 5 scenarios, for both Cases A and B, where the stated preference to use ordinary road dominated the two choices. The increment in number of responses between the two routes would mean that there were more respondents in these levels whose usual destinations were out of the toll way routes, therefore, they have no other alternative choice except to use the ordinary roads.

Table 8. Case A: Choice of Road to Use for "Work Trip" Purpose

Form Type	Travel Time (Min.)		Travel Cost (Pesos)		Frequency		
	Ord. Rd.	Toll Rd.	Ord. Rd.	Toll Rd.	Ord. Rd.	Toll Rd.	Total
1	90	50	0	30	155	162	317
2	90	50	0	20	82	166	248
3	90	50	0	40	116	59	175
4	120	80	0	30	98	126	226
5	120	80	0	40	145	112	257
Total					596	627	1,223
%					48.73	51.27	100.00

Table 9. Case B: Choice of Road to Use for "Work Trip" Purpose

Form Type	Travel Time (Min.)		Travel Cost (Pesos)		Frequency		
	Ord. Rd.	Toll Rd.	Ord. Rd.	Toll Rd.	Ord. Rd.	Toll Rd.	Total
1	30	30	0	20	140	177	317
2	60	30	0	10	76	172	248
3	60	30	0	30	110	65	175
4	20	10	0	20	102	124	226
5	20	10	0	20	142	116	258
Total					570	654	1,224
%					46.57	53.43	100.00

Conversion to MRT

In the MMUTIS survey, a query on MRT conversion was included to gain insight if a car user would also be willing to shift to railway transit instead of using a car if given some attractive situational scenarios, such like reduction in travel time and cost. The Light Rail Transit (LRT) Line 1 has proven as an effective alternate mode for most public transport and private car users traveling from North (at Monumento) to South (at Baclaran) of Metro Manila, particularly during peak hours of the day. The MRT III along EDSA, the subject of one of the experiments, is now on its completion stage and envisioned to serve the central portion of Metro Manila from same direction of the metropolis. It is expected that this mass transit would reduce a great volume of traffic while releasing road space to other road users. These two routes also provide links between the two existing toll roads in Metro Manila, the North and South Luzon Expressways.

Stated Preference Experiment for Conversion to MRT for Work Trip Purpose: Cases A and B

As presented in Table 10, the SP experiment for conversion to MRT has two cases to examine. Case A has five scenario of reductions in travel time, ranging from 35 to 80 minutes with corresponding average reductions in travel cost from 0 to P10.00 for 1A, 3A, 4A and 5A in favor of MRT. With exception in 2A, MRT displays an increase of P5.00 in travel cost over a car use. It has a total response of 1,220. Negligible portion of five car users did not answer the query. Case B has also five scenarios in travel time reductions, ranging from 10 to 15 minutes. Except for 4B also where MRT's travel cost dominates over a car use by P5.00, the average reductions in travel cost for 1B, 2B, 3B and 5B ranges from 0 to P5.00 in favor of MRT.

Assessing the respondents' mode choice behavior in Case A, the highest count of 323 out of the total respondents of 1,220 subscribed scenario 1A. Fifty five percent of which would like to switch to MRT given the case of savings in travel time of 35 minutes and reduction in travel cost of P5.00. The rest 45 % would remain using their car. Comparing 1A with other scenarios like, 3A, 4A and 5A, these got positive responses also of 61%, 63% and 50%, respectively, in favor of MRT. However, 4A posted the highest willingness to switch to MRT compared to others because of the level's high reduction in travel time of 80 minutes without any increase or decrease in travel cost. In contrast with scenario 2A, a car user would not want to switch to MRT since the travel time reduction of 35 minutes and an increase of P5.00 more in travel cost were not so attractive to them.

With respect to the result of the SP experiment in Case B, there were only a general average 28 % out of the total count of 1,225 who would like to shift to MRT because of the very low reductions in travel time presented. The remaining 72% would continue using their cars.

Overall observation shows that there were more car users who would like to switch to MRT use if given a scenario of an average savings in travel time of 54 minutes as in Case A. However, when this savings in travel time would be reduced to an average of 11 minutes, as presented in the scenarios of Case B, the mode choice of individual car users would maintain using a car regardless of travel cost.

Computing the value of time for Case A, 54 minutes savings in travel time using MRT would yield an additional compensation of P28.00 for the individual car users for an average wage rate of P250.00 per an 8-hour work-day or P0.52 per minute. The value of time of only P6.00, equivalent for an average of 11 minutes savings in travel time taking MRT was not so much attractive for the 72% of the respondents in Case B. Thus, would remain using their car, including those 45% accounted for the mode in Case A. Most of the reasons for the non-switching behavior of car users include: inconvenience, particularly if they have baggage; hate walking and waiting; and security.

Table 10. Summary for Cases A and B: Conversion to MRT for Work Trip Purpose

	Travel Time Reduction (min.)	Travel Cost (P) Increase/(Decrease)	Count by Case	Remain Using Car (%)	Switch to MRT (%)
1A	35	(5.00)	323	44.9	55.1
1B	10	(5.00)	324	80.2	19.8
2A	35	5.00	256	55.1	44.9
2B	10	0	259	78.0	22.0
3A	80	(10.00)	209	39.2	60.8
3B	10	(5.00)	209	62.7	37.3
4A	80	0	231	37.2	62.8
4B	10	5.00	231	66.2	33.8
5A	40	(5.00)	201	49.8	50.2
5B	15	(5.00)	202	70.8	29.2
Total					
A	54	(3.00)	1,220	45.2	54.8
B	11	(2.00)	1,225	71.6	28.4

Summary of Findings and Analysis

This section summarizes the most meaningful findings and analysis of the above data.

- a) In the analysis for the significance of the willingness-to-pay attitude of car users, the findings can be best proven by the pattern of responses attributed to

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the variables that influenced the decision to use the toll roads. Tables 11 and 12 would reveal cross sectional data for the cost of WTP for 20% and 50% travel time reductions as influenced by trip purpose and actual travel time. Both tables indicate that majority (525 or 43%) of the car users' trip purpose was "to work" trips. This large portion of respondents were willing to pay the average amount of P5.00 to P8.00 for an average travel time reductions of about 10 to 25 minutes for using the toll roads. These results hold through in computing the overall general average WTP. There were those who wished to pay more but they were outnumbered in terms of frequency of responses.

- b) Another significant finding has proven the hypothesis that as actual travel time increases the car users willingness-to-pay decreases. This is revealed when xy diagram for the actual travel time and the WTP cost per minute reduction in travel time of car users was plotted, as shown in Figure 4. The actual travel time presented in this figure is based on the actual travel time made by the individual car users in making their recent trips, as summarized in Table 5. This is fitted against the results in the WTP for 20% and 50% reduction in travel time of the respondents, as also summarized in Table 7. For example, those with usual travel times of less than one hour were willing-to-pay more for a certain percentage of reduction in travel time. While those whose usual travel times were longer than an hour would only want to pay less.

Table 11. Average WTP for 20% Travel Time Reduction as Influenced by Trip Purpose and Average Actual Travel Time

Trip Purpose	Actual Travel Time	20% Travel Time Reduction in min.	WTP for 20% (Peso)	Count	%
Work	52	10.43	5.39	525	42.93
School	46	9.23	6.00	84	6.87
Private Business	55	11.02	4.71	214	17.50
Employees Business	56	11.11	3.57	142	11.61
Medical	52	10.43	5.09	35	2.86
Social	51	10.22	4.81	32	2.62
Eating	45	9.00	2.92	9	0.74
Shopping	45	9.01	4.18	108	8.83
Church	37	7.33	2.88	15	1.23
Accom. Oth. Mem.	47	9.31	4.75	55	4.50
Others	39	7.75	6.25	4	0.33
Average	48	11.00	4.59	1,223	100.00

Table 12. Average WTP for 50% Travel Time Reduction as Influenced by Trip Purpose and Actual Travel Time

Trip Purpose	Actual Travel Time	50% Travel Time Reduction in min.	WTP for 50% (Peso)	Count	%
Work	52	25.38	8.34	525	43.00
School	46	22.80	8.02	84	6.88
Priv. Business	55	27.42	7.78	214	17.53
Empl. Business	55	27.77	5.34	140	11.47
Medical	52	26.07	7.60	35	2.87
Social	51	25.55	7.47	32	2.62
Eating	45	22.50	5.53	9	0.74
Shopping	45	22.54	6.69	108	8.85
Church	36	18.33	4.39	15	1.23
Accom. Oth. Mem.	46	23.27	7.05	55	4.50
Others	38	19.38	9.00	4	0.33
Average	48	27.00	8.02	1,221	100.00

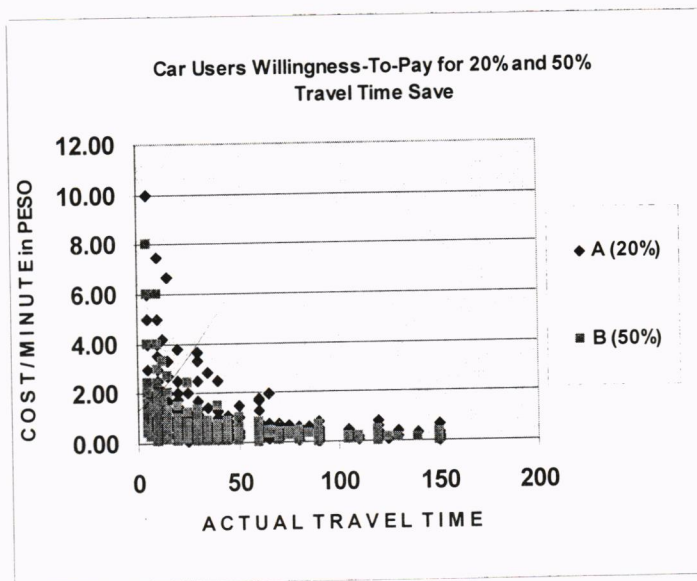


Figure 4 XY Scatter Diagram for Car Users Willingness-To-Pay for Travel Time Reduction

- c) The part of the hypothesis that personal characteristics of car users can also contribute to the influence of the decision to choose the toll road and the willingness-to-pay attitude for travel time reduction was not given enough weight because of inadequate data on personal and family income. The 30% to 39% differences in the responses of these data would imply that revealing income was a confidential matter for these particular groups of respondents.

- d) The mode and route choices are two of different categories in transportation system. However, when link to the people using the systems can create correlation, particularly in the travel time and cost involve. Between ordinary road and toll road, greater percentage of car users would like to use toll road, because of the value of time. It was said that the value of time for trips made during or part of the work is equal to the gross hourly income of the traveler, including all additional cost to the employer. Time saving, even how small it is, should be valued equally as more significant savings. (Ortuzar, 1994).
- e) The same is true between car and MRT. It is noted that in the mode and route choices, there was a common objective in the selection of choices as postulated in the two stated preference scenarios for both toll road and MRT, which was the "work trip" purpose, packaged in Case A and Case B. In the analysis of mode choice, the result in Case A scenario revealed that there were more car users who would be attracted to convert to MRT after his tolled route if the minimum reduction in travel time would be about 35 minutes and maximum travel cost of P10.00. In this case, there is a greater possibility that a car user may decide to leave his car in a safe parking space near the toll road with minimal parking fee than bringing his car to his next route when expected heavy traffic would occur. However, in Case B with a reduction in travel time of about 10 to 15 minutes only and reduction in travel cost of 0 to P5.00, more car users would prefer to remain using car than riding MRT being not so attractive for them.

6.2 The Focus Group Session

Overall assessment of the FGS survey shows that although it was conducted in a simplified approach, the effect of its responses was so vital to the findings of the study as it provided direct quality opinion derived from the exchange of views and experiences with fellow participants. The validation of data on the query on WTP was limited to the SP experiments for both route and mode choices. The same MMUTIS survey instruments were used in the FGS for Cases A and B for these choices to determine the trip behavior of car users.

The choice between ordinary road and toll road showed that there were more respondent who would like to use toll road in Case A (68%), than in Case B (54%), simply because of the significant difference in reduction in travel time and cost, as shown in Table 13.

Table 13. Summary of Results for SP Experiment Cases A and B for Choices between Ordinary Road and Toll Road

Case	Aver. Trav. Time Red.(min.)	Ave. Red. in Trav. Cost (P)	FGS (27 Samples)	
			Ord. Road (%)	Toll Road (%)
A	40	30	32	68
B	18	20	46	54

The findings in the mode choice behavior of the respondents show dominance responses in favor of MRT for Case A and in favor of car for Case B, as summarized in Table 14. It was evident that the most common factor that influenced the outcome of the two cases was the difference in travel time. The average reduction in travel time of 54 minutes in Case A scenarios contributed to the significant percentage of responses (73%) who would like to shift to MRT. However, in Case B, about 51% would like to remain using a car if only given an average reduction in travel time of 11 minutes. Interviews revealed that using car was so very important in their daily trips due to the type jobs they have.

Table 14. Summary of Results for Experiment Cases A and B
For Probable Conversion to MRT

Case	Aver. Trav. Time Red.(min.)	Ave. Red. in Trav. Cost (P)	FGS (27 Samples)	
			Remain Using Car (%)	Switch to MRT (%)
A	54	3	27	73
B	11	2	51	49

FGS also considered some opinion survey on additional stated preference scenario on WTP for congestion pricing. It was found out that majority of the respondents were aware of problem of congestion on the Metro Manila's road network. Except for the negative response on the application of additional road pricing on peak-period of traffic, a greater number of them were willing to pay for any increase in toll charges to release road space from congestion and improve revenue collection.

7. SUMMARY AND CONCLUSION

7.1 Summary

Based on the objective of the study, this research was able to examine the factors that influence decision of car users: a) willingness-to-pay for travel time reduction; and b) the route and mode choice behavior of the car users. It was able also to assess the public's support and acceptability of toll road pricing policies. It has provided better understanding on the purpose of toll road pricing policy, such as a means of raising revenue to finance road infrastructure projects of the government and to relieve traffic on congested highways

The positive findings for the responses of car users on the willingness-to-pay for 20% and 50% travel time reductions in addition to the present toll charges were sustained by the magnitude of responses dominated by "work trip" purpose. On the other hand, the presence of the scenario on TDM measures and expressway developments had enhanced the willingness-to-pay attitude of the car users, which could result to the positive acceptance of related policies on toll road charges. This was affirmed by the result of the FGS survey where respondents remarkably displayed willingness-to-pay for any increase in toll charges to open up available road space for other car users and to generate revenue for road improvements. As beneficiaries of improved tolled roads and the fact that they continue to use such types of roads, car users' contributions to the toll revenue component of the road user charges reflect their willingness-to-pay.

Model estimation has been attempted in this research but only to test the significance of the explanatory variables for the route choice behavior of car users. Data on work trip purpose, employer's business, difference in travel time and cost were considered as the most significant explanatory variables fitted for estimation to get the desired WTP attitude of car users. Using Logit model through SAS Logistic procedure, the estimated output has a resulting good fit for a model with a -2 Log Likelihood for intercepts and co-variates of 3,238.4. It has also an overall significant level of 99.99% or a *p*-value of 0.0001.

The model emphasizes the importance of time, reliability and efficiency in the route choice behavior of car users. The perception of time relates to the value of work delivered by an individual if the expected time of arrival to his destination is reached, which is equivalent to the hourly rate compensation of his job. The importance of reliability and efficiency would correlate to the type of facility the car user has chosen, considering the high level of utility attraction compared to an ordinary road.

7.2 General Conclusion

It can be conclusively stated that the data available for this study made it possible to establish a systematic variation existing in car users willingness-to-pay for travel time reduction regardless of route and mode. The generic influences that could be attributed to the car users WTP in MMUTIS survey were mainly credited to travel time and trip purpose. While in FGS, WTP is influenced by the household income, trip attributes, availability of other alternate modes, and the awareness of the information on the policies regarding toll road pricing. The willingness to shift to MRT for a greater number of respondents in both surveys also validated the information that car users gave much attention to the use of other modes as contribution to the solution of congestion problem on transportation system.

8. POLICY RECOMMENDATION

8.1 Emphasis of willingness-to-pay technique on all toll road studies.

A review on related literatures on toll road pricing indicated that few studies adopted the technique on the willingness-to-pay. Tolls are increasingly seen as the most practical means of raising revenue to finance capacity expansion. Yet, for commuters in suburban areas take it as unfair taxes, especially if the central city or another local government units own the tolled facility. These fragmentation of opinions from some sectors of society made implementation of toll road pricing policy unpopular and unsuccessful. To obtain full support on the implementation of such policy, an analysis on WTP attitudes should be considered as part and partial in every transport planning studies.

8.2 Full implementation of existing policy on toll road pricing.

As observed, the recent needs of transportation demand have caused a lot of financial constraints to the government. Assessing the revenue raised on toll roads in a country, it can be said that the current road-pricing scheme does not seem to be adaptive anymore with the present situation considering the high maintenance and operating costs in keeping the system. Lack of information drive on the objective of the policy is one that hinders the people to accept for any increase in toll road pricing. Hence, to recognize the needs to upgrade or improve the system, it is recommended that concerned agencies handling the implementation of these measures should review the existing policies. Coordination mechanism must be developed to come up with an appropriate policy acceptable not only by the toll road users but also by the general public. The agencies concern may also adopt an improved technology in collection of toll charges to maximize toll road revenue. Where possible, the revenue on toll roads should be earmarked to finance the needs for transport infrastructure sector only.

8.3 Suggestion for Further Studies

Toll road study involving willingness-to-pay technique is very broad. Due to inadequacy of data this research has covered only travel time and trip purpose as the most influential factors that contributed to the decision of car users' willingness-to-pay. It is suggested that further studies should be undertaken to continue identifying other factors which may affect the car users' WTP attitude, such as awareness of the environmental problems, level of road traffic congestion, safety and convenience of alternative modes, etc.

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