

# People's perception of Metro Manila's electronic toll collection (ETC) system

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**ABSTRACT:** The benefits of using an ETC instead of manual toll payment are clear. It has been observed in Philippine expressways that the average service time per vehicle with E-pass is 1.5 seconds compared to 15 seconds for manual collection. This translates to reduced traffic congestion at toll plazas, lower fuel consumption, less air pollution, and therefore less economic losses. However, the current number of E-pass subscribers is still small compared to the number of toll road users. Possible reasons are the high initial cost of subscription, infrequent use of tollways by some users, lack of information, etc. To ascertain these reasons and to understand the factors that can increase E-pass subscription, it is important to know the perception of people about the ETC. This study aims to 1.) To gather an assessment of ETC by users and non-users; 2.) To relate socio-economic characteristics with ETC acceptability; and 3.) To identify factors that would make non-ETC users shift to ETC.

**RÉSUMÉ :** Les avantages d'utiliser un système de contrôle électronique au lieu du paiement par péage manuel sont évidents. Il a été observé sur des voies express des Philippines que le temps moyen de service par véhicule avec le laissez-passer électronique est d'1,5 seconde comparé aux 15 secondes pour la collecte manuelle. Cela se traduit par la réduction des encombrements aux péages, par une plus faible consommation de carburant, par moins de pollution de l'air et donc moins de pertes économiques. Cependant, le nombre actuel d'abonnés au laissez-passer électronique est toujours faible comparé au nombre d'utilisateurs sur les routes à péage. Les raisons possibles sont le coût initial élevé d'utilisation de l'abonnement, la faible fréquentation des routes à péage par quelques usagers, un manque d'information, etc. Pour vérifier ces raisons et comprendre les facteurs qui peuvent augmenter l'abonnement au laissez-passer électronique, il est important de connaître la perception des gens au sujet du laissez-passer électronique. Cette étude vise à 1.) recueillir une évaluation du système de contrôle électronique auprès des utilisateurs et des non-utilisateurs ; 2.) rattacher les caractéristiques socio-économiques à l'acceptation du système de contrôle électronique ; et 3.) identifier les facteurs qui sauraient convaincre les non-utilisateurs du système de contrôle électronique de devenir des utilisateurs.

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## 1 INTRODUCTION

The application of the Electronic Toll Collection (ETC) System can be found in several countries. A pioneer is Singapore with its Electronic Road Pricing (ERP) system that it uses to implement congestion pricing. Japan initiated its ETC services in April 2000. Penang, Malaysia uses the "Smart TAG" for cars and the "Touch n Go Smartcard" for other vehicles. Norway uses the "Q-FREE" where tolls are charged at entry points. In the United States, applications can be found in Florida where there are 150,000 "E-pass" subscribers. In New York, Delaware, and New Jersey, subscribers use the "E-ZPass". In San Francisco, the Automatic Toll Collection (ATC) is used. The same is true for toll bridges in Louisiana, Oklahoma, and Texas.

In the Philippines the ETC System is used in the South Luzon Tollway (SLT) and the Metro Manila Skyway (MMS) linking Metro Manila with the southern provinces. This was launched in August 2000. Vehicles of ETC subscribers are fitted with electronic transponders (commonly known as E-pass) and toll collection is done electronically. There are exclusive E-pass lanes and the majority of the other lanes are for mixed E-pass or non-E-pass users. Initial cost is 2,200 Pesos (about 40 US\$) inclusive of 1,400 Pesos (25 US\$) for the transponder and 800 Pesos (15 US\$) worth of toll. Value pre-loading can be done by credit card or cash payment at designated areas. Since launching, a total of 58,000 subscribers have enrolled in the program. From January to August 2002, an average daily total of 212,680 non-ETC users (79%) and 55,335 ETC (21%) subscribers use the expressway system.

The benefits of using an ETC instead of manual toll payment are clear. It has been observed in the Philippines that the average service time per vehicle with E-pass is 1.5 seconds as compared to 15 seconds per vehicle for manual collection (Padayhag, 2002). This translates to reduced traffic congestion at toll plazas, lower fuel consumption, less air pollution, and reduced delay and therefore less economic losses. However, the current number of E-pass subscribers is still small compared to the total number of toll road users. This is clearly illustrated by the contrast between the manually operated toll gates (with long queues of vehicles being processed) and the E-pass toll gates (with swift flow of vehicles). To ascertain the reasons why some people subscribe to the ETC and why others do not and to understand the factors that can encourage more E-pass subscribers, it is important to know the perception of people about the ETC.

## 2 SURVEY METHODOLOGY

An ETC Perception Survey was designed with the following objectives. 1.) To gather an assessment of ETC by users and non-users; 2.) To relate socio-economic characteristics with ETC acceptability; 3.) To identify factors that would make non-ETC users shift to ETC.

Two waves of surveys were conducted in order to capture a significant representation of both ETC users and ETC non-users in the SLT/MMS tollway system.

### 2.1 First Wave: Questionnaire Interview survey

The Interview Survey was held on 20 and 23 November 2002 at establishments in the Petron and Shell gasoline station rest areas along South Luzon Tollway. On 20 November (Wednesday), 14 surveyors conducted an interview survey with patrons of fast-food restaurants and the convenience store of Shell gasoline station rest area from 12:00nn to 8:00pm, while 15 surveyors conducted an interview survey at Petron and Shell gas stations on 23 November (Saturday), also from 12:00nn to 8:00pm.

Each surveyor approached prospective respondents and conducted a 20-minute interview. Responses from a total of 349 samples were gathered during the survey: 158 on the first day and 191 on the second day. Ballpens were given away as incentives for the respondents.

### 2.2 Second Wave: Questionnaire Survey

The Questionnaire Survey was held in coordination with PNCC-Skyway Corporation (the operator of the Metro Manila Skyway System) from 11 to 20 February 2003 in order to capture regular tollway users (defined as those who pass by the SLT/MMS system at least 3 times a week per direction). The questionnaire used earlier was converted into a one-page brochure to facilitate easy handling and self-administration by the respondent. A cellular phone (Nokia 3310) raffle was incorporated into the survey to promote respondent participation.

Twelve thousand (12,000) survey brochures were printed and distributed in three ways:

#### 2.2.1 Through Entry Tollbooths (9,500 distributed)

PNCC-Skyway Corporation offered to distribute survey forms through their entry tollbooth personnel in five toll plazas. One survey form with an attached raffle stub was handed to each toll user entering the plaza from 6:00 am of 11 February. The forms were distributed within two to four hours containing the peak period.

### 2.2.2 Through Exit Tollbooths (1,500 distributed)

In order to capture E-Pass users, NCTS surveyors were positioned in five exit plazas to hand out survey forms to exiting vehicles in E-Pass dedicated lanes.

### 2.2.3 Through Replenishment Centers (580 distributed)

Another way to capture E-Pass users is to distribute survey forms at PNCC E-Pass replenishment centers, where subscribers can load their transponders with additional toll units. Distribution was done at 4 replenishment centers.

A total of 11,580 brochures were distributed. Of these, 520 forms were returned by the respondents by 20 February 2003 (the raffle draw was held on 21 February), but 171 of these were rejected due to duplication of entries and insufficient information. Thus, there are 349 entries gathered for encoding, or 3.01% of the total distributed forms. Of the 349 forms, 236 came from entry tollgates (2.48% return rate), 78 came from exit tollgates (5.50% return rate), and 32 came from replenishment centers (5.52% return rate, based on distributed forms).

## 3 SURVEY RESULTS

### 3.1 General

From the two surveys held, the 698 respondents (349 respondents for both 1st and 2nd waves) were classified by ETC usage and vehicle ownership as follows. "Vehicle user" is defined here as driver of the vehicle who has ties with the owner (family or friend). "Driver" is defined here as one employed by the owner of the vehicle.

Table 1. ETC Usage & Vehicle Ownership Characteristics.

ETC Usage	Owner	Vehicle User	Driver	Total	Share
User	145	57	19	221	31.66%
Non User	276	126	57	459	65.76%
Quitter	13	4	1	18	2.58%
Total	434	187	77	698	100%

### 3.2 Trip Information

The frequency distribution of expressway use (defined as one-way use) of respondents is shown in Figure 1.

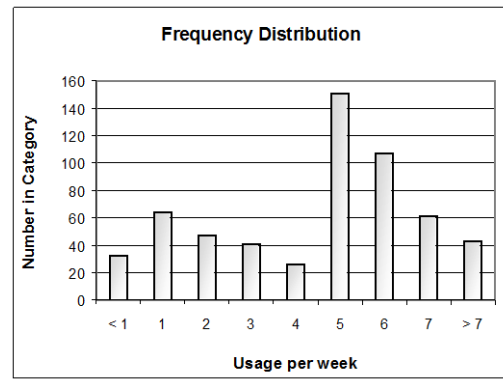


Figure 1. Frequency Distribution of Expressway Use.

### 3.3 Trip Purpose Characteristics

"To work" is the dominant trip purpose followed by "to home", "private business", and "to school". The trip purposes are 1-To home, 2-To work; 3-To school; 4-Private business; 5-Employer's business; 6-Medical; 7- Visitfamily/relatives;8- Leisure or recreation; 9-Accompany HH members; 10-Others. The trip purpose distribution is shown in Figure 2.

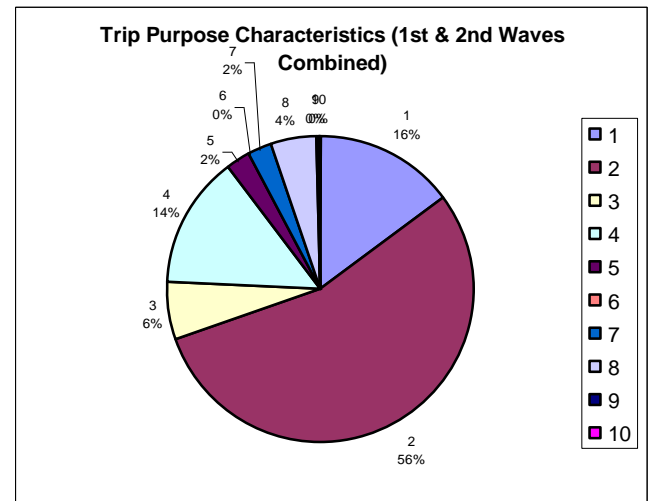


Figure 2. Distribution of Trip Purpose.

### 3.4 Perception

The perception on ETC is categorized according to the three groups of respondents:

- ETC users
- Non-ETC users
- ETC quitters

The perception on ETC of current users is discussed here. The reasons why respondents subscribe to ETC are as shown in Table 2. The main reasons why users subscribe to ETC is that it offers "faster" transaction. This is followed by the convenience offered by ETC.

Table 2. Reasons for Subscribing to the ETC.

Reasons for using ETC:	1 <sup>st</sup> Reason	2 <sup>nd</sup> Reason
1 Status Symbol/High	1	1

tech			
2	Faster	117	45
3	Safer	3	6
4	More convenient	73	98
5	Frequent use	14	18
6	Others	0	0
Total		208	168

To further improve the ETC, current users suggest the offering of toll discounts and the addition of exclusive ETC lanes. "Cheaper transponder" is also suggested by the respondents as a way to improve the current ETC. The reduction in cost of ETC in the form of lower tolls or less expensive hardware add to its utility to users. Table 3 shows the suggestions for ETC improvement.

Table 3. Suggestions for Improving the ETC.

How ETC can become more attractive:	1 <sup>st</sup> Suggestion	2 <sup>nd</sup> Suggestion
1 Add exclusive ETC lanes	30	53
Reasons for quitting ETC:		
	1 <sup>st</sup> Reason	2 <sup>nd</sup> Reason
1 E-pass is elitist	1	0
2 Infrequent use/underutilized	1	1
3 Inconvenient to store up load	4	4
4 Others	8	2
Total	14	7
2 Stricter enforcement	16	24
3 Toll discounts	96	46
4 Cheaper transponder	43	29
5 More convenient payment	17	11
6 Others	14	12
Total	216	175

Cost is perceived to be the major deterrent why some people do not subscribe to the ETC. Another reason that discourages potential ETC users is the infrequent use or underutilization of the technology. If a user thinks that he will rarely use the ETC, then its cost will be perceived to be much higher than if it were to be more frequently utilized or enjoyed. Table 4 shows the reasons why people do not use the ETC.

Table 4. Reasons for NOT using the ETC.

Reasons for NOT using ETC:	1 <sup>st</sup> Reason	2 <sup>nd</sup> Reason
1 Dislike high tech/prefer traditional	1	12
2 Not safe	1	5
3 No information on ETC	32	28
4 Expensive initial cost	230	60
5 Infrequent use/underutilized	95	80
6 Others	66	35
Total	425	220

Table 5 shows the improvements that may convince current non-ETC users to subscribe to ETC. Most respondents perceive that they will be encouraged to use ETC if it becomes less expensive (or cheaper transponder and availability of toll discounts).

Things that will make them convert to ETC:	1 <sup>st</sup> Answer	2 <sup>nd</sup> Answer
1 Add exclusive ETC lanes	13	26
2 Stricter enforcement	10	5
3 Toll discounts	83	125
4 Cheaper transponder	178	43
5 More convenient payment	36	29
6 Others	79	29
Total	399	257

Table 5. Things that will make non-users to subscribe to ETC.

There are few former ETC users who have quit the subscription. Various reasons are cited why some users have quit ETC. The survey database includes reasons like "no more ETC sponsor" in the case of those who used to drive company cars with e-pass; "erroneous debiting of toll", "lack of load verification or monitoring", and inconvenience to store up load. Table 6 shows the reasons for quitting the ETC.

Table 6. Reasons for quitting the ETC.

Some quitters suggest that to make them subscribe again, it may be helpful to have a monthly billing report so they can easily monitor their toll payments. Another reason is if they can again find a sponsor to shoulder the costs of ETC subscription. Other improvements like toll discounts, cheaper transponder, and more convenient payment method are possible ways to convince quitters to renew their subscription. Table 7 shows the factors that will make quitters subscribe to ETC again.

Table 7. Factors that will make quitters re-subscribe to ETC

Things that will make them subscribe to ETC again:	1 <sup>st</sup> Answer	2 <sup>nd</sup> Answer
1 Add exclusive ETC lanes	2	0
2 Stricter enforcement	1	0
3 Toll discounts	3	4
4 Cheaper transponder	0	3
5 More convenient payment	3	2
6 Others	6	2
Total	15	11

For all categories of ETC usage, the general perception of the impact of the ETC in improving the expressway system is as shown in Table 8. About a sixth of the respondents "strongly agree"; about half of the respondents "agree" that the ETC has improved the expressway. About a third "disagree" to this statement. Table 8 shows people's perception on how the ETC has improved the expressway.

Table 8. Perception on how the ETC has improved the expressways.

"The ETC has improved the condition of the expressway"	Number of responses
1 Strongly agree	100
2 Agree	305
3 Disagree	213
4 Strongly disagree	44

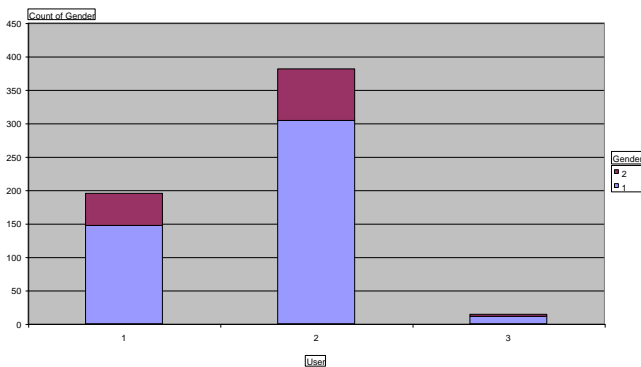
Total	662
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Among the improvement measures that the respondents perceive to be necessary for the expressway, widening the right-of-way is considered to be the most needed. This is followed by pavement improvement and strict traffic enforcement. Table 9 shows the suggested expressway improvements.

Table 9. Suggested Expressway Improvements.

Ways to improve the expressway	1 <sup>st</sup> Answer	2 <sup>nd</sup> Answer
1 Improve signage	14	29
2 Improve lighting	29	56
3 More rest areas	5	12
4 Widen right-of-way	192	47
5 Strict traffic enforcement	100	107
6 Prompt incident management	23	50
7 Improvement pavement condition	109	115
8 Improve emergency soldiers	11	17
9 Others	38	46
Total	521	479

### 3.5 Socio-economic Characteristics and ETC Use



This section shows the cross-tabulation of various socio-economic characteristics and ETC usage.

#### 3.5.1 Gender

The following chart and table show the gender and ETC usage characteristics of the respondents. The biggest category in this cross tabulation is the “male ETC non-users” comprising 52% of the concerned respondents. This is followed by the “male ETC user” which comprises 25%. Seventy-eight (78%) of all respondents are male. Of all ETC users, 75% are males. Of non-users, 80% are males.

Figure 3. Gender and ETC Usage.

Table 10. Gender and ETC Usage Characteristics.

Count of Gender	Gender		Grand Total
User	1-Male	2-Female	

1 – User	147	48	195
2 – Non user	304	77	381
3 – Quitter	11	3	14
Grand Total	462	128	590

#### 3.5.2 Age

The biggest age group in the survey is the 31-40 years old segment that comprises about a third of the total number of respondents (202 samples out of 602). Of this, 71 or 35% are ETC users; 126 respondents or 62% are non-users; and a miniscule number represents the quitters. Figure 4 and Table 11 show these characteristics.

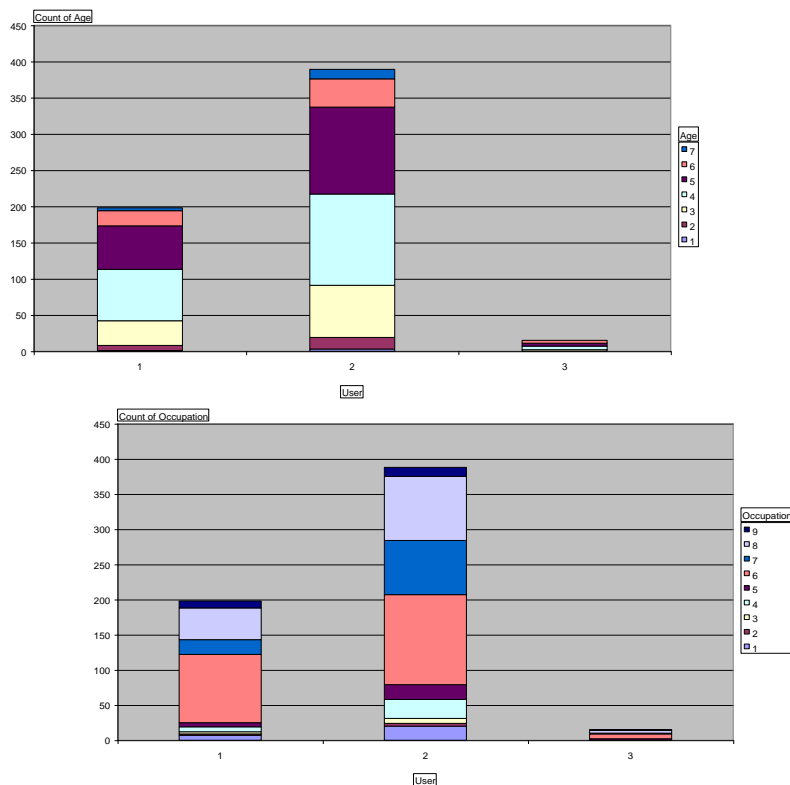


Figure 4. Age and ETC Usage.

Table 11. Age and ETC Usage Characteristics.

Age	1-User	2-Non user	3-Quitter	Grand Total
1 (<18)	1	3		4
2 (18-22)	7	16		23
3 (23-30)	34	72	2	108
4 (31-40)	71	126	5	202
5 (41-50)	60	120	4	184
6 (51-60)	21	39	4	64
7 (>60)	4	13		17
Grand Total	198	389	15	602

#### 3.5.3 Occupation

The occupation of the biggest bulk of respondents is “6 – Private Sector Employee (Management Level)”.

These respondents comprise 232 (39%) of all respondents. Of these, 42% are users; 55% are non-users; and 3% are quitters. The next biggest group is “8 - Own business enterprise, freelance” which is composed of 140 or 23% of all respondents. Table 12 shows the occupation categories. Table 13 and Figure 5 show the characteristics of occupation and ETC usage.

Table 12. Categories of Occupation.

1	Student
2	Housewife
3	No job (including retired)
4	Govt employee (managerial)
5	Govt employee (staff)
6	Private sector employee (managerial)
7	Private sector employee (staff)
8	Own business enterprise, freelance
9	Others

Table 13. Occupation and ETC Usage Characteristics

Occupation	1- User	2 – Non user	3 - Quitter	Grand Total
1	7	20	0	27
2	2	4	0	6
3	3	7	0	10
4	7	27	0	34
5	56	21	2	79
6	97	128	7	232
7	21	77	1	99
8	45	91	4	140
9	10	13	1	24
Grand Total	198	388	15	601

Figure 5. Occupation and ETC Usage.

### 3.5.4 Income

Income categories are as follows as shown in Table 14. Table 15 and Figure 6 show the characteristics of monthly personal income and ETC usage.

For monthly personal income, the biggest income category is the income group number 8 with monthly personal income of 40,000 – 59,999 pesos. These respondents comprise 17% (or 99 out of 572 respondents). The income groups 4 through 8 (with monthly personal income of 10,000 to 59,999 pesos) compose 413 or 72% of all the respondents. Of these 413 samples, 134 or 32% are ETC users; 271 or 66% are non-users. Two (2%) are quitters.

Table 14. Categories of Income.

Income Categories	
1	Under 3,000 Pesos
2	3,000 – 5,999
3	6,000 – 9,999
4	10,000 – 14,999
5	15,000 – 19,999
6	20,000 – 29,999
7	30,000 – 39,999

8	40,000 – 59,999
9	60,000 – 99,999
10	100,000 – 149,999
11	150,000 – 199,999
12	200,000 – over

Table 15. Monthly Personal Income and ETC Usage Characteristics.

Monthly Personal Income Category	1 - User	2 – Non user	3 - Quitter	Grand Total
1	5	10	0	15
2	6	18	1	25
3	10	40	2	52
4	15	57	0	72
5	25	67	1	93
6	26	71	2	99
7	33	46	4	83
8	35	30	1	66
9	11	17	2	30
10	5	5	0	10
11	11	8	1	20
12	4	3	0	7
Grand Total	186	372	14	572

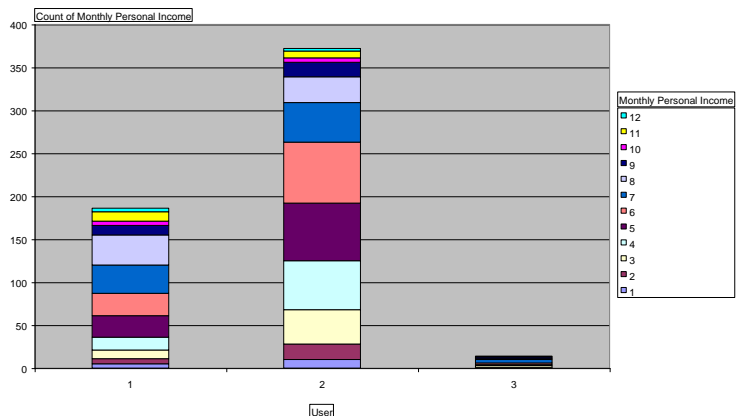


Figure 5. Monthly Personal Income and ETC Usage.

## 4. CONCLUSION

This paper presents the results of the survey conducted in Metro Manila to determine the perception of expressway users on the electronic toll collection (ETC) system locally known as the E-pass.

The study finds that the main reasons for subscription to the E-pass are faster tollgate processing and convenience. The most prominent suggestions for improving the E-pass are cost-related: availability of toll discounts and cheaper transponders. If these suggestions are implemented, E-pass non-users may be prompted to subscribe to the program. The surveys also reveal that the major reasons for not subscribing to the program are the high initial costs and infrequent use or underutilization of the expressway.

Furthermore, approximately two-thirds or 66% of the 698 respondents agree (or strongly agree) that the ETC has improved the operations of the expressway. This includes even those who are currently non-ETC subscribers. Among the improvement measures that the respondents perceive to be necessary for the expressway, widening the right-of-way is considered to be the most needed. This is followed by pavement improvement and strict traffic enforcement.

The study also presents the socio-economic profile of the respondents as correlated with ETC usage.

The study recommends the review of pricing of the E-pass subscription. A check with the expressway authorities revealed that no in-depth market study was made prior to the implementation of the ETC program. With the clear findings of the survey regarding people's perception on the cost of ETC, it is suggested that the pricing scheme be revisited to determine the optimum pricing that would maximize ETC subscription and at the same time give a reasonable rate of return to the expressway operator.

It is also suggested that information on the benefits of ETC to expressway users be aggressively and creatively disseminated. After all, the best way to market a product (like the ETC) is to market its benefits.

A future research topic is the extension of this study to time-based toll pricing as a TDM (travel demand management) measure.

## 5. REFERENCE

Padayhag, G. 2002. *Evaluation of Electronic Toll Collection Along South Luzon Expressway and Manila Skyway*, Master's Thesis, Department of Civil Engineering, University of the Philippines Diliman.