A STUDY ON STAKEHOLDER SATISFACTION WITH A BOT PROJECT: THE CASE OF THE BANGKOK MASS TRANSIT SYSTEM (BTS)

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ABSTRACT

Many Build-Operate-Transfer (BOT) projects are being or have been executed in developing countries. Several of the projects have been done in Thailand. Before the projects are started, studies are generally conducted for impact assessment. Nevertheless, it is not common for post construction studies on the same projects to be made to evaluate and determine effects during the operation period. To understand whether the intended benefits of a project are really delivered, this research studies satisfaction with a BOT project in Thailand; namely the Bangkok Mass Transit System (BTS) project.

The BTS skytrain project is now at the operation stage and being patronized by people in the metropolis. The concession for the BTS was awarded to the Bangkok Mass Transit System Public Company Limited (BTSC) in 1992. The BTSC was permitted to retain all revenues deriving from the system operation for 30 years. The objectives of the project are to assist in alleviating the chronic traffic problem within the city and to provide Bangkok citizens with a fast and efficient means of transportation within the central business district.

In this study, surveys, of users (757) and non-users (1530), were been made between November 2003 and January 2004 using questionnaires as the research instrument, to evaluate the real benefits of the BTS. The study results show that promoters, users and non-users are satisfied with the benefits derived from the project. Users are happy with the convenient transportation system, which has improved the traffic situation, but they suggest that the system should be extended to bring more benefits to commuters.

Key words: BOT, Stakeholder satisfaction, Mass transit, Public-private partnership, Infrastructure privatization

INTRODUCTION

The BOT scheme represents the commitment of a private enterprise to “Build, Operate, and Transfer” public infrastructure to a concession granting public agency after a certain period. The private sector invests in the development of public infrastructure and has the right to operate the infrastructure by imposing tolls or user charges to recover capital cost of construction and make a certain amount of profit under a specific concession period. At the end of concession period, the infrastructure is to be returned to the host

government [Levy, 1996]. A PPP infrastructure development can be defined as: the permission private sectors obtain from the host government to provide infrastructure services under specific agreement and conditions of market mechanism [Walker and Smith, 1995]. The most noticeable and current type of PPP mechanism in transportation infrastructure development is the Build-Operate-Transfer (BOT) scheme [Walker and Smith (1995), Dias and Ioannou (1996), Malini and Raghavendra (1996), Mohamed-Asem *et al*. (2001), Zhang and Kumaraswamy (2001), Zhang *et al.* (2002)].

The BOT scheme is gaining popularity and acceptances as an innovative way to finance the construction of infrastructures in both developed and developing countries [Jirapong et al., (2003)]. For instance, it was estimated that the developing countries would spend US$ 200 billion annually on infrastructure, of which Asian countries account for 80%.

Furthermore, many privately financed infrastructure (PFI) projects have been executed in the Asian region. A few of them are in Thailand. These infrastructure projects are large, and large projects often influence the community significantly. Usually studies are made before constructing these projects as part of the feasibility or impact assessment study. However, studies can be done on the same projects to evaluate and determine the effects or benefits from projects while operating. In order to understand whether the intended benefits of the projects really exist, this research studies the real benefits from a BOT project in Thailand. It will be extremely useful for the policy makers to study if the objectives of the projects done in the past have been achieved and to know how it can be improved on when undertaking future projects.

The main objective of the study is to determine how well the BTS project has delivered the intended benefits to stakeholders, to evaluate the perceived extent of achievement of benefits on the project, and to propose recommendations on how to improve the services of the project.

DESCRIPTION OF THE BTS PROJECT

On the 9th of April 1992, the Bangkok Mass Transit System Corporation Limited (BTSC), a special purpose company formed by Tanayong Public Company Limited, signed a concession agreement with the Bangkok Metropolitan Administration (BMA) to build, operate and transfer an elevated mass transit railway system on two routes in Central Bangkok. The concession was awarded by the BMA following a competitive tendering process and approval by the Ministry of Interior and the Thai Cabinet. The Bangkok Transit System (BTS) was opened and became operational in 1999. BTSC operates and derives revenue from the 23.5 kilometers railway for 30 years before handing it back to the BMA. BTSC was established with the sole purpose of constructing and operating a mass transit railway system, on prudent commercial principles, in order to ease the increasingly severe traffic problem in Bangkok. The main objectives of BTSC are to provide a safe, comfortable, fast, convenient, reliable, and affordable public transit system for the public and to give the shareholders of BTSC a reasonable return for their investments.

According to BTSC (2003), BTS would result in change in traveling pattern in Bangkok. The problems of traffic and inability to arrive at destinations on time would be solved.

Since traveling has an impact on economic development, BTS also affects the economic growth of Thailand. Consequently, BTS benefits were expected to be economic and social.

BTS passengers can save on travel expenses and time. As per the research conducted by BTS, the project can assist all passengers, altogether resulting in net saving of about 15 million Baht per day. The economy will be expanded due to the increase in working efficiency resulting from reduced commuting time, and the reduced cost of solving traffic problems. The quality of life, both physical and psychological, is expected to be better. Family members would have more time to rest and spend with each other. In short, the project benefits the people by improving their quality of lives.

METHODOLOGY

The intersecting area from two sets can represent the term "satisfaction"; namely BTS' services and the needs of stakeholders. BTS is the service provider. Similarly, each relevant stakeholder in the BTS system also possesses a certain set of expectations. If a service provided by BTS to the individual is well accepted, it is likely that the recipient will be satisfied with BTS services on different aspects. The extent of satisfaction would relate to the extent of achievement of the perceived benefits. This extent of satisfaction concerns both physical and psychological aspects that can be measured through a questionnaire. Figure 1 illustrates each physical and psychological condition by the area of intersection between BTS Services and stakeholder satisfaction. The larger the intersecting area, the better the emotional stage of the involved persons.

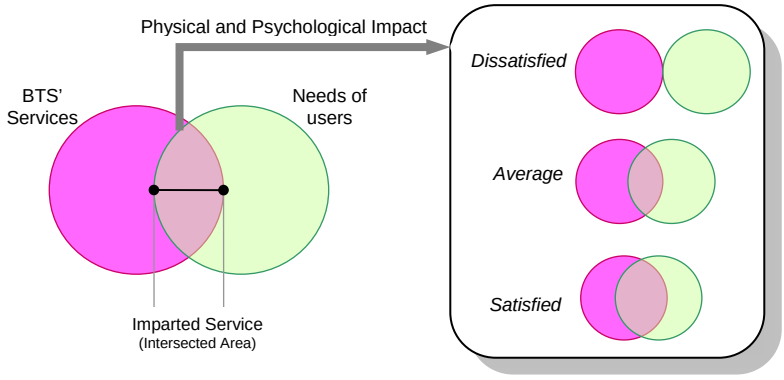


Fig. 1 Model to Represent Extent of Achievement of the Benefits

Data collection

Data collection for this research was accomplished through the administration of questionnaires. Responses from a large number of users formed the main input to the data analysis. Users of the system were random sampled within the transit system. Since the answers from the respondents was predominantly qualitative in nature, a rating or ranking scales were used to convert the answers to quantitative values [Miles and Huberman, (1994)]. The study was also based on qualitative research conducted through in-depth face-to-face interviews. Thus, it enabled the research team both to gain an initial

understanding of the studied problem and to identify phenomena, attitudes, and influences [Maxwell, (1996)].

First, interviews were conducted with the officers of the Traffic and Transportation Department (TTD) and BTS to know the intended benefits of the project. Part of data collection was through the official documents from the BTS. Questionnaires were prepared to obtain responses from the users of the facility. Data were obtained exclusively from contingent stakeholders such as passengers, vendors and people working near the project. Next, both of the BTS-user and non-user surveys were conducted in November-December 2003, and January 2004. Besides, pilot tests were initiated early in November 2003.

Before going through this step, however, the BTS-user and non-user questionnaires were made as clear as possible to convey the true intent of the research team to the respondents. Effort was made to reduce the time needed to answer the questions, yet making them comprehensive enough to avoid any informational error. Long questions were avoided in order not to cause any undesired rejection from the respondents. Questionnaires were handed over personally to the respondents as well as collected personally from them to encourage participation.

Respondents to the skytrain-user questionnaires were selected at random at three BTS stations (National Stadium, Siam, and Mo Chit). In the same way, non-users replying to the questionnaire were people working near BTS stations. This means that the surveyed areas were located around the BTS routes. The questions in the survey were meant to find out the attitudes of the people who use the BTS skytrain as well as those who directly benefit from the project such as shop owners and street vendors, taxi drivers, and police officers.

Data analysis

The responses to questionnaires were analyzed using various statistical methods. The chi-square test was used to determine the relationship between characteristics of BTS respondents and factors such as service, safety and operation factors. The influence of gender, age, occupation, income, frequency of use, and main purpose for using BTS were tested using the chi-square test. The Statistical Package for the Social Sciences (SPSS) and Microsoft Excel were employed for the tests.

SURVEY RESULTS

Satisfaction of Local Users

The local user questionnaire was completed by 627 individuals, of which 32% were male riders and 68% were female riders. The profile in Table 1 shows that the majority of the users are within the active working age between 20 and 50 years. Many young college students also use the system.

Overall, 64% and 9% of the BTS riders are satisfied and very satisfied respectively on service factors; besides, 64% are satisfied, and 11% are very satisfied on the safety factors (Tale 2). On the operation factors, 60% are satisfied, and 6% are very satisfied while 337 skytrain users (54%) are satisfied and 73 users (12%) are very satisfied on other factors "Being able to lift up your life (Physical and Psychological)," with an item mean of 3.74/5.0. 304 BTS users (49%) and 188 users (30%) are also satisfied and very satisfied respectively with the factor "Having a role to solve traffic problem in the city," with item mean of 4.04. There are 230 respondents (37%) rating at the average level for the item "Saving cost of traveling" while 169 riders (27%) are satisfied and 47 passengers (8%) are very satisfied. The mean of the item is 3.06. 288 BTS riders (46%) are satisfied with the item "Saving traveling time", and 274 BTS respondents (44%) are very satisfied; the item mean rises to 4.32.

Table 1: Demographic Profile of Users

			Age in Years				
	Male	Female	< 20	20-30	31-40	41-50	> 50
Thai	198 (32%)	429 (68%)	118 (19%)	399 (64%)	64 (10%)	34 (5%)	12 (2%)
Foreigner	65 (50%)	65 (50%)	7 (5%)	68 (52%)	40 (31%)	13 (10%)	2 (2%)

Table 2: Satisfaction of Thai Users

Factor	Result						
	Very dissatisfied	Dissatisfied	Average	Satisfied	Very satisfied	Mean	SD
Services	4 (0.6%)	17 (2.7%)	149 (23.7%)	402 (64%)	55 (9%)	3.78	0.66
Safety	1 (0.2%)	10 (1.6%)	146 (23.2%)	404 (64%)	66 (11%)	3.84	0.62
Operation	4 (0.6%)	30 (4.8%)	177 (28.2%)	377 (60.1%)	39 (6.2%)	3.67	0.69
Others (Life improvement)	1 (0.2%)	18 (2.9%)	198 (31.6%)	337 (53.7%)	73 (11.6%)	3.74	0.70

Satisfaction of Foreign Users

Non-Thai BTS users were also surveyed. There were 130 respondents comprising 65 male riders (50 %) and 65 female riders (50%). There were 7 (5%) youngest users below the age of 20. There were 68 persons whose ages are between 20 and 30 and it is the largest group (52%). The number of 31-40 year-old users is 40 (31%), and 13 people (10%) are within the age range 41-50. Again the smallest group is the 2 (2%) riders who are older than 50 years.

Overall, 75% of the foreigners (98 riders) using the BTS system are satisfied and 14% (18 users) are very satisfied on the service factors; there is no one who is either very dissatisfied or dissatisfied (Table 3). In addition, 94 foreign users (72%) are satisfied overall on the safety factors as well as 27 passengers (21%) are very satisfied on it. For overall satisfaction on operation factors, 97 BTS users (75%) are satisfied, and 19 persons (15%) are very satisfied. No one is dissatisfied or very dissatisfied. On the "other factors," 85 foreign users (65%) and 30 users (23%) are satisfied and very satisfied

respectively with the item "Being able to lift up your life (Physical and Psychological Health)," and the item mean is 4.12. 70 Foreign BTS Users (54%) are also satisfied as well as 33 riders (26%) are very satisfied with the factor "Having a role to solve traffic problem in the city," and the item mean is 4.03. There are 64 respondents (49%) rating the item "Saving cost of traveling" at the satisfied level and 28 users (22%) are very satisfied; therefore, yielding an item mean of 3.89. 48 Foreign BTS riders (37%) are satisfied with the item "Saving time of traveling." Not only satisfied with this factor, but 80 non-Thai respondents (62%) are also very satisfied. No one is dissatisfied or very dissatisfied with this item; the item means being 4.60.

Foreign users reported that traffic in Bangkok has improved over the years; thereby making the city a more attractive tourist destination.

Table 3: Satisfaction of Foreign Users

Factor	Result						
	Very dissatisfied	Dissatisfied	Average	Satisfied	Very satisfied	Mean	SD
Services	0 (0.0%)	0 (0.0%)	14 (10.8%)	98 (75.4%)	18 (13.8%)	4.03	0.50
Safety	0 (0.0%)	1 (0.8%)	8 (6.2%)	94 (72.3%)	27 (20.8%)	4.13	0.53
Operation	0 (0.0%)	0 (0.0%)	14 (10.8%)	97 (74.6%)	19 (14.6%)	4.04	0.50
Others (Life improvement)	0 (0.0%)	0 (0.0%)	15 (11.5%)	85 (65.4%)	30 (23.1%)	4.12	0.58

Cross-analysis of characteristics of respondents and usage factors

This research also studied the relationship between the BTS users' satisfaction on various factors and their demographic characteristics, (i.e., gender, age, occupation, monthly income), as wee as frequency of use per week, and the main purpose for using BTS services. The result of the Chi-Square Test (Table 4) shows that "frequency of use per week" is related to satisfaction with "quick and convenient steps of using BTS services" with the significance level at 0.026 but most riders in each class are satisfied. Next, "occupation" and "frequency of use per week" are related to "the appropriateness of service times (6:00am - 12:00pm daily)" with the significance level at 0.021 and 0.009 respectively. Students who ride BTS very often are satisfied but those who need to travel at odd hours are less satisfied. "Age" and "frequency of use per week" are related to satisfaction with "the appropriateness of BTS fare" with the significance level at 0.031 and 0.000 respectively. It is found that the riders younger than 31 years old are sensitive to BTS fare if they travel on it lower than four times a week. In addition, "age" and "frequency of use per week" are related to satisfaction with "services and shops in BTS areas" with the significance level at 0.031 and 0.018 respectively.

There is only one variable, frequency of use per week, related to satisfaction with "the sufficient number of security guards" with the significance level at 0.044 and using the BTS services two or three times a week. "The main purpose for using BTS" is related to satisfaction on "the appropriate speed of the BTS skytrain" with the significance level at 0.034, for the persons who study or work and go shopping. Besides, only gender is related to satisfaction with "sufficient routing of the BTS" with the significance level at

0.000. This means that female BTS users are less satisfied than their male counterparts and, as such, want the system to extended to reach other areas. The result of the Chi-Square Test illustrates that "age," "frequency of use per week," and "the main purpose for using BTS" are related to satisfaction with "the passenger managing system in each station" with the significance level at 0.004, 0.018 and 0.043 respectively. It is specific that the 20-30 year-old users who ride the skytrain more than two times a week and to go study, work, or shopping are more satisfied with this factor than others. "Age" and "the main purpose for using BTS" are related to satisfaction with "the punctuality of departure and arrival times" with the significance level at 0.005 and 0.001 respectively. Young people going to study want trains to be more punctual than the others.

Furthermore, the result of the Chi-Square Test demonstrates that "age" and "monthly income" are related to satisfaction with the factor, being able to lift up your life, with the significance level at 0.013 and 0.012 respectively. It means 20-50 year-old riders who earn 5,000-35,000 Bath per month are satisfied with this factor. Those who earn less and young people are less satisfied than others. Next, "gender" and "the main purpose for using BTS" are related to the factor, having a role to solve traffic problem in the city, with the significance level at 0.011 and 0.001 respectively. Results show that 50% of the female users are satisfied and very satisfied with the factor in order to work, study or go shopping. Finally, "age," "usage frequency," and "purpose of use" are related to "saving cost of traveling," with the significance level at 0.002, 0.043 and 0.012 respectively. Most BTS passengers younger than 31 years old and using BTS for going to study, work, home, and shop lower than four times a week rate levels of satisfaction at the average.

Table 4: The Summary of Cross-Analysis of the Characteristics and Factors

BTS-User Factors	Gender	Age	Occupation	Income	Frequency	Purpose
Service Factors						
The convenience from the start point to the BTS station						
Quick and convenient steps of using BTS services					*	
The appropriateness of service time			*		*	
The appropriateness of BTS fare		*			*	
Services and Shops (Convenient Stores) in BTS areas		*			*	
Free BTS Shuttle Bus service						
Safety Factors						
The sufficiency of warning signs						
The safety of stairs and Skybridges connecting BTS stations						
The sufficient number of security guards					*	
The alerting system of skytrain doors while opening and closing						
The reliability in safety systems of the BTS skytrain						
The appropriate speed of the BTS skytrain						*
Operation Factors						
Sufficient routing of the BTS	*					
The efficiency of using BTS tickets to enter and exit stations						
The passenger managing system in each station		*			*	*
The surroundings and cleanliness of BTS stations						
The punctuality of departure and arrival times		*				*

The announcement to prepare yourself for exiting the skytrain					
Other Factors					
Being able to lift up your life		*	*		
Having a role to solve traffic problem in the city	*				*
Saving cost of traveling		*		*	*
Saving time of traveling					

Note : * = Significance Level at 0.05 or less

Results of the non-users' satisfaction

The research also surveyed the attitudes and satisfaction of several secondary stakeholders of the BTS skytrain. Shopkeepers, van and bus drivers, taxi drivers, and personal-car users are included in this category. The main purpose is to understand the feelings of other stakeholders towards the existence of BTS. A non-user questionnaire was designed for this purpose and the results from the survey are presented below.

Shop owners along the major highways can benefit from improvement in traffic through better patronage because better traffic make it more attractive for people to come to their shops. A total of 440 shopkeepers were sampled yielding an overall mean of 4.26. The number of customers seems to have improved. Consequently, their mean satisfaction improved from 3.53 before the system to 4.03 after the system (Table 5).

Table 5: Satisfaction of Non-Users

Factor	Result						
	Very dissatisfied	Dissatisfied	Average	Satisfied	Very satisfied	Mean	SD
Shopkeepers Before	0 (0.0%)	37 (8.4%)	176 (40.0%)	212 (48.2%)	15 (3.4%)	3.53	1.57
After	1 (0.5%)	10 (2.3%)	73 (16.6%)	243 (55.2%)	112 (25.4%)	4.03	0.75
Minivan drivers Before	2 (1.7%)	42 (35.0%)	39 (32.5%)	37 (30.8%)	0 (0.0%)	2.93	0.85
After	0 (0.0%)	1 (0.8%)	39 (32.5%)	53 (44.2%)	27 (22.5%)	3.80	0.76
Bus Drivers Before	2 (1.7%)	1 (0.8%)	26 (21.7%)	65 (54.2%)	26 (21.7%)	3.93	0.79
After	2 (1.7%)	25 (20.8%)	45 (37.5%)	37 (30.8%)	11 (9.2%)	3.25	0.95
Motorcycle Taxi Drivers Before	1 (1.0%)	5 (5.0%)	52 (52.0%)	42 (42.0%)	0 (0.0%)	3.35	0.63
After	0 (0.0%)	1 (1.0%)	34 (34.0%)	43 (43.0%)	22 (22.0%)	3.86	0.77
Motorised Tri-cycle Taxi Drivers Before	2 (2.0%)	8 (8.0%)	43 (43.0%)	38 (38.0%)	9 (9.0%)	3.44	0.84
After	1 (1.0%)	9 (9.0%)	47 (47.0%)	37 (37.0%)	6 (6.0%)	3.38	0.84
Taxi Drivers Traffic Situation After BTS	0 (0.0)	23 (15.3%)	65 (43.3%)	56 (37.3%)	6 (4.0%)	3.30	0.78

Car Users	Before	16 (5.3%)	115 (38.3%)	112 (37.3%)	52 (17.3)	5 (1.7%)	2.72	0.87
	After	0 (0.0%)	5 (1.7%)	52 (17.3%)	156 (52.0%)	87 (29.0%)	4.08	0.72
Police		11 (5.5%)	18 (9.0%)	27 (13.5%)	95 (47.5%)	49 (24.5%)	3.77	1.09

Minivan drivers normally carry passengers over long distances. They are particularly affected by heavy traffic on the major highways. From 120 van drivers sampled, the mean of "overall point of view on BTS" is 3.75. Moreover, their patronage improved after the BTS system was introduced; resulting in improvement in satisfaction with patronage from 2.93 to 3.90 (Table 5). This is because it is now easier for them to stop only at BTS stations to pick up passengers.

A total of 120 bus drivers and conductors were sampled along the roads nearby BTS routes. Overall, the respondents were satisfied with the introduction of the BTS system (mean = 3.54). However, the mean satisfaction with "overall traffic on roads after having BTS" is only 2.48. It does seem that traffic only improved marginally on the bus routes after the BTS system was introduced. Bus drivers and conductors were also dissatisfied with the post-BTS drop in the number of bus passengers (mean reduced from 3.9 to 3.25).

Motorcycle taxi drivers normally take passengers from the major roads into the minor streets. The response from 100-motorcycle taxi drivers show that their income and patronage improved after the BTS was introduced. Consequently, the mean satisfaction improved from 3.35 before to 3.86 after the system came into being (Table 5).

Motor-tricycle taxi drivers on the roads around BTS routes were sampled. The result from the 100 respondents shows that the number of passengers using their services was hardly affected by the introduction of the BTS system. Their satisfaction on this item reduced marginally (from 3.40 to 3.38) after the introduction of the BTS (Table 5).

150 taxi drivers were sampled along the roads nearby BTS. Their mean response on the "overall traffic on roads after having BTS" is 3.30 suggesting that they were moderately satisfied with the traffic situation. However, they reported slight reduction in income and taxi rider ship after the system was introduced (Table 5).

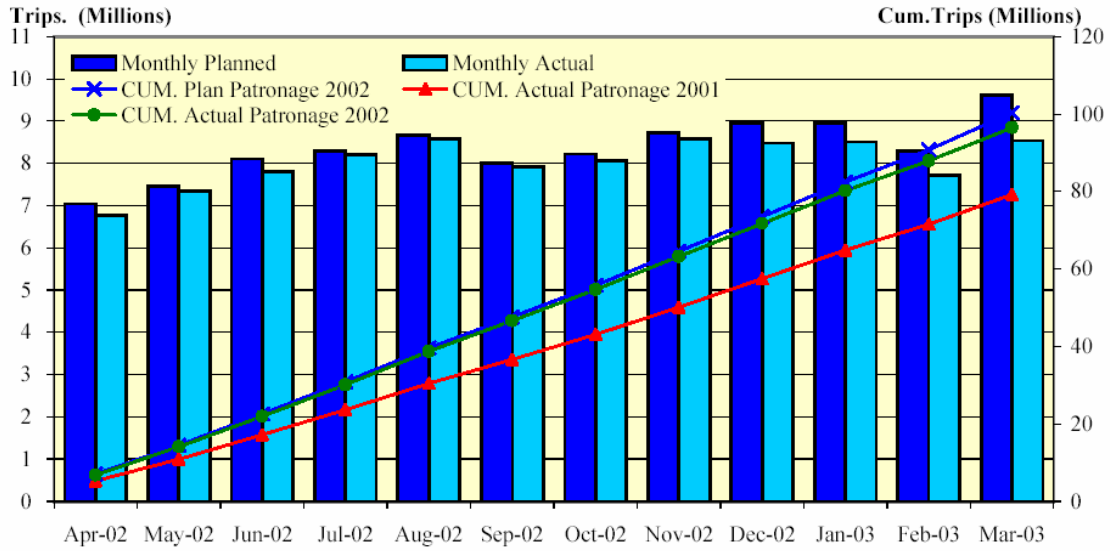
Personal car users were surveyed on various items of which the condition of traffic is particularly relevant to their needs. The 300 respondents were moderately satisfied (mean = 3.60) on the condition of traffic after the BTS system was introduced (Table 5).

Police officers were surveyed on the condition of traffic after BTS system came into being. The result in Table 5 shows that the majority of the 109 respondents was satisfied with the system (mean = 3.77) and believed that it had contributed to the alleviation of traffic problem in the city.

SURVEY OF PROMOTERS OF THE BTS SYSTEM

The primary promoters of the BTS system were also interviewed in form of two senior BTS and two senior TTD officers. It is found that they are all satisfied with the services, safety, and operations of the system. In addition, the four officials are convinced that the system has improved the quality of life in the city and that it saves travel time.

Furthermore, one of the main purposes of the BTS project is making financial profit. Figure 2 shows the numbers of BTS passengers each month during the fiscal years 2001 – 2002. The BTS passenger growth rate shows the success of the BTS in fulfilling this purpose. However, newspaper reports show that the BTS Company is having problem meeting financing obligations. In addition, the number of users dropped after the subway project started operating. The Thai Government is also considering the idea of buying up the system in order to merge it with the recently completed underground system. Although the merger would create better service for the users of the system, investors are likely to lose out as the reported purchase price of B3.0 per share being mooted is well below the B10.0 par value for the shares [The Nation, (2004)].



Source: BTSC (2003)

Fig. 2: The Key Performance Indicator – Monthly Patronage

CONCLUSIONS

The primary objective of this study is to evaluate stakeholder satisfaction with the benefits on a BOT project in Thailand, i.e., BTS project. It is obvious that most of the people studied in this research are satisfied with the following factors: services, safety, and operations. Hence, it is safe to conclude that BTS is beneficial to the people within the Bangkok metropolis. It has contributed to the uplifting of the quality of life (physical and psychological health), reduction in travel time times but did not reduce cost for riders. Moreover, the benefits are being enjoyed by local people as well as foreigners; thereby making Bangkok a more attractive travel destination for tourists.

The promoters of the system, namely the officials of the TTD and BTS are also satisfied with the performance so far. The system seems to be making money, thereby meeting one of the objectives of private participation in infrastructure provision. However, the route is limited in coverage. The users of the system believe that it should be extended to better serve the needs of the people living in or visiting the city.

The performance of this project is a good advertisement for the public-private partnerships in infrastructure delivery. Since many developing countries have difficulties in funding public infrastructure, a well-designed PPP scheme can deliver services to the population with minimum use of public funds. However, the company running the system seems to be having problems meeting funding obligations. The Government is interested in buying up the system at a price that is reported to be lover than fair market price (the Nation, 2004). This kind of issues needs further investigation.

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