An Evaluation of Smart Selangor Bus Service Efficacy

Jezan Md Diah[1,2*], Noraishah Akhirruddin[1], Raha Abd Rahman[3]

[1]School of Civil Engineering, College of Engineering, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia

[2]Malaysia Institute of Transport (MiTRANS), Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia

[3]Department of Civil Engineering, Faculty of Civil Engineering and Built Environment, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Johor, Malaysia

* Corresponding author: jezan@uitm.edu.my

Abstract

Smart Selangor Bus (SSB) is a free bus service that is a local government initiative as one of the most effective measures for its citizens. It aims to improve the quality and transport system in the state of Selangor. The SSB serves as one of the public transport vehicles carrying passengers around the city without charge regardless of age, occupation, gender or nationality. The purpose of this research is to determine the factors that can contributed to commuter satisfaction and evaluate an effectiveness on subsidized fare free public transport (FFPT) services provided. Data for the study were gathered through questionnaire among passenger of SSB on socio-demographic characteristics, travel behaviour characteristics and question of willingness to changes the mode of transportation and rider's data depends on type of routes from Klang Municipal Council (MPKlang). The Cronbach's Alpha test shows that the value is α>0.7 which is it showed the questionnaire to reach the high reliability. The results of this study show that an effectiveness of SSB is significantly related commuter satisfaction on bus stop cleanliness and comfort, bus cleanliness, comfort and safety of the bus and also punctuality and other facilities and also related to the increase in the number of riders every month. Those factors that can contribute to the commuter satisfaction further affect the willingness of Klang residents to switch to public transport mode options and continue to enjoy this free fare public transport facility and at the same time increase the effectiveness of SSB service. These findings provide a vision for better management to SSB stakeholders, especially to funders namely the MPKlang and the Selangor State government as well as bus service operators and the general public.

Keywords: Effectiveness, Punctuality, Public Transportation, Reliability, Willingness, Cleanliness

1. Introduction

Through the initiative of the Selangor state government, starting 1st July 2015, dream of people in Selangor enjoying free public transportation have come true where Klang town manage by MPKlang one of the earliest towns to be selected to start the Smart Selangor Bus (SSB) service. It was an initiated by the local government as one of the effective measures for its citizens. It also aims to improve the quality and transport system in the state of Selangor. This initiative was introduced and continues to this day to assist the daily expenditure of the people, and it is also to encourage the use of fare free public transport (FFPT) instead of private vehicles by 2035 (Ibrahim, 2019). An effectiveness of this free public transport service is also in question whether FFPT

are enough to convince passengers to continue using this service rather than private vehicles (De Witte et al., 2008), whether these free public transport fares affect various aspects of the mobility system (Macharis, et al., 2006) and whether consumer satisfaction can affect the level of effectiveness of this free public transport service (Nor Azilah Husin et al., 2019). However, there are also several studies that support this free fare policy as a tool for sustainable development in public transport services (Štraub and Jaroš, 2019) (Kęblowski, 2018a). In the background, some limited empirical studies have been carried out to determine the effectiveness of the SSB initiative and the user satisfaction of the SSB involved by the State Government (Nor Azilah Husin et al., 2019), so this study aims to determine the factors that can contributed to commuter satisfaction and to evaluate an effectiveness on subsidized FFPT services provided.

FFPT began to appear around the world from the 1960s - 1970s (Štraub and Jaroš, 2019). This FFPT scheme is available in 154 locations worldwide. Where, more than half of them are in Europe, most of which can be seen in France and Poland. In addition to Europe, a large number of FFPT cities are also available in the United States, followed by Brazil, China, Australia and the latest in some Southeast Asian countries included Penang, Johore, Kuala Lumpur and Petaling Jaya, Selangor. However, the implementation of FFPT gets a lot of objection thus criticised for making negative impact on the financial stability from many parties especially from the public services company network itself (Kęblowski, 2018a). However, in most of the cities listed above, the free fare service has been partially eliminated. There are five forms of free public transport that are fully fare free public transport, temporary, socially limited, spatially limited and temporarily limited fare free public transport (Kęblowski, 2018b and 2019).

In improving the quality of public transport and mobility, there are certainly complaints coming from passengers, especially female passengers. all the complaints that come with it must be handled properly. Among the most frequent complaints are heavy vehicles and rejection incidents, strong sweat odors, sexual harassment by male passengers, theft risk, slow speed, frequent stops, and frequent change of bus stop location (Pojani, 2011). Therefore, municipalities need to ensure that the public service provided is comfortable, safe, user-friendly and features such as private vehicles such as air conditioning, CCTV, WIFI, comfortable seating, elderly and disabled and driver friendly. With the improvement in the quality of public services and with the continued promotion of the use of public services, passengers are no longer afraid but comfortable and confident in continuing to use the services provided. As a result, the number of passengers will increase and the number of cars on the road will decrease. Therefore, traffic congestion can be overcome, and mobility and transport levels can be improved and sustainable development can be achieved by 2030

Three challenges that we have to meet when conducting research about FFPT. Firstly, examining and resolving the influence of connections, secondly, giving priority to the needy, and thirdly, solving contradictions. To make free public transport fares fully usable, municipalities and appointed public transport companies need to improve the quality of bus services. Bus quality services can be defined using different attributes that include things such as scope of service, duration of service, time of service, and reliability (Munzilah et al., 2012). Bus cleanliness and safety of users while waiting and boarding the bus are also important elements in meeting consumer satisfaction (Nor Azilah Husin et al., 2019). Specifically, customer satisfaction surveys and optional surveys are the best methods to assess the level of service by bus. Lack of bus service or performance can be assessed and improved from surveys.

2.   Methods

To gather a relevant data, a set of questionnaires and data collection from MPKlang are used in order to accomplish the objectives of this study. In order to make the SSB fully functional, a survey questionnaire form will be prepared and distributed to the passengers. The collection of passenger capacity data obtained from the MPKlang, will also help to track the effectiveness of the SSB itself. This is because the large number of passengers at one time could determine the success and effectiveness of using the SSB in Klang. A set of survey

questionnaires was distributed in softcopy via JotForm to Whatapps application between Klang district residents' associations and a group consisting of school students who are also SSB users. This questionnaire has been adapted from previous studies on transport effectiveness such as like Nor Azilah Husin et al. (2019), Hotor (2016), De Witte et al. (2008), Munzilah et al. (2012) and Štraub (2019).

The questionnaire is formulated in 3 sections, namely user demographics where questions are asked about nationality, age, gender, marital status, citizenship status, level of education, average income, travel destination, passenger employment, purpose of journey, declaration of vehicle ownership and trip frequency of the respondents. While the second part is about consumer satisfaction with the level of bus service, bus stop, driver and cleanliness of the bus itself. The third part is about the reasons for the general choice for public transport and the willingness of bus passengers to switch to the public service. Five (5) Likert scales are used to measure respondents' satisfaction in the following order: 1. represents "strongly disagree"; 2. "disagree", 3. "agree"; and 4. "strongly agree".

3.   Results and Discussion

Table 1 shows information about respondents' demographic profiles of the respondents. The majority of the users are Malaysian which represents 100% and only 0% are non-Malaysian. However, when compared to the commuter data, the percentage of foreigners can be seen in Figure 1 based on the data obtained from August to November 2019 for 2 routes namely KLG2 and KLG4. Through the diagram, it is possible to commute among non-citizens seen almost half of the total number of commuters per month. The mean for non-citizen passengers is 36.8% compared to the average for citizen passengers which is 63.2%. The age of the majority of the respondents is 38-47 years old. Female is the major respondent who represent 65.8% than 34.2 % of male. The biggest number of respondents who represent more than 28.2% are those that work as the private sector employee. Single people were a majority user with 53% than 47% married people. While, for educational level, below than SPM holder were the highest majority represent 66.7%. With regards to the income group, 29.9% of the respondents are categorized in the group income which is none. 68.4% of the respondents having an own vehicle. For the purpose of journey, respondent more choose to travel to working place by SSB which is represent 36.8% and 33.4% of the users using SSB for 21 - 30 times a month in a month.

Table 1. Demographic Profile

Characteristics	Frequency	Percentage
Nationality		
Malaysia citizen	117	(100)
Non-Citizen	0	(0)
Age		
17-year-old and below	28	(23.9)
18 - 27-year-old	18	(15.4)
28 – 37-year-old	21	(17.9)
38 – 47-year-old	30	(25.6)
48 – 57-year-old	10	(8.5)
58-year-old and above	10	(8.5)
Gender		
Female	77	(65.8)
Male	40	(34.2)
Occupation		
Government worker	24	(20.5)
Not Working	3	(2.6)
Private sector employee	33	(28.2)
Retirees / Senior Citizens	11	(9.4)

|		
Self-employed	16	(13.7)
Student	30	(25.6)
Marital Status		
Married	55	(47.0)
Single / Widower / Widow	62	(53.0)
Educational Level		
Master/PHD	2	(1.7)
Certificate / Diploma / Degree	37	(31.6)
UPSR / PMR / SPM	78	(66.7)
Income Level		
None	35	(29.9)
RM1,000 and below	32	(27.4)
RM1,100 – RM2,000	12	(10.3)
RM2,100 – RM3,000	17	(14.5)
RM3,000 and above	21	(17.9)
Vehicle availability		
No	37	(31.6)
Yes	80	(68.4)
Journey Purpose		
Hospital	15	(12.8)
Market	9	(7.7)
School	30	(25.6)
Shopping complex	20	(17.1)
Working	43	(36.8)
Frequency of Ride		
1 - 10 times a month	39	(33.3)
11 - 20 times a month	39	(33.3)
21 - 30 times a month	39	(33.4)
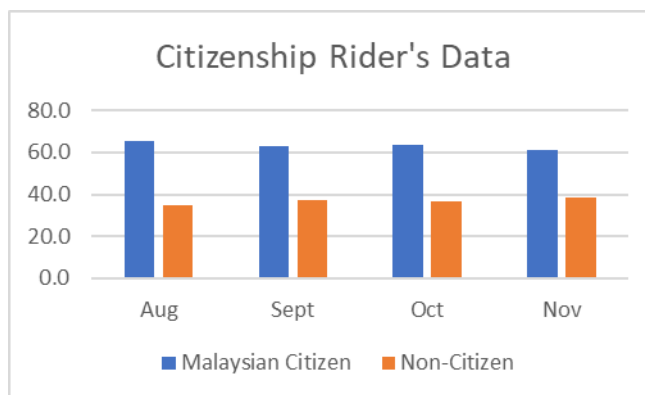
Figure 1. Citizenship rider's data

Table 2 shows the results of Cronbach Alpha which indicate that all variables to achieve acceptable reliability are above 0.7, conforming that all items employed for this study are reliable. Also shown in the table are the

item total statistic that all items are eligible to be defended. The Corrected Items column - Total Correlation tells how much each item correlates with the overall score of the questionnaire. Each Correlation is greater than $r = 0.30$ indicating that all of these items belong to the scale. Therefore, if one of the items is removed, a decrease in alpha value will occur.

Table 2. Reliability Test

No.	Item	No. of Item	Cronbach's Alpha	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1.	*Bus Stop Cleanliness and Comfort*				
	The bus stop is clean and tidy			0.700	0.804
	The seat is comfortable and clean			0.808	0.758
	There is a clean trash can nearby	4	0.850	0.643	0.828
	I take a good care of the bus stop for future use and for the convenience of other users			0.618	0.841
2.	*Bus Cleanliness*				
	Floor of the bus is clean			0.530	0.614
	Bus walls and seats are clean from the effects of vandalism			0.446	0.666
	I will maintain cleanliness by not throwing garbage and not doing vandalism for future use and the comfort of other passengers	4	0.704	0.443	0.667
	Drivers wear neat and appropriate clothing			0.542	0.605
3.	*Bus Comfort and Safety*				
	Customer friendly driver			0.653	0.825
	Bus driving is careful and cautious			0.637	0.849
	The driver is a person who is friendly to the disabled	4	0.850	0.771	0.788
	I really like the service provided by the bus driver			0.759	0.779
4.	*Bus Punctuality and Other Facilities*				
	The bus leaves / arrives on time			0.375	0.712
	Wifi is available and works well			0.571	0.627
	The communication device in the bus works well (example: stop bell)			0.565	0.650
	There are reserved seats for the disabled in the bus	5	0.734	0.539	0.651
	I will never abuse / damage the services provided by the government / Klang Municipal Council for me and the people of Klang			0.403	0.704
5.	*Willingness to Change Transport Mode*	5	0.734		

Rider Data for Bus Routes of KLG1, KLG2 KLG3 and KLG4, From 2015 to 2019
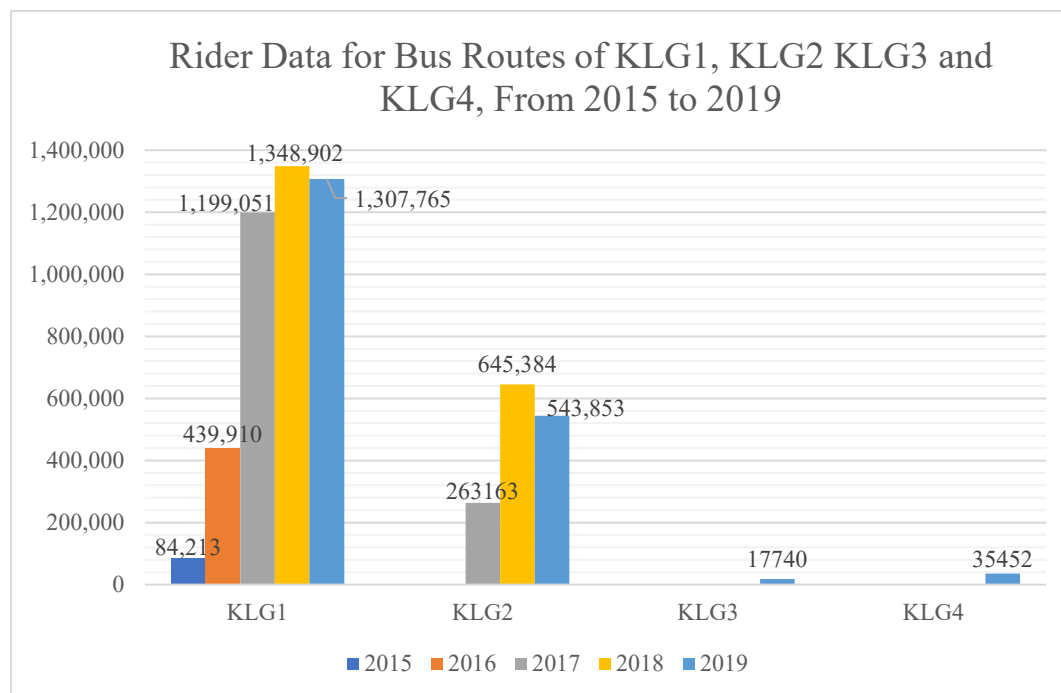
Selangor Smart Bus is the only public service that offers services for free	0.375	0.712
The bus stop is close to my residential area	0.571	0.627
Bus routes through places and areas that are the focus of the public such as schools, markets, hospitals, business centres and shopping malls	0.565	0.650
Selangor Smart Bus is very comfortable, clean and user friendly	0.539	0.651
I am willing to use Selangor Smart bus instead of using a taxi / e-hailing	0.403	0.704
I will use the Smart Selangor bus service more often	0.777	0.762
I will encourage friends / neighbours / the public to use the Smart Selangor bus service	0.685	0.778

Figure 2. Total rider data for KLG1, KLG2 KLG3 and KLG4 bus routes from 2015 to 2019.

The outcome from Figure 2, can be seen an increase of the number of riders on the KLG1 route column from year to year. This shows that, this free fare bus service is very well received by the residents and workers around Klang. An increase in the number of passengers also occurred on the KLG2 route where residents in the north Klang area really enjoy this FFPT service. However, there was a slight drop in rider's data in 2019 on KLG1 and KLG2 routes. This may be due to the increase in bus routes namely KLG3 and KLG4 in that year, where there are similar routes traversed by KLG1 and KLG3 buses. The same goes for KLG2 and KLG4.

4.   Conclusion

Based on the study that have been conducted between the respondents, it can be concluded that the free bus facility provided by the Selangor state government and also the local authority, SSB, is not only enjoyed by citizens but also enjoyed and used by foreigners. It is because only SSB offers free services, and there are no

barriers for foreigners to ride and use the service comfortably. A study also found that most of the respondents' travel patterns were to work and school, i.e. doing important business as opposed to relaxing or shopping at the mall or market. As for the frequency of use of SSB by respondents, it can show that SSB is the main transportation for some residents in Klang compared to other transport. Through a reliability analysis that has been conducted, can be concluded that the factors that can contribute to user satisfaction are bus stop cleanliness and comfort, bus cleanliness, bus comfort and safety as well as punctuality and other facilities. A Studies on respondents' willingness to change modes of transportation were also show that respondents are willing to change the mode of transportation if SSB is the only free public service that has a bus route close to residential areas, shopping malls, markets etc.

Therefore, the outcome shows that the main objective of this research is to determine the factor that can contributed commuter satisfaction on the SSB service has been achieved, and this will be used to determine an efficiency and effectiveness of the free and subsidized SSB service. Bus riders who are comfortable and satisfied with the bus service guarantee an increase in the number of new riders who are willing to change the mode of transportation and while maintaining the number of riders available and even more often use the SSB service. However, the willingness to change the mode of choice and the satisfaction of riders can be challenged by the inefficiency of governance by bus operators and bus drivers. Therefore, MPKlang as the authority that appoint the bus operators should give a warning and advise bus drivers to be more disciplined and maintain the cleanliness of the bus as well as the function of facilities that must be maintained and improved immediately. MPKlang also needs to ensure that the bus stops provided are clean and tidy for the convenience of riders. To attract more new riders and retain existing riders, a new initiative and an innovative solution need to be put in place. Based on the findings of the study, the following recommendations are made:

i. A strict enforcement on existing parking rules. This way it can clean up arbitrary behaviour by private vehicle drivers, pedestrians and other road users. A very bold decision to be upheld by the transport authorities is to set the intersections and lanes of bus preference. With the special bus lane as well, can launch the bus journey to the next stop without obstruction from traffic congestion. Summons should be imposed on the driver of the vehicle other than the bus passing through the special bus lane. Front view cameras can be mounted on the bus and can be used as proof of wrongdoing. The bus stop should also be properly designed to give passengers space to wait, get in and out and get in at the same time, making it easier for the bus to drop off passengers.

ii. Restrictions should be imposed on all types of privately-owned vehicles from entering the city. With SSB, a better access to the city centre and the movement of all residents is also increasing. To increase the level of sustainable cities, local authorities need to establish zero emission zones by imposing tolls and emission charges imposed on vehicles entering the city by restricting car access to the city centre through the promotion of non-motorized transportation methods and by opening new cycle routes and creating more pedestrian zones, the city centre is also safer than ever.

iii. An improvement on an Intelligent Tracker System (ITS) that established by the state government to allows commuters to track the bus on the route provided and in turn can estimate the time the bus arrives at the bus stop. Therefore, the waiting time will be short and not to be wasted. The council can also monitor the journey of each bus on each route and subsequently monitor driver discipline in terms of timeliness.

iv. 'A Day Without Vehicles' in the City' programme that can be held in the city or in small towns in the district of Klang. This promotion is very popular and easy to implement because it is only done in a short period of time in one day. only SSB is allowed to enter or pass through the promotional area. Massive promotions by creating stalls selling and renting to Klang residents to do business need to be held to further encourage visitors to attend and contribute to the economy further increasing the number of riders. Therefore, free parking needs to be provided and SSB is specially provided for the promotional site.

v. To further the study and increase an effectiveness of Smart Selangor bus, it is recommended to the Klang Municipal Council or any researcher to make a study on new routes through village and residential areas

and also for inter-city or district such as from Shah Alam to Klang city for example. Either Klang Municipal Council or the researchers should think of the best way to meet the demands of the public and at the same time, maintenance costs including time and money can be saved.

Acknowledgements

References

De Witte, A., Macharis, C., Mairesse, O. (June 2008), How persuasive is 'free' public transport? A survey among commuters in the Brussels Capital Region, Transport and logistics, Transport Policy, p. 216-224.

Hotor. D. E., July 2016, The use of public transport services by residents in the acra metropolitan area, p. 1-14

Ibrahim, N., (Nov, 2019), 8.8 juta manfaat Bas Smart Selangor hingga Julai, Selangor kini. Retrieved from https://selangorkini.my/2019/11/8-8-juta-manfaat-bas-smart-selangor-hingga-julai/.

Kęblowski, W. (2018a), "Free Public Transport: Scope and Definitions" in J. Dellheim and J. Pince (eds.) Free Public Transit: And Why Don't We Pay to Ride Elevators, Black Rose Books, Montreal, p. 1-7.

Kęblowski, W., (2018b), More than just riding without ticket? Exploring the geography of fare-free public transport, cosmopolis working paper, p. 1-32.

Kęblowski, W., (2019), Why (not) abolish fares? Exploring the global geography of fare-free public transport, Belgium, Transportation, p. 1-29.

Macharis, C., De Witte, A. D., Steenberghen, T., De Walle, S. V., Lannoy, P., Polain, C. (2006), Impact and assessment of "free" public transport measures: lessons from the case study of Brussels, European Transport, p. 26-48

Munzilah Md. Rohani, Devapriya Chitral Wijeyesekera, Ahmad Tarmizi Abd. Karima, (2012), Bus Operation, Quality Service and The Role of Bus Provider and Driver, p. 167 – 178

Nor Azilah Husin, Mohammad Zaidi Jaafar, Wan Zaharuddin Wan Ahmad, Alhadi Harun, (2019), Users' Satisfaction of Smart Selangor Bus Services, Vol. 4, No. 1

Pojani, D. (2011), Mobility, Equality and sustainability today in Tirana, Vol 4, No. 2. Trimestale del loboratrio, p. 99-110

Štraub, D (2019), Riding without ticket: geography of free public transport policy in Poland, p. 17-27

Štraub, D. and Jaroš, V. (2019), Free fare policy as a tool for sustainable development of public transport services, Human Geographies, Journal of Studies and Research in Human Geography, vol 13, p. 45-59