

## *Assessing the Service Quality and Passenger Satisfaction towards SMART Selangor Buses Using SERVQUAL Model*

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### ABSTRACT

Perception of the SMART Selangor bus users needs to be examined to ensure the quality of service is always satisfactory, and to suggest improvement on the quality of this free service. Therefore, this study was conducted to determine the level of customer satisfaction on the quality of the SMART Selangor bus services in Shah Alam city. Customer satisfaction is important because organisations sometimes do not understand what goes on in the customer's mind. Therefore, this study aims to analyse the level of customer satisfaction as well as to analyse the quality of services offered by the SMART Selangor bus. A total of 410 respondents were selected through a simple random sampling method. This study uses five dimensions of SERVQUAL, namely, Reliability, Assurance, Tangibles, Empathy, and Responsiveness. Data were analysed using descriptive, correlation, and multiple regression analysis. The findings show that respondents were satisfied with the overall quality of the SMART Selangor bus services. The results of the regression analysis found that reliability, empathy, and responsiveness have a significant influence on user satisfaction. Based on Pearson correlation results, there is a strong and significant linear positive relationship between user satisfactions with all dimensions of service quality. This study also found that there were significant differences between demographic factors such as gender, employment status, and monthly income in determining the satisfaction of the SMART Selangor bus users. It is suggested that the management of the SMART Selangor bus must improve its quality of services to the passengers.

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## 1 INTRODUCTION

The Selangor government's Green Technology Action Plan 2015-2018 is well promoted by its free bus service known as the SMART Selangor Bus, which is the first bus service provided throughout the state of Selangor. It is mainly aimed to reduce the use of cars on the road, especially during peak hours, and at the same time to reduce 40% of carbon emission

by the year 2030 (Selangor State Treasury, 2018). The nationwide free bus service was launched in 2015 which also helped ease the burden of passengers from the low-income group (B40), elderly, students (schools, colleges, and universities), and industrial and government workers (Selva, 2016). During the state assembly meetings held from October

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31st to November 10th, 2015, free bus service was one of the main topics discussed.

This paper examines the service quality and passenger satisfaction towards SMART Selangor bus services. In any business-to-customer type of environment, satisfying a customer is the main target and objective. This may be because organisations usually do not fully understand what customers need. Therefore, this study focuses on assessing customer satisfaction on the quality of SMART Selangor free bus service that has never been done by other researchers before.

The term service quality is a combination of two different terms, namely service and quality. Service is defined as one of the activities or movements that an individual can give to another person who basically does not take a name for the result. Meanwhile, quality has meant as an essential tool to achieve better service efficiency and performance. The capacity of a service provider to meet the customer in a productive way where he can better run his business is referred to as service quality (Ramya, Kowsalya & Dharanipriya, 2019).

According to Eboli and Mazzulla (2016), service quality can also be defined as customer perceptions and expectations. A comparison of customers before service expectations with actual service experience is seen as customer perceptions of service quality (Naik, Gantasala & Prabhakar, 2010). According to Tazreen (2012), measuring service quality consistently becomes a challenge for service providers. The difference between the evaluation of expectations and perceptions sets the measure of the quality of service certified.

Customer satisfaction is a positive expression of customer feelings towards the experiences after using the service, whether each service has met their expectations (Sultana, Islam & Das, 2016). According to Szuts and Toth (2008), customer satisfaction is defined as customer perception that their needs, desires, expectations, or wants with respect to item and quality of service have been met. Customers want the best service in terms of quality and response, as well as what they want (Zheng and Jiaqing, 2007).

Bus transportation is a part of the services of the transport sector, and its primary purpose is to provide public transportation for everyone, especially for the low and fair income families (Sokchan Ok & Hengsadeeikul, 2018). According to a study conducted by Del Castillo and Benitez (2012), the quality of public transportation is measured by evaluating aspects of punctuality, route coverage, and service frequency. In addition, comfort, accessibility, and safety are some of the most important factors influencing the satisfaction of public transport users (Noor, Nasrudin & Foo, 2014)

According to a study conducted by Shaaban and Khalil (2013), passengers who use their own vehicles are more likely to turn to public services if it can make their journey faster, less stressful, and cheaper than using their own vehicles. Zakiah *et al.* (2016) study on the level of passenger satisfaction of urban-rural bus services in selected states in

Malaysia. The results show that demographic factors and travel characteristics influence the level of satisfaction of passenger towards the improvement of future bus services. A study conducted by Rohani *et al.* (2013) stated that the factors influencing the use of public transport services are public service reliability, safety, comfort, and cleanliness. Improving the performance of these factors can motivate people to choose public transport. Putra and Sitanggang (2016) revealed aspects of the quality of life as measured by the perception of happiness. When public transport service is bad, it can reduce the quality of life. Similarly, with the increase in public transport, it can contribute to the improvement in the quality of life.

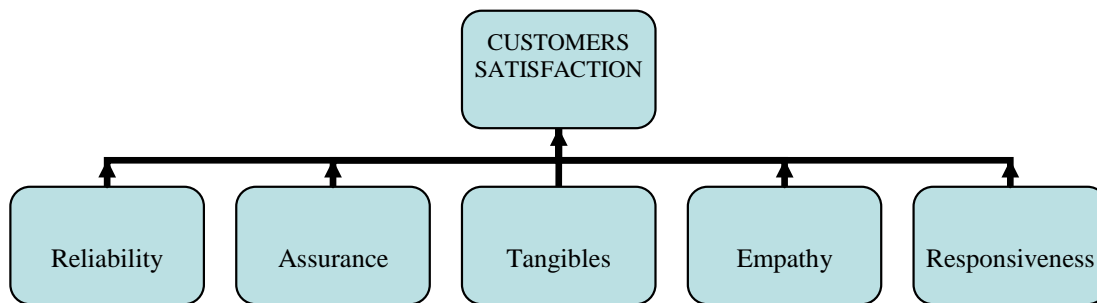
Free public transportation has also been used in the United States, providing free access to the students in 50 American colleges and universities. It also happened in Brussels when the Flemish Community Commission (VGC) invested around 1.2 million Euros to help students use Brussels “free” public transport services (De Witte *et al.*, 2006). Meanwhile, in Malaysia, the Selangor state government has provided free bus service known as the SMART Selangor bus to all citizens in Selangor. In this paper, researchers study passenger satisfaction with the free SMART Selangor bus in Shah Alam city.

## 2 METHODOLOGY

This study was conducted to investigate the passengers' satisfaction on service quality of the SMART Selangor bus in Shah Alam city based on the SERVQUAL dimensions. It examines the relationship between five components of service quality and passenger satisfaction. A quantitative approach is used in this study, so the data can be presented in a descriptive form, and inferences can be made using the data. It also involves correlation and regression to describe the relationship between the independent variables (SERVQUAL dimensions) and dependent variable (passengers' satisfaction).

A model was developed by using multiple linear regression to determine the relationship of all five dimensions of service quality on passengers' satisfaction. The correlation describes the strength of the relationship between two or more variables is related. (Mark *et al.*, 2009). This study was also carried out by Mounica (2014) that used correlation to evaluate the customer satisfaction level in public bus service in Tirupati, India and the result shows that certain attributes such as staff behaviour, bus comfort, travel time and cleanliness have the highest correlation with overall satisfaction.

The dependent variable used in this study is overall passengers' satisfaction with the SMART Selangor bus service while the independent variables are the five dimensions of the SERVQUAL model (Figure 1). The SERVQUAL scale introduced by Parasuraman *et al.* (1988) has to be one of the most appropriate approaches to measure the quality of service given to customers. This scale has also been used by other researchers (e.g., Brown *et al.*, 1993; Sokchan 2018; Cavana and Corbett, 2007; Barabino *et al.*, 2012).



**Figure 1**  
Research framework

Data were gathered via survey questionnaires from a sample of 410 respondents in Shah Alam, specifically to those who have experience in using the SMART Selangor bus service. Respondents were selected through a simple random sampling method. The questionnaire consists of two sections, as follows:

SECTION A: Demographic information (gender, age, race, education, employment status, owned transport, route, the purpose of using the SMART Selangor bus)

SECTION B: This section measures the passengers' satisfaction that relates to five dimensions of SERVQUAL (Reliability, Assurance, Tangibles, Empathy, and Responsiveness)

**3 FINDINGS**

**Demographic information**

This part discusses the distribution of the data according to the specific demographic information. A total of 410 questionnaires were obtained for this study. Based on Table 1, the questionnaire was answered by 62% of females and 38% of male respondents which equals 254 females and 156 males. The age range of 10-20 years old has the highest percentage of 48.8% by representing 200 respondents, while the lowest percentage is 0.5% (50 years old and above) equals two respondents. 46.8% of respondents were from the age range 21-30 years old, which were 192 respondents. 31-40 years age

category has found 2.4%, which were ten respondents and six from 410 respondents (1.5%) were 41-50 age category who has answered the questionnaires. Regarding the respondents' race, the majority was Malay (85.9%), 12.4% was Indian, and 1% was Chinese, and others (0.7%), respectively.

As to the respondents' education level, most of the respondents that answered the questionnaire were degree holders, 132 respondents (32.2%). 172 respondents (42.0%) were Diploma/A-level students, and 67 respondents (16.3%) were SPM students. 9 respondents (2.2%) were UPSR students, 8 respondents (2.0%) were PT3 student, 5 respondents (1.2%) were postgraduate students, and 2 respondents (0.5%) were others. Regarding employment status, the majority of the respondents were students (82%), followed by private staff (9%), unemployed (3.7%), self-employment (2.2%), Government servant (1.5%), housewife (1.2%) and retiree (0.50%), respectively.

Besides, the majority of the respondents (80.7%) have no income because most of them are students. Regarding the purpose that the respondents use SMART Selangor Bus, 52% of the respondents said they use this bus to university/college or school and 68% of them used this bus from route commuter station to Section 7. This is in line with Fadilah M.N. (2014) stated that people use public transport to enable them to go to their workplace, education institution, and elsewhere. Interestingly in the urban area, public bus transportation is part of their main social, economic, physical structure. Moreover, it has been competitive and attracts most to the transit founder.

**Table 1**  
Distribution of demographic information

	Frequency	Percentage
Gender		
Male	156	38.00%
Female	254	62.00%
Own transportation		
Yes	154	37.60%
No	256	62.40%
Race		

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Malay	352	85.90%
Indian	51	12.40%
Chinese	4	1.00%
Others	3	0.70%
Age group		
10 – 20	200	48.80%
21 – 30	192	46.80%
31 – 40	10	2.40%
41 – 50	6	1.50%
50 and above	2	0.50%
Education level		
UPSR	9	2.20%
PT3	8	2.00%
SPM	67	16.30%
STPM/STAM	15	3.70%
Diploma / A level	172	42.00%
Bachelor Degree	132	32.20%
Post Graduate	5	1.20%
Others	2	0.50%
Employment status		
Government servant	6	1.50%
Private sector	37	9.00%
Self-employment	9	2.20%
Retiree	2	0.50%
Student	336	82.00%
Housewife	5	1.20%
Unemployed	15	3.70%
Income (monthly)		
No monthly income	331	80.70%
< RM1000	27	6.60%
RM1000 to RM1999	28	6.80%
RM2000 to RM2999	11	2.70%
RM3000 to RM3999	6	1.50%
RM4000 to RM4999	5	1.20%
>RM5000	2	0.50%
Route		
Commuter Station Shah Alam to Section 7	279	68.00%
City central to Commuter Station	24	5.90%
Commuter Station to Section 18, 17 and 24	45	11.00%
Commuter Station to Section 19 and 20	37	9.00%
Others	25	6.10%
The purpose of using SMART Selangor bus		
Workplace	29	7.90%
School / College / University	213	52.00%
Market	11	2.70%
Station Bus / Commuter / LRT / MRT	75	18.30%
Shopping complex	43	10.50%
Others	39	9.50%

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## Reliability Test

Reliability test was performed to check the reliability of the statements in the five dimensions of SERVQUAL. Table 2 shows the Cronbach's Alpha computed were 0.803, 0.933, 0.905, 0.887 and 0.926, which indicate the reliability of the items for the study.

**Table 2**  
Reliability Statistics

Dimensions	Cronbach's Alpha
Reliability	0.803
Assurance	0.933
Tangibles	0.905
Empathy	0.887
Responsiveness	0.926

## Satisfaction service of SERVQUAL Dimensions

Quality of service is measured by the total mean obtained based on five dimensions which are Reliability, Assurance, Tangibles, Empathy, and Responsive. According to Konting (2000), the interpretation of mean satisfaction is considered low if the mean score is 1.00-2.33, moderate (mean score = 2.34 – 3.67), and high (mean score = 3.68 – 5.00). The mean value of each dimension for this study was listed in Table 3. From Table 3, the mean total quality of service of the SMART Selangor bus is at a high-level satisfaction (mean = 3.77, standard deviation = 0.7036). It follows with a few SERVQUAL dimensions recorded with high score mean value at a high level of satisfaction which is mean satisfaction for assurance is the highest with mean equals 3.89, followed by reliability (mean = 3.74) and Responsive (mean = 3.69), respectively. The mean score for the dimension of Empathy and Tangible is considered as moderate since the value is 3.65 and 3.60, respectively.

**Table 3**  
Quality of service

Variables/Dimensions	Mean	Standard Deviation	Skewness	Interpretation
Total Quality of Service	3.77	.70357	-.853	High
Dimension of Reliability	3.74	.61527	-.717	High
Dimension of Assurance	3.89	.59680	-1.249	High
Dimension of Tangible	3.60	.62878	-.611	Moderate
Dimension of Empathy	3.65	.62221	-.967	Moderate
Dimension of Responsive	3.69	.62682	-1.095	High

## Normality Test

Test for normality is applied to the mean total dimensions of satisfactions. Table 4 indicates that the data is not normally distributed since the  $p$ -value = 0.000 is less than  $\alpha = 0.05$ . However, this result is still acceptable in the context of large sample sizes due to their ability to reduce errors in a study. Pallant (2007) said that the parametric techniques could be continued if the sample size is large. This was agreed by Freund (2012) where the value of sample size greater than 30, the distribution of population can be closely approximated by a normal distribution. According to George and Mallery (2010), if skewness is between -2 and +2, the data can be considered as the normal distribution. Thus, this data is considered normally distributed.

**Table 4**  
Normality Test

	Kolmogorov-Smirnov		
	Statistic	df	Sig.
Mean of total dimensions	0.071	410	.000

## Hypotheses Testing

This section elaborates the result of independent *t*-test and the Analysis of Variance (ANOVA) used in the mean of customer satisfaction between gender, race, educational level, employment status and monthly income.

HO<sub>1</sub> : There is no significant difference between male and female in their satisfaction.

HO<sub>2</sub> : The passengers' mean total dimensions of satisfaction is the same irrespective to their races.

HO<sub>3</sub> : The satisfaction of the passengers is the same irrespective to their educational attainment.

HO<sub>4</sub> : The satisfaction of the passengers is the same irrespective to their employment status.

HO<sub>5</sub> : There is no significant difference of the passengers' satisfaction irrespective to their monthly income.

**Table 5**

Independent sample *t*-test in the mean total dimension of satisfaction between male and female.

	Levene's Test for Equality of Variance		<i>t</i> -test for equality of means	
	F	Sig.	t	Sig. (2-tailed)
Equal variances assumed	0.672	0.010	-2.402	.017
Equal variances not assumed			-2.291	.023

Table 5 indicates that equal variance did not assume since the *p*-value = 0.010 is less than  $\alpha = 0.05$ . This result indicates that there is a significant difference in the mean total dimensions of satisfaction of users and gender since the *p*-value = 0.023 is less than  $\alpha = 0.05$ .

Table 6 shows the result of the analysis of variance. At 5% level of significance, there is no difference for the mean total dimensions of satisfaction between race (*p*-value = 0.0802).

Table 7 shows that at 5% level of significance, there is no difference in the mean total dimensions of satisfaction between education level since the *p*-value = 0.276.

At 5% significance level, the null hypothesis is rejected while the alternative hypothesis is accepted (*p*-value = 0.005) denoting that there is a significant difference in the mean total dimensions of satisfaction between employment status, as is evident from Table 8. The mean values of satisfaction between employment status were slightly different among each other except for retiree (mean = 2.3376) and housewife (mean = 4.1463). The mean value of satisfaction for Government

servants was 3.9302, followed by those from the private sector with mean satisfaction of 3.7685, student (mean = 3.7178), unemployed (mean = 3.5997) and self-employment (mean = 3.5459), respectively.

The result from Table 9 shows that the *p*-value is 0.005. Since this value is less than 0.05, it is concluded that the null hypothesis can be rejected, while the alternative hypothesis is accepted. Hence, there is a significant difference in the mean total dimensions of satisfaction between monthly incomes. Mean value of satisfaction from the Table 9 revealed that the highest value was respondent whose income RM3,000 – RM3,900 (mean = 4.0626), followed by those with income RM1,000 – RM1,999 (mean = 4.0458), for those income less than RM1000 (mean = 3.7086), for those has no income (mean = 3.7023), income RM2,000 – RM2999 (mean = 3.4836), income RM4,000 – RM4,999 (mean = 3.0803) and the lowest mean satisfaction was for those income above RM5,000.

**Table 6**

Analysis of Variance for the mean total dimensions of satisfaction between race

	N	Mean	Standard deviation	F	Sig.
Malay	352	3.7159	0.52636	0.332	.802
Chinese	4	3.4544	0.69612		
Indian	51	3.7330	0.70259		
Others	3	3.6442	0.44217		

**Table 7**

Analysis of Variance for the mean total dimensions of satisfaction between education level

	<b>N</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>F</b>	<b>Sig.</b>
UPSR	9	3.5916	0.91277	1.247	.276
PT3	8	3.5654	0.61361		
SPM	67	3.7841	0.46787		
STPM/STAM	15	3.9239	0.44303		
Diploma/A level	172	3.7223	0.53667		
Bachelor Degree	132	3.6502	0.58282		
Post Graduate	5	4.1078	0.44851		
Others	2	3.6406	0.62495		

**Table 8**

Analysis of Variance for the mean total dimension's satisfaction between employment status

	<b>N</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>F</b>	<b>Sig.</b>
Government servant	6	3.9302	0.49028	3.134	.005
Private sector	37	3.7585	0.62337		
Self-employment	9	3.5459	0.98171		
Retiree	2	2.3376	1.42501		
Student	336	3.7178	0.52224		
Housewife	5	4.1463	0.34569		
Unemployed	15	3.5997	0.35527		

**Table 9**

Analysis of Variance for the mean total dimension satisfaction between monthly income

	<b>N</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>F</b>	<b>Sig.</b>
No income	331	3.7023	0.51961	4.176	.000
Less than RM1000	27	3.7086	0.68963		
RM1000 – RM1999	28	4.0458	0.41275		
RM2000 – RM2999	11	3.4836	0.64804		
RM3000 – RM3999	6	4.0626	0.41455		
RM4000 – RM4999	5	3.0803	1.18982		
Above RM5000	2	3.0759	0.16263		

## Correlation

In this part, the linear relationship between five SERVQUAL dimensions (Responsiveness, Assurance, Tangibility, Empathy, and Reliability) and customer satisfaction was tested by using the coefficient of correlation.

**Table 10**

Correlation

	Satisfaction	Responsiveness	Assurance	Tangible	Empathy	Reliability
Satisfaction	1.000					
Responsiveness	0.635*	1.000				
Assurance	0.620*	0.717*	1.000			
Tangible	0.658*	0.657*	0.757*	1.000		
Empathy	0.773*	0.695*	0.726*	0.801*	1.000	
Reliability	0.802*	0.708*	0.709*	0.755*	0.899*	1.000

\*statistically significant at the 0.01 level.

According to Table 10, there are significant and positive relationships between the five dimensions of service quality and customer satisfaction. The highest value of the coefficient of correlation is between Empathy and Reliability ( $r = 0.899$ ), showing the strongest relationship between them; followed by Tangibility and Empathy ( $r = 0.801$ ), Tangibility and Assurance ( $r = 0.757$ ) and Empathy and Assurance ( $r = 0.726$ ), respectively. The lowest value of coefficient of correlation is between assurance and

customer satisfaction ( $r = 0.620$ ). All the coefficients of the correlation were positive, meaning that the service quality and customer satisfaction are positively related. In other words, the better the service quality, the higher the customer satisfaction. Next, the most important service quality dimension that affects customer satisfaction is reliability ( $r = 0.802$ ), which means that reliability was the main factor affecting service quality followed by empathy ( $r = 0.773$ ). The weakest factor that has a positive relationship is assurance ( $r = 0.620$ ). It indicates that assurance is the least factor influencing customer satisfaction.

### Regression

The regression model is referred to as a function relating customer satisfaction to the SERVQUAL dimensions. Therefore, the model was developed to determine the effect of  $X_1$  (Reliability),  $X_2$  (Assurance),  $X_3$  (Tangibility),  $X_4$  (Empathy), and  $X_5$  (Responsiveness) on customer satisfaction. According to McIlroy and Barnett (2000), an important factor to be considered when developing a customer loyalty program is customer satisfaction.

If the relationship exists, it will improve the accuracy in predicting values for the dependent variable using the information in the independent variables. The value of adjusted  $R^2$  was observed to study the variation of the dependent variable was explained in the model.

**Table 11**  
Regression results for Customer Satisfaction

Model	(%)	Beta	T-test	Significance
Constant		0.189	1.331	0.184
Reliability		0.112	2.143	0.033
Assurance		0.011	0.186	0.853
Tangibility		0.031	0.525	0.600
Empathy		0.249	2.990	0.003
Responsiveness		0.569	7.377	0.000
Adjusted R squared	0.659			
F value	158.975			
Significance	0.000			

*Dependent variable: Customer satisfaction*

As seen from Table 11, the value of  $R^2$  based on regression analysis is 0.659 which explains that 65.9% of the total variation in customer satisfaction was explained by the service quality dimensions such as Reliability, Assurance, Tangibility, Empathy, and Responsiveness.

Based on the regression analysis for all variables on customers, three out of five hypotheses are supported. The findings show that the Responsiveness dimension is the most significant in the regression analysis, which was given the largest  $t$  value that is 7.377 with the value of significant 0.000 ( $P < 0.05$ ). This result indicates that the Responsiveness dimension is the most contributive factor to determine customer satisfaction. As hypothesised, Reliability ( $\beta_1 = 0.112, P < 0.001$ ) and Empathy ( $\beta_4 = 0.249, P < 0.001$ ) has a statistically significant and positive relationship with customer satisfaction. This result is in line with the finding of Sultana (2016), which stated that customer satisfaction and Service, Availability, Time and Environment always have a significant relationship. However, in this study Assurance ( $p$ -value = 0.853) and Tangibility ( $p$ -value = 0.600) dimensions have no significant positive relationship on customer satisfaction, respectively. This result is consistent with the value of the coefficient of correlation between customer satisfaction and assurance ( $r = 0.620$ ), which gives the least value compared to others. This implies that factor assurance is not a key factor in determining customer satisfaction. Based on a large number of  $F$  value (158.975), it indicates that the combination of all service quality seems to have a statistically significant and positive influence on customer satisfaction.

## 4 CONCLUSIONS

We found that most of the SMART Selangor bus users are students. Students use this service to travel to their campus. The most common bus routes are from the commuter station to Section 7, which is the location of two higher learning institutions. The level of users' satisfaction varied by gender, employment status, and monthly income. The findings showed that the dimension of Reliability, Empathy and Responsiveness was significant in influencing user satisfaction. The overall results show that passengers are satisfied with this free bus service. Users have suggested that the management of the SMART Selangor bus should provide an itinerary screen to show the schedule of the estimated time of buses' arrival and departure. Moreover, users also suggest the waiting time should be shortened to maximise passengers' satisfaction. Thus, the management of the SMART Selangor bus must improve the quality of its services to enhance customer satisfaction.



## 5 LIMITATION OF THE STUDY

Data were collected while the passengers were waiting for the bus service; as a result, they have very limited time to complete the questionnaire. Data were collected during peak hours within a month resulting in the shortage of occupants of cover per trip. Future studies should incorporate a longitudinal study that will provide more accurate evidence. The generalisation of the results might be limited because the study was conducted only in the Shah Alam area. Therefore, a study should also be conducted in other districts in Selangor.

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