

# Perception of Public Van Users in Bangkok

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## ABSTRACT

Van service in Bangkok City has gained immense popularity in a very short time but recently has acquired the reputation of unsafe travel mode due to the alarming number of accidents and harassment incidents in the past two years. This paper aims to explore perception of van users regarding service quality, safety and security of van service of Bangkok City involving questionnaire survey. The sample data showed that people are least satisfied about waiting area condition, inadequate punishment for the drivers and pickpocket and high jacking incidents during their travel by van. This study found that perception regarding service quality, safety and security differs with demographic characteristics. Users blame poor road condition and inadequate laws over driver behavior for the accidents. It also concluded that even though passengers are not satisfied with safety and security condition of van service, they still prefer this mode because of the ticket collection system, travel time and cost of travel.

*Keywords: Van, Bangkok, passenger perception, service, safety, security*

## 1. INTRODUCTION

Passenger van is considered among the most popular public transport services of Thailand nowadays. When public bus service was failing to meet the travel demand of sub-urban residential areas, passenger van was introduced as a more comfortable and convenient service to the passengers. Several features of this service including guaranteed seats, fixed routes, consistent speed, high frequency and flexibility of dropping passengers at their desired location have made it popular among passengers in a short period of time.

Research had showed that van service can serve passenger expectation more appropriately than traditional bus system in Bangkok city (APEIS, 2004) but in the last few years, increased number of accidents and on board harassment events in Bangkok and nearby areas are influencing the passenger perception towards this service. Public transportation have always had the reputation as an unsafe mode for women but the recent rape incident of the fatal bus rape in India, which has become big news internationally, has reminded the threat of violence and harassment towards women on transit systems worldwide. Van service in Thailand is also considered as a threatening mode for women especially at night. Van passengers of Bangkok city seem to have a wide range of perception towards van public transport. When some passengers indicated that speed as the most advantageous feature of this service, some others stated that they wonder why there is so less number of accidents, considering reckless driving attitude of most of the van drivers on the roads (People's forum, 2012). A group of people blamed only drivers for these unexpected incidents while a number

of people think that the situation actually reflects the lack of law enforcement situation in Bangkok (Saiyasombut and Siam, 2011).

A number of studies can be found that focused on the quality and integration of van transport with other services (Laosirihongthong and Kunasol, 2001; Tangphaisankun *et al*, 2010) market structure of the system (Leopairojna and Hanoaka, 2007), but not on the issues raised by the recent safety and security events in Bangkok, over the last few years. A study focusing on the perception of passenger of van service can be very helpful in revealing passenger's journey experience considering levels of service quality, safety and personal security.

The aim of this paper is to explore the public perception concerning service quality, safety and security problems in the operation of van service. Factors of service quality, safety and security, which strongly influence passenger's perception level, are evaluated. How the perception of passengers change with gender, education level, income level and other demographic characteristics, is also addressed in the analysis. The results of this study are expected to help provide an improvement agenda of the concerned authority.

## 2. VAN AS A PUBLIC TRANSPORTATION MODE

Since 1995, van transportation had been widely used in Bangkok city as an option for travelling between residential, recreational, business areas and major transportation hubs and the number passenger, using this service is increasing day by day (Leopairojna and Hanoaka, 2007). As shown in table 1, modal share of van transport services have increased considerably over the past few years.

Table 1. The number of in-use vehicles in Bangkok, 1994–2010.

Type of vehicle	1994	2003	2010	Average annual growth (%)	2010	
					Share of fleet in Bangkok (BMA)	Bangkok fleet as % of Thailand's
Car	716,951	1,162,704	1,203,764	3.77	36.14%	53.59%
Microbus and Passenger van	241,120	149,613	104,703	-5.78	3.14%	50.35%
Van and pickup	245,942	583,045	522,511	5.53	15.69%	20.44%
Urban taxi	22,256	63,228	49,224	5.83	1.48%	98.90%
Motor tricycle taxi (TukTuk)	3,645	7,394	4,876	2.10	0.15%	41.94%
Motor cycle	851,853	857,460	1,299,637	3.06	39.02%	14.46%
Truck	73,145	75,800	61,732	-1.20	1.85%	14.39%
Bus	17,457	26,225	18,831	0.54	0.57%	27.26%
Other	13,220	11,248	65,298	12.09	1.96%	27.30%
Total	2,185,229	2,936,717	3,330,616	3.06	100.00%	22.51%

Sources: World Bank, 2007

Van service is very popular among people traveling with work trip purpose in the morning and return home trip in the evening as the routes of van transit are selected to offer the shortest travel time between origin and final destination. The operator also maintain frequency of the service at off peak hour to serve the passengers traveling forshopping or

other recreational trip purposes. Research shows that passenger van is preferred by middle income people as it offers level of service similar to taxi but in much lower prices (Leopairojna and Hanoaka, 2007). Van service is also popular among women as it assures better safety feelings to them who are traveling alone (Leopairojna and Hanaoka, 2005).

A study in Rio, Brazil (Balassiano and Braga, 1999) identified the main reasons leading users to travel by van. In that research, attributes regarding van service (comfort, travel time, safety, etc.) were evaluated by the mean of questionnaire survey among users. The result showed that most of the van users previously travelled by bus. The main reasons mentioned by users to travel by van were: the speed of the service (24.0%) and the comfort provided (14.2%). The study revealed that van users considered the level of service of van quite good and also better than other public transport system. Safety was the only attribute which had less than average mark in the perception scale of the passengers.

A few studies could be found focusing on the safety characteristics of van transport of different countries (Wegmann and Noltenius, 2008; Mississippi Institutions, 2006). A study, conducted by National Highway Traffic Safety Administration (NHTSA) in USA, examined statistics on fatal crashes involving 15-passenger vans from 1990 to 2002. According to this study, 1,957 crashes that involved 15-passenger vans and discovered that the more passengers the van was carrying, the more likely it was to overturn. In April 2001, NHTSA issued a Research Note and Consumer Advisory on 15-passenger van safety which stated that 15-passenger vans should be operated only by experienced drivers, and that seat belts should be used at all times. In May 2008 a study published by the same organization indicated that fatalities have been on a downward trend since 2001 and In 2006, 18 per cent of 15-passenger vans involved in fatal crashes rolled over where in 2001 there were 91 fatalities in vehicles that rolled over; this constituted 70 per cent of all crashes involving the 15-passenger van.

In Thailand, with the increase of number of passenger, share of accidents involving van transport is also increasing. Two deadly passenger van accident involving 17 deaths in just two months in the year 2010 have resulted a drastic change in the passenger perception towards van service (Saiyasombut and Siam 2011). The year 2011 and 2012 have experienced several death and injuries involving van over a short interval of time. Moreover, the recent event, in which a van driver was charged for the attempted rape on board of two dutch tourists, have strongly shaken the local law enforcement and transport authority as well as the international media. Safety and security aspects of van transport have come into people's concern in a wider range than before. Authority, working with an objective of increasing usage of public transport, need to pay special attention to safety and security aspects along with service quality of the van transport system.

In order to improve, agencies must understand the service from the perspective of the passengers. A passenger perception survey regarding a transport service can be considered a powerful tool to understand the actual condition of the transit. To measure the performance of a transit line, various factors can be taken into consideration including service quality, safety and security aspect of the service.

The decision of a passenger whether to use a public transport or not, depend on the quality of service provided by the transit line. Low quality of service discourages users to use public transport. A number of criteria can be used to measure the performance quality of a service (TRB, 2003 ; Napiah, 2011). In this research, the passenger satisfaction regarding vantransport service is evaluated in terms of waiting time, waiting area condition, fare collection system, passenger comfort, cost of ticket, and travel time.

According to Transportation Research Board, safety and security can be considered as criteria for measuring performance of a transit service (TRB, 2003). Safety can be explained as safety from accidents which take consideration of driver behavior, law enforcement, road

vehicle condition etc. Security refers to security from crime which takes into account surrounding people, driver, staff/police presence; lighting; identified help points, etc. (Joewono and Kubota, 2006).

### 3. METHODOLOGY

The survey was designed with total 25 questions among which 7 questions were about demographic characteristics of the passenger and 18 questions were about their perception of service quality, safety and security. The questions were carefully designed to guide passengers in providing their perception specifically for the van. Survey administrators were also instructed to clearly inform the respondents that the survey is about van.

In order to design the questionnaire of the survey, various researches focusing on passenger perception of public transportation service (Crockett, 2002; Napiyah, 2011) and safety, security issues (U.S. Department of Transportation, 2009; Joewono and Kubota, 2006; Desai *et al*, 2010) were considered. Before conducting the main survey, a pilot survey had been undertaken over 12 samples to check the adequacy of the questions. The questions were then translated into Thai and then another pilot survey had been conducted over 5 samples to remove the ambiguity in question wording. The pilot survey was found to be successful and only a few changes in the questions wording were made as some people mentioned that few technical terms were difficult to understand for common people who have no knowledge in transportation.

A total of 140 passengers were surveyed during the 1<sup>st</sup> week of November 2012. Among the collected sample, only 134 were considered valid for the analysis. Considering the funding and the time constraint in conducting the research, 140 respondents were the numbers of respondents that can be collected. When time allowed, brief informal interviews were also conducted to some respondents to gain more insights about their perception and experience in using the van.

Respondents were randomly selected, consisted of 73 valid samples at off peak hour and 61 valid samples at peak hour. During the survey, it was observed that passengers at peak hour were more difficult to be approached to fill the questionnaire, may be because they were in hurry to reach their destination and high demand of using the van. Peak hour passengers mainly use van transport for their home to work round trips whereas off peak hour passengers are those who use vans for shopping or other recreational activities.

The data was collected during weekdays at Victory Monument Station which is one of the busiest transportation hubs in Bangkok. Van passenger of all routes from city's outskirts to nearby areas can get their ride here. A wide range of outer suburban areas are covered by this service and the travel time varies from 45 minutes to 3.5 hours from the origin. The fare is set based on route distance starting from 30 baths per person. Frequency of the van service is high and each route has a queuing area. During peak hour, headway can be as low as 10 minutes so passengers do not need to wait long. There is also a waiting area for the passengers waiting for low frequency routes.

The Victory Monument is also a BTS station and public buses of almost all routes start from here. As BTS have limited network, many passengers need to transfer to another mode to reach their destinations. Van has more advantages in this aspect. People, who demand nonstop travel from origin to city's outskirts, prefer van over BTS. Van service mainly has to compete with public bus in Thailand. However, van is faster than public bus and the fare is not significantly different. The survey conducted in this area, contains respondents of all routes

and demographic characteristics who expressed their preferences towards van over the other available services.

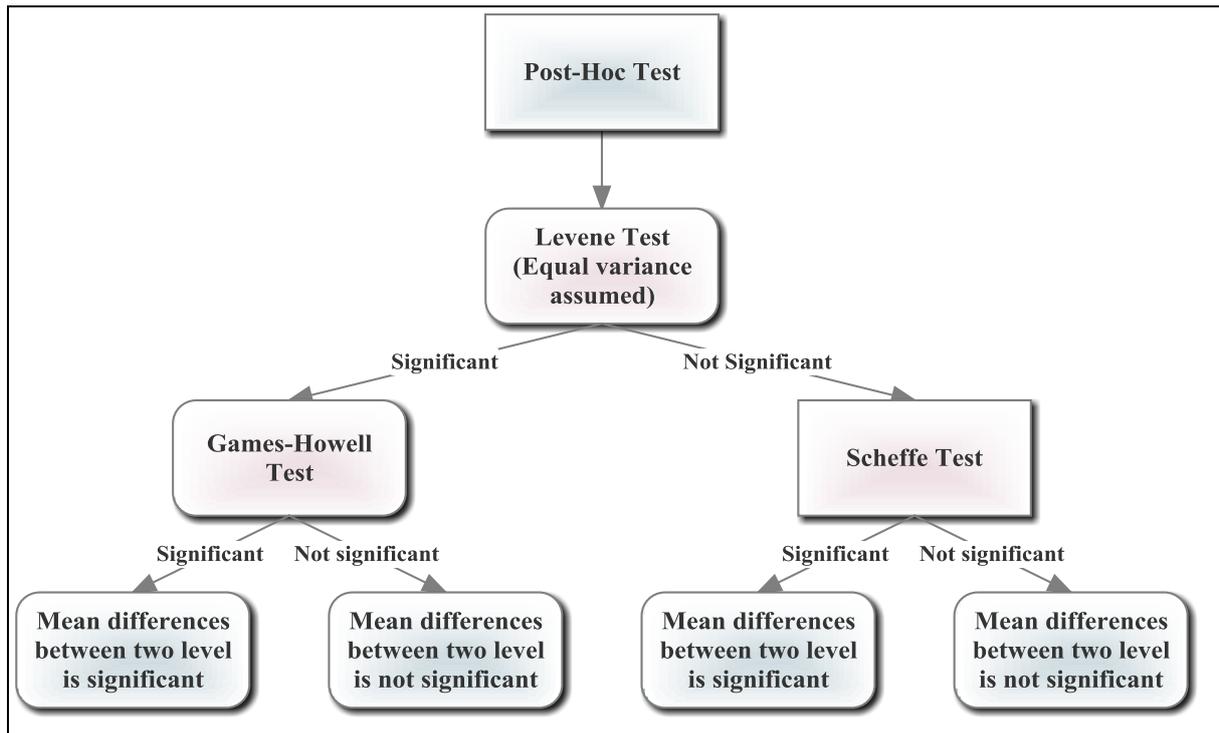
This study surveyed both queued and waiting passengers. During data collection, passengers sitting in van or waiting for this service were identified and approached to fill the survey. The questions were asked regardless the route of the passengers based on their general experience. It took on average 8-10 minutes to answer the questions and during that time, surveyors were waiting near the respondents to provide any assistance if it was necessary.

For the analysis of data, perception of passengers about service quality, safety and security were measured on five scales (1-5) where 1 indicates strongly agree and 5 suggest strong disagreement. It may be noted that each question or attribute was assumed to have equal weightage on the total score. Consistency in the format of a questionnaire is one of the many important factors in avoiding confusing for respondents. For this purpose, negative form was adopted in all perception questions of this survey. Therefore, strongly disagree answer of a satisfaction question indicated that passengers were very satisfied about the attribute of the service. As an example, when passengers ticked strongly disagree at the statement “vehicles are old and poorly maintained” it indicated that passengers think vehicles are well maintained and they are very satisfied with the vehicle condition. As strongly disagree got 5 points on the scale, the more the number in the perception scales the more the satisfaction of the passengers.

In the survey design, age, gender, educational level, occupation, monthly income, car ownership, and frequency of van use data of each passenger were taken for making comparison of perception in each group. The comparisons were carried out as it is understandable perception of passengers may depend on their demographic characteristics.

Inferential statistics was implemented in order to make deductions about population based on the sample data that had been collected and analyzed. Perceptions of respondents regarding service, safety and security were evaluated among each different group. One Way ANOVA and T-Test were used to compare the mean value of the sample groups in order to make inferences about the population means.

When One Way ANOVA shows that there is a significant difference, post hoc tests will be conducted to analyze further the mean difference of each group in the analysis. Figure 1 shows the procedure of conducting the post hoc test. First, Levene Test determined the type of Post Hoc that should be implemented. If Levene test was not significant, Post Hoc Scheffe test was considered appropriate for the post analyze. However, if Levene test was significant, Post Hoc Games Howell test was preferred.



Source: Morgan et al. (2004)

Figure 1. Post-Hoc Test Procedure

## 4. QUANTITATIVE ANALYSIS

### 4.1. Respondent characteristics

Table 2 provides the general characteristics of the respondents using public van in the Bangkok city. The female respondents represented almost 63 % of the total respondents. Moreover, the age of the respondents varied in the range of 16 – 60 years old with the majority between 16 – 24 years old with the percentage of exactly 47% of the total respondents. The study concludes that female students are the majority users of van.

Table 2: General characteristics of respondents for using public van

Characteristics	Statistics
1. Gender	Female (62.7%), male (37.3%)
2. Age	16-24 years old (47%), 25-34 years old (35.1%), 35-60 years old (17.9%)
3. Education	High school or lower (10.4%), Bachelor degree or higher (78.4%), Others (11.2%)
4. Occupation	Worker (9%), Student (45.5%), Businessman (10.4%), Public servant (17.9%), Others (17.2%)
5. Monthly income/allowance (Thai Baht)	Less than 10,000 (38.8%), 10,000-25,000 (46.3%), 25,000-60,000 (14.9%)
6. Household car ownership	Did not own any car (23.1%), at least own one car (76.9%)
7. Frequency of using the public van	Rarely use (15.7%), at 1 time per day (35.1%), at least 2 time per day (49.3%)

In terms of education, almost 79% of the respondents had at least a high school degree. However, students attending high school or lower education and other kinds of education (non-degree education) are 10.4% and 11.2 % of the total sample, respectively. As the majority of the passenger was student with a share of 45.5%, monthly income/allowance of the respondents is not high. Nevertheless, the worker, businessman, public servant and others (housewife, retired people) participated with the percentage of 9%, 10.4%, 17.9% and 17.2%, respectively, reflecting the dominance of middle range (10,000-25,000) monthly income. This result confirmed the study conducted by Leopairojna and Hanoaka, 2007 which showed that passenger van is preferred by middle income people. It can be noted that only a small percentage of van user respondent (14.9%) came from the high income class having income range between 25,000 to 60,000 Thai Baht. Respondents were asked about their household car ownership and it can be noticed that most (77%) of them own at least one personal car in their household. This result supports the idea that students, although have a car in the households, prefer to use van or other public transport for their daily trips. Around 35% of respondents use van once a day. This is because some passengers may use MRT or BTS for the morning work trip when time is quite tight but use van service at the evening when time is more relax and cost less than using MRT or BTS. Victory monument is also a popular hangout places for local people with a lots of accessories and food shops. Passengers, going back home after work, may prefer to rest and eat food before getting into a van for destination. Half of the respondents use the public van at least two times per day indicating the people who use van for their both ways commuting trips

#### **4.2. Perceptions of service, safety and security**

Passengers were asked about six attributes affecting van service quality. The questions regarding service quality were specifically related to the van.

The bar chart in figure 2 shows that 50%, 63% and 43% of the respondents agreed with the fact that average waiting time is high, waiting area condition is not satisfactory and passenger comfort is not up to the mark, respectively. More than half of the respondents were satisfied with the ticket collection system, cost of travel and travel time required at the van. It can be noted that a very few percent of the passengers showed their strong disagreement about the service attributes. Passengers, stating strong dissatisfaction about the service, probably still use van because of its high accessibility during peak hour. However, around 10% people showed strong dissatisfaction about the closely spaced seating arrangements of vans. Unlike buses, space between two seats of van is limited and passengers, especially women, often feel uncomfortable.

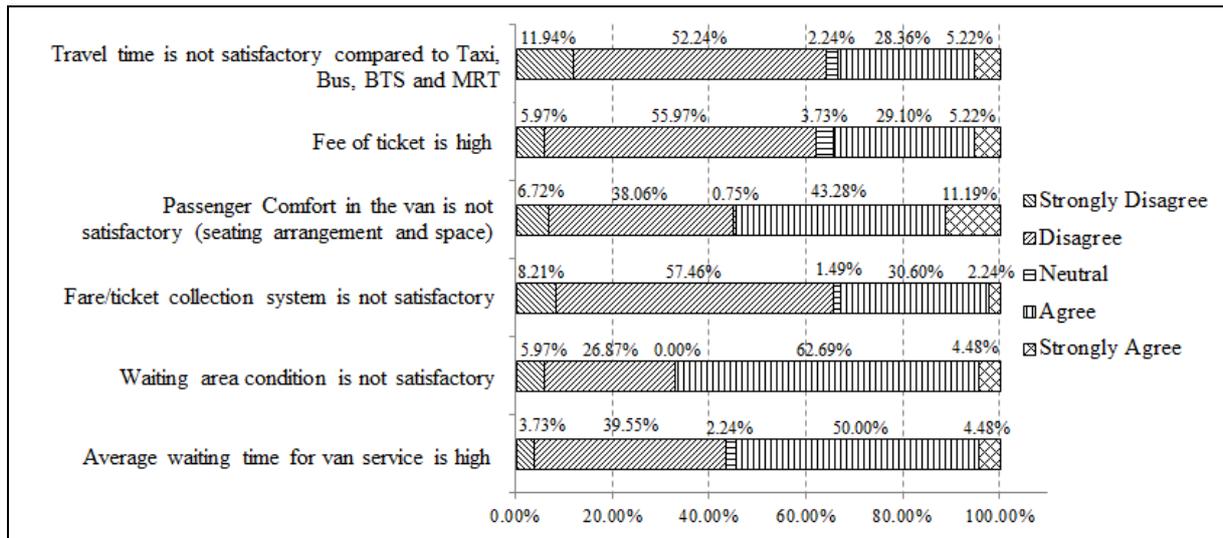


Figure 2. How satisfied do you feel with the service?

Table 3. Descriptive statistics of the attributes of service quality

Variables	Mean	S.D
Average waiting time for van service is high.	2.88	1.10
Waiting area condition is not satisfactory	2.67	1.10
Fare/ticket collection system is not satisfactory	3.39	1.08
Passenger Comfort in the van is not satisfactory (seating arrangement and space)	2.86	1.23
Fee of ticket is high	3.28	1.11
Travel time is not satisfactory compared to Taxi, Bus, BTS and MRT	3.37	1.17

Among the six attributes of the service quality of public van, fare/collection system was evaluated as the most satisfactory facility among the users ( $M=3.39$ ,  $SD=1.08$ ); however, passengers were least satisfied with the condition of the waiting area ( $M=2.67$ ,  $SD=1.10$ ). People seemed to have fairly good perception regarding the fee of ticket and travel time of the service. The study supported the idea that passengers usually compare service attributes of van with that of buses. Waiting area of van is very important as usually the service do not have any fixed schedule. During off peak hours, operators wait until the van is fully occupied and passengers may have to wait in the parked van for a long time which is not comfortable during hot season. Passengers were satisfied about the fare collecting system as they do not have to wait in long queues for tickets like in bus or train stations. Most of the people did not think that the fee of ticket is high which supports the study of Leopairojna and Hanoaka, 2007 which showed that passenger van is preferred by middle income people. The study also concluded that most of the passengers consider van service is more preferable in terms of total travel time, than bus, taxi and even BTS and MRT service. This is because Bangkok BTS and MRT route networks cover only a limited part of the city. Besides, van stations are more easily accessible compared to BTS and MRT stations. As van can stop anywhere responding passenger's demand, sometimes it provides door to door services for some passengers. It can be a strong reason behind the passenger satisfaction regarding van travel time

The analysis concluded that perception of van users regarding service attributes of the service is fairly good. This supports previous studies on van service in Thailand (APEIS, 2004) and Rio, Brazil (Balassianoand Braga, 1999) which pointed out that passengers consider level

of service of van is better than that of buses. During peak hours, passengers may need to wait for the van but when they get in the van, they can be sure that everyone gets a seat. The certainty of getting a seat allows passenger to relax or do other activities more productively than standing. This may influence the favorable perception towards vans than buses.

The study in Rio also concluded that passengers are quite satisfied about the comfort provided by van service which contradicts the finding of this study that considers seating arrangement in the van was uncomfortable. This is probably because passengers in Brazil preferred a guaranteed seat in van at peak period rather than standing in the bus. This study, where most of the respondents are women, revealed an additional perspective that closely spaced seating arrangement was not preferable. Thai culture that considers it is a poor manner for touching woman in public even in a hand shake (Thai people ‘wai’ when they greet) may influence this perception.

The survey contained 12 questions related to safety and security aspect. These questions were organized to reveal passenger perception related to safety and security aspect of van service and overall transportation system. The questions regarding driver quality, vehicle condition and speed of van is related to van safety and security aspect whereas traffic furniture, regulation and road condition related questions are inclined to condition of the transportation system. The response of passengers revealed that passengers are dissatisfied with the transportation facilities and system over van security and service aspects.

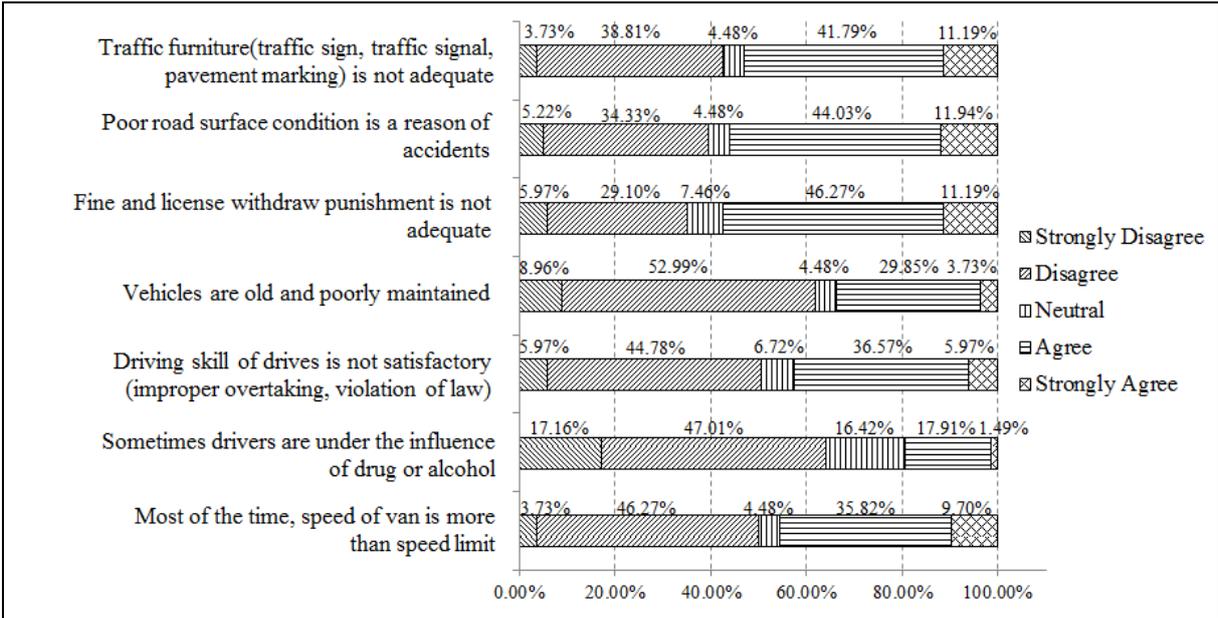


Figure 3. How safe do you feel?

Figure 3 showed responses to the safety question “how safe do you feel?” Around 50% respondents disagreed that speed of the van is beyond speed limit, drivers are under drug influence, drivers are not skilled and vehicles are not properly maintained. Moreover, majority of respondents, although less than half of the total, agreed over the facts that there should be more punishment for violating laws, road condition may be a reason of accident and traffic signal, signs and road markings are not adequate. From the bar chart, it can be seen that around 12% users showed strong dissatisfaction about the current traffic sign, signal, pavement marking, road surface condition and inadequate punishment for the offenders. It indicated that users feel that not only the van authority but also the government transportation sector should be held responsible for the current accident situation. Van service, around the

world, is considered vulnerable to serious accidents and this survey also revealed Thai people's concern about this issue.

Table 4 showed, respondents believed that the influence of drug or alcohol on the drivers is not the main reason of current van safety problem, (M=3.60, SD=1.02). Nevertheless, most of the respondents emphasized the fact that fine and license withdraw punishment should be reinforced strictly for improving the safety condition (M=2.72, SD=1.17). It can be noted that according to laws of Thailand, the first-time offender (who

Table 4. Descriptive statistics of the attributes of the safety

Variables	Mean	S.D
Most of the time, speed of van is more than speed limit	2.99	1.17
Sometimes drivers are under the influence of drug or alcohol.	3.60	1.02
Driving skill of drives is not satisfactory (improper overtaking, violation of law).	3.08	1.14
Vehicles are old and poorly maintained.	3.34	1.11
Fine and license withdraw punishment is not adequate	2.72	1.17
Poor road surface condition is a reason of accidents	2.77	1.19
Traffic furniture (traffic sign, traffic signal, pavement marking) is not adequate	2.82	1.18

drives beyond 90kms/hr.) would be fined at Baht 5,000, the second-time offender would be fined at Baht 10,000 along with the public transport licence revocation. In spite of the enforced laws, the road users stated their disappointments, as they feel that van drivers are not affected by the fine. During National Songkran festival of Thailand the speeding problems get worse and hundreds of deaths and injuries are reported in 5 to 6 day period. The analysis concluded that people blame current road condition and traffic laws more than the behaviors of van operators for the large number of accidents. The majority of the respondents were satisfied with the driving skill of the driver but complained about that road surface condition and inadequate traffic sign, signal and markings.

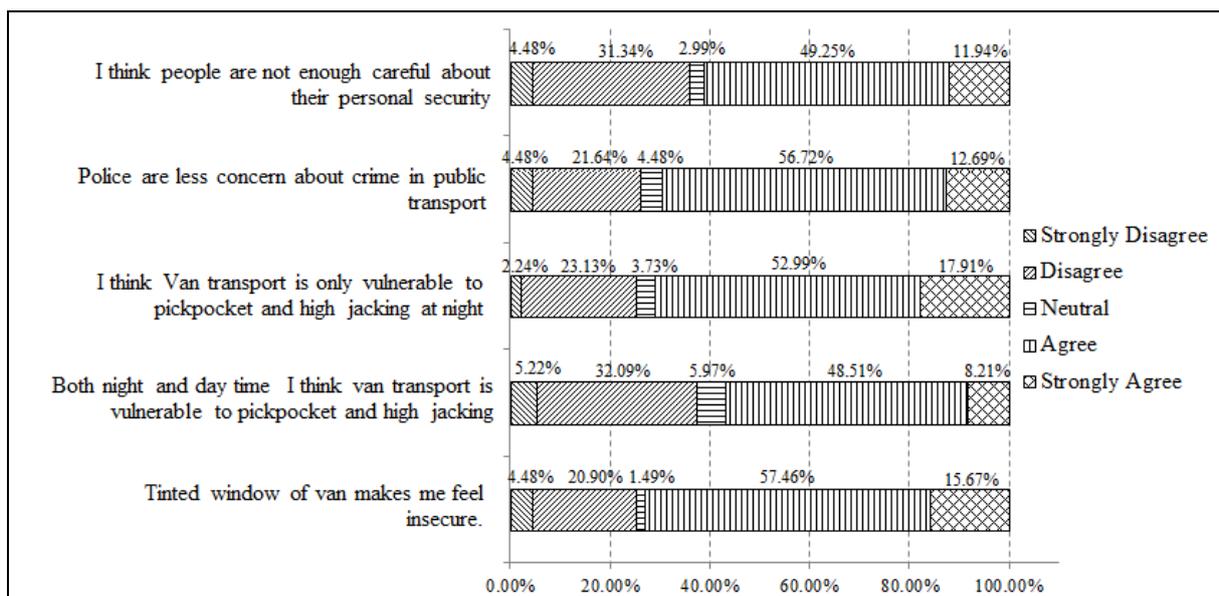


Figure 4. How secure do you feel?

Figure 4 shows the responses to the question; “how secure do you feel?” The questions were set to check if the service is perceived to be vulnerable when it comes to security aspect or passengers blame overall deteriorating security condition of public transport system. The response analysis asserts that passengers consider van travel as a potential threat to their security.

Majority of respondents revealed their dissatisfaction with the security aspect of van stating concern about the tinted windows of vans. Respondents considered that night time operation of van is very vulnerable to pickpocket and hijacking. This may be related with their dissatisfaction of the work of law enforcements to suppress crime in public transportation. It concludes that passengers are strongly influenced by the recent security issue regarding van and they demands immediate improvement of the condition.

Table 5. Descriptive statistic of the attributes of the security

Variables	Mean	S.D
Tinted window of van makes me feel insecure.	2.41	1.12
Both night and day time I think van transport is vulnerable to pickpocket and high jacking	2.78	1.14
I think Van transport is only vulnerable to pickpocket and high jacking at night	2.39	1.10
Police are less concern about crime in public transport	2.49	1.10
I think people are not enough careful about their personal security	2.67	1.17

The mean value of security perception of passengers is lower than that of service quality and safety. Pickpocket and high jacking at night time were found to be provoking the insecure condition of public van (M=2.78, SD=1.14). People also seemed to be concerned about tinted window of van and role of police authority. A significant amount of people stated that passengers should be more careful to avoid any unwanted situation. A study by Leopairojna and Hanaoka, 2005 showed that van service is popular among women as it assures better safety feelings to them who are traveling alone which completely opposed our survey result. In this study, most of the women respondents were found highly dissatisfied about the poor security condition. Recent harrasment incidents pointed tinted glass of vans as a negative aspect of the vehicle and our survey result also conformed to the view, which may indicate the shift of the perception which can be linked to the growth of criminality in the van due to its popularity.

#### 4.3. Differences of perception among the demographic characteristics

In table 6, difference of perception regarding van service, safety and security in each different group was evaluated by means of One Way ANOVA for grouping variable with at least three levels and T-Test analysis for grouping variable existing only two levels.

It can be seen from Table 6, female respondents (M=3.16) were more satisfied about the service compared to male respondents (M=2.93) ( $t = -1.81$ ,  $df = 132$ ,  $p=0.072$ ). However, safety and security perception was not found statistically significant between male and female. Also, no statistically significant difference could be found regarding service and safety among the age group and occupation group.

A statistically significant difference was found among the three level of passengers' age,  $F(2,131) = 3.56$ ,  $p < 0.05$ , the three level of passengers' education,  $F(2,131) = 5.51$ ,  $p < 0.05$  and five levels of their occupation,  $F(4,129) = 2.01$ ,  $p = 0.09$ , on the security. Post Hoc Scheffe Tests indicated that the 16-24 and 25-34 age groups differed significantly in the security perception ( $p < 0.05$ ). Result showed that 16-24 age group (M=2.37) felt more

insecure than 25-34 group (M=2.77) when using the public van. On the other hand, non-degree educated people (M=3.01) believed that they feel more secure using the public van than that of people having education of university level (M=2.43) (p=0.03). Moreover, a statistically significant difference was found among the three level of passengers' education on the service,  $F(2,131) = 4.67$ ,  $p = 0.01$  and safety perspective,  $F(2,131) = 3.49$ ,  $p = 0.03$ . According to the Post Hoc Scheffe, passengers educated up to high school (M=3.62) were more satisfied about the van service than the ones educated in university level, (M=3.02),  $p=0.01$ , and in non-degree level (M=2.97),  $p=0.05$ . Also, passengers educated up to high school (M=3.53) felt more safe in using the public van than those educated in university level, (M = 2.99),  $p = 0.04$ . Furthermore, the difference of perception among different income group, car ownership group and frequency of using van group about service, safety and security were not statistically significant.

Table 6. Mean score of each group differing in gender, age, education, occupation, monthly income, car ownership and frequency of using public van

	Service	Safety	Security
Gender	*	<i>ns</i>	<i>ns</i>
Male	2.93 <sup>a</sup>	3.03	2.53
Female	3.16 <sup>a</sup>	3.05	2.56
Age	<i>ns</i>	<i>ns</i>	**
16-24 years	3.08	3.03	2.37 <sup>b</sup>
25-34 years	3.07	3.15	2.77 <sup>b</sup>
35-60 years	3.08	2.89	2.56 <sup>b</sup>
Education	**	**	**
High school or below	3.62 <sup>b</sup>	3.53 <sup>b</sup>	2.91 <sup>b</sup>
University level	3.02 <sup>b</sup>	2.99 <sup>b</sup>	2.43 <sup>b</sup>
Others (non-degree degree education)	2.97 <sup>b</sup>	3.00 <sup>b</sup>	3.01 <sup>b</sup>
Occupation	<i>ns</i>	<i>ns</i>	*
Worker	3.03	3.25	2.88
Student	3.10	3.03	2.40
Businessman	3.09	2.87	2.31
Public servant	2.99	2.97	2.74
Others	3.11	3.18	2.70
Monthly income (Thai Baht)	<i>ns</i>	<i>ns</i>	<i>ns</i>
Below 10,000	3.21	3.14	2.62
10,000-25,000	2.99	3.03	2.46
25,000-60,000	2.96	2.86	2.63
Car ownership	<i>ns</i>	<i>ns</i>	<i>ns</i>
No car	2.97	3.13	2.56
At least 1 car	3.11	3.02	2.54
Using public van	<i>ns</i>	<i>ns</i>	<i>ns</i>
Rarely use	3.16	3.01	2.38
1 time per day	3.11	3.10	2.66
2 times per day	3.03	3.02	2.52

Note: \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ , *ns* = not significant at  $p < 0.10$

*Italic characters show the performing analysis in T-Test procedure.*

<sup>a</sup>The value *t* and *df* weren't adjusted since variances were equal  $p > 0.10$  (Levene Test)

<sup>b</sup>Scheffe Test was implemented because Levene Test was not significant,  $p > 0.10$

## **5. RECOMMENDATION AND SCOPE OF FURTHER RESEARCH**

The sample size of the study is not large due to time and budget constraints but we believe that the results can provide general perception about van as a mode of transportation in Bangkok as guidance for future research with focus on specific topic. It is also true that more samples will provide better reliability of the result. Further studies, covering perception of both van users and non-users can give us a better understanding of the situation.

Considering the propensity of van to experience roll-over crashes, a few studies had taken some initiatives to build a set of recommendation (Wegmann and Noltenius, 2008; Mississippi Institutions, 2006). A report published by Mississippi Institute of Higher Learning safety and loss control had summarized a set of recommendation mentioning that stricter standard can be chosen with minimum allowable consideration. The recommendation includes requirements of driver skill and experience, standard driver working hour, maximum passenger numbers and use of safety belts. A research note issued by NHTSA in 2001 (Wegmann and Noltenius, 2008) strictly stated that 15-passenger vans should be operated only by experienced drivers and seat belts should be used at all times. A detailed study focusing on the van accident pattern reviewing crash statistics in Thailand can be helpful to build a recommendation set for the operation of van transport in the cities. Besides, in this study, the respondents were chosen only from current van users. Dissatisfaction of auto users over van service attributes can be explored in further studies which will be helpful for the marketing purpose of van services in order to improve acceptability and thereby promote mode share.

## **6. DISCUSSIONS AND CONCLUSIONS**

This paper aims to explore the perception of van users of Bangkok city focusing on service quality, safety and security. Various attributes that affect the quality, safety and security feelings of the passengers were evaluated and compared with the demographic characteristics of the passengers.

When it comes to service quality, people were found to be most satisfied about the fare collection system but least happy about the waiting area condition. Van users compare the service with traditional buses and consider pros and cons of each facility before selecting their rides. Regarding the safety issue, people seemed to have less complains about driver's skill or alcohol consumption and also vehicle condition. Most of the respondents stated that pavement, traffic signs and signals should be improved and laws and regulation should be strictly reinforced in order to reduce the number of accidents. Accident related studies conducted in Thailand also identified pavement condition as one of the vital reason of traffic accidents. A study by Thailand Accident Research Center concluded that Poor pavement condition affects traffic condition. When vehicles cannot maintain its usual traveling speed and orientation, it may result serious rear-end or side sweep collisions (TARC, 2008).

The result also referred that people blame current transport condition and policy rather than the driver behavior for the large number of accidents. Recent accidents incidents where the offenders are left unpunished, probably the main cause behind this perception. When it comes to security perception, people did not seem to be much concerned about hijacking or pick pocketing problems at day time but they think van service is vulnerable to these incidents at night time. However, tinted window glass is a concern for passengers because if a crime happens inside the van, it could not be seen from outside.

When perceptions of passengers were compared with their demographic characteristics, it can be observed that female feel more satisfied with the service rather than male. Female passengers share the major percentage of the respondents and they prefer van over buses showing satisfaction over the service attributes of the service. Education of the passengers also had an effect on service perception. Passengers educated up to high school are the most satisfied with the service compared to others. This result infers that well-educated people probably expects better service quality from the van transport, the same expectation for safety attribute. Recent accidents involving vans may have compelled them to think more about the safety aspect of this service.

Security perception is affected by age and occupation of the passengers. Young people (16-24) feel less secure than the age group 25-34. And also labor workers group of people feel the most secured compared to other occupation people whereas students feel least secure. This result confirms that young people (mostly students) are affected by the current security incidents and feel insecure during their travel. Labor workers group of people may not be aware of the situation and feel unaffected by the anticipated dangers.

In spite of the low perception regarding security and safety condition of van service, people are still using van because they are satisfied with most of the attributes of the service including ticket collection system, reasonable cost and travel time. However, it is still the job of government to ensure safety and security of its citizens in their traveling activities.

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